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OF NATIONS.

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UNITED WEST AFRICA (OR AFRICA) AT THE BAR OF THE FAMILY OF NATIONS.

FOREWORD

— by —

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F.R.C.L., John Stuart Mill Scholar (U.C.L.) of the Inner Temple,
Barrister-at-Law, Ex-President of the W.A.S.U., and Editor of
Wasu from 1926—1927.

BY the time Alexander the Great was sweeping the civilized world with conquest after conquest from Chaerona to Gaza, from Babylon to Cabul; by the time this first of the Aryan conquerors was learning the rudiments of war and government at the feet of philosophic Aristotle; and by the time Athens was laying down the foundations of modern European civilisation, the earliest and greatest Ethiopian culture had already flourished and dominated the civilized world for over four centuries and a half. Imperial Ethiopia had conquered Egypt and founded the XXVth Dynasty, and for a century and a half the central seat of civilisation in the known world was held by the ancestors of the modern Negro, maintaining and defending it against the Assyrian and Persian Empires of the East. Thus, at the time when Ethiopia was leading the civilised world in culture and conquest, East was East, but West was not, and the first European (Graecian) Olympiad was as yet to be held. Rome was nowhere to be seen on the map, and sixteen centuries were to pass before Charlemagne would rule in Europe and Egbert become first King of England. Even then, history was to drag on for another seven hundred weary years, before Roman Catholic Europe could see fit to end the Great Schism, soon to be followed by the disturbing news of the discovery of America and by the fateful rebirth of the youngest of World Civilisations.

In taking up the gauntlet of "United West Africa at the Bar of the Family of Nations," Mr. Ladipo Solanke, who has kindly asked me to write a foreword to this book, fully entrenches himself in the incontrovertible facts of history, for there is much in the story of the Negro, or of the Ethiopian generally, to strengthen Mr. Solanke's faith and hope in the ultimate success of the stupendous task he sets before himself and all patriotic sons of West Africa.

As Mr. Solanke makes clear in his introductory words, the primary aim of the lectures embodied in this book is to bring the modern Negro in intimate touch with the wider world and at the same time to stimulate the thinking class of Europeans and Asiatics to realise, and own to, the sane humanity of the Negro. Adequately to perform this task one should have the historical sense of a Wells, the urbanity of a Burleigh and the intellectual comprehensiveness of a Macaulay. Clearly, a stupendous task. But in an amazing way Mr. Solanke performs the task with no mean success aided, no doubt, by that intangible characteristic of the West African which so often enables him to radiate his infectious enthusiasm and natural humour to all men of sense and sympathy. It should not be forgotten that in face of enormous odds this characteristic of the Negro is increasingly bringing the West African into the immediate field of modern European consciousness.

To those of us who have heard Mr. Solanke deliver portions of the lectures to the West African Students' Union or the Union of Students of African Descent, and, who further have had the opportunity of working hand in hand with him, there can be no doubt that the zeal, the untiring energy, and, above all, the faith that sustains him in these researches into the Negro's past and present history, will ultimately obtain their deserved reward in the gradual fruition of our supreme object, namely, the recognition of the full rights and liberties of the Negro and Negroland. Mr. Solanke desires the restoration, the regeneration, and the future rise of Africa, and by this he is appealing to the whole world to recognise three outstanding facts concerning the West African:—

In the first place, by giving a comprehensive survey of the past history of the Negro, going right back to the dawn of civilisation, Mr. Solanke refutes one of the silly shibboleths frequently advanced to relegate the Negro to an inferior place in the economy of the world. Here in this little book, the author marshals a sustained account of historical data to show that the contention that the Negro has no creative capacity and that the West African's contribution to civilisation is negligible, cannot be sustained in substance and in fact.

Secondly, in dwelling upon the modern history of the Negro and in showing the relation of chattel slavery and the European invasion and partition of Africa to the West African's position in the world to-day, Mr. Solanke is quite legitimately tracing effects to their rightful causes and thereby proving how far, if at all, the Negro himself may be held responsible for his present cultural and economic impoverishment. He points out a way in which the West African peoples may rid themselves of that insidious exploitation of their human and material capacities which, during the last half century, has quite nearly sapped their virility and desecrated their mineral and agricultural resources.

Thirdly, by emphasising his well-known doctrine of "Self-help" among West African peoples, Mr. Solanke leads the way to a clear constructive policy which will act as a beacon and a guide for the rising Negro, enabling him to restore and regenerate that noble race of Ethiopians who were among the very first to bring light and plenty into our human darkness.

and need, setting the lamp of progress in front of the world. By "SELF-HELP" Mr. Solanke explains that he does not mean non-co-operation, and whether the cry be "Africa for the Africans" or "Africa and Humanity" one cannot help but maintain that we in West Africa will only be able to contribute towards progress, the conquest of Man over Nature, and the happiness and enduring welfare of all humanity, when all that conduces to the self-respect of a people and fosters and nourishes the legitimate aspirations and the racial and national consciousness of an energetic and progressive race, have been rendered possible of attainments in the world of economics, science, education and good government. If there be an African who desires less than this or is ideally satisfied with less than the reality, these lectures are intended to show him that he is not doing his duty by Negroland. If there be a non-African who refuses to recognise this legitimate aspiration of the Negro, these lectures are intended to show him that he is an enemy of humanity.

Briefly, the modern Negro demands that the world should note these facts (or "platitudes" as some may choose to regard them) :—

1. That the past history of the world shows what the Negro *has been* ; he has already contributed to the progress of the world ; he has initiative ; is creative and progressive. The Negro has moved with the movement of world history.
2. That the contemporary history of the world shows that the Negro *is* : he is alive. Despite injustices, persecutions, and prejudices, the Negro exists ; he is enduring ; and his presence is intensely felt by an uncomfortable world ; and
3. That the present aspirations of the Negro unmistakably shows, that he fully intends that he *shall be*. He has the will to live. And he shall live. He will not exterminate himself. He will endure. The old adage is as true of the Negro as of any other race. :—

"Where there is a *will* there is a way."

The way to success is the way of those that help themselves, and to this end the Negro world is indebted to Mr. Ladipo Solanke for pointing out how he conceives progress to be attainable by West Africa.

To conclude, it seems to me necessary to draw attention to what Mr. Solanke has to say on the relation of the educated West African to the Natural Rulers of West Africa and through them to the general body of our so-called "uneducated" brethren. If anything, Mr. Solanke's treatment of the subject reveals the true mentality of the educated African as striving in all earnestness to co-operate with and work in the service of the Natural Rulers for the greater and higher end of a "United West Africa." Viewing the West African problem as a whole, one cannot help expressing the conviction that, if West Africa is to sustain an intensive national consciousness in the larger Imperial programme, no effective progress can be achieved except in and through the aboriginal Rulers, through whom alone concerted action against all obstacles obstructing Negro progress in West Africa can be carried on with all the unquestionable force of constitutionalism and legality.

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For the rest, however much I may differ from Mr. Solanke in some of the views expressed in the following pages, his vision of the general Negro problem so appeals to my sympathy that I am pleased to have had a opportunity of writing this short note on his admirable work.

J. B. DANQUAH.

Lausanne, Switzerland,
26th August, 1927.

DEDICATION.

*I dedicate this booklet to all the Natural
Rulers and Youths of West Africa.*

I am,

Yours for Africa,

LADIPO SOLANKE.

*University College,
London.*

United West Africa (or Africa) at the Bar of the Family of Nations.

INTRODUCTION.

IT is my earnest desire to make an attempt in this lecture at giving a brief historical sketch of West Africa with reference to its aboriginal governments, education, trade and industry and religion in the past and present, with a view to furnishing some suggestive and useful data which may properly constitute an introduction to the right solution of the numerous and complicated problems of West Africa.

The history of West Africa began, like all others, several thousands of years B.C., but materials to give us a detailed account seem at one time to have been almost non-existent, until through recent discoveries and research work these have been rapidly forthcoming. (1)

West Africa's history and traditions are so intimately connected with those of her adjoining sister countries like the Ancient Egypt, Abyssinia, Carthage, Phoenicia, Arabia, Morocco, Sudan and, in short, all the North African countries, that much allusion has to be constantly made to these countries in order to enable one to present the fairest possible treatment of the subject matter. In fact, Biblical history alone shows that these countries were originally the land of the Ethiopians or black race. (2)

DIVISION OF THE SUBJECT MATTER.

For our purpose here, I shall divide the subject matter as follows :—

Chapter I.—West Africa in Ancient Times.

Chapter II.—West Africa in Midæval Times.

Chapter III.—West Africa in Modern Times.

Chapter IV.—West Africa's three "R's," namely Restoration, Regeneration and Rise; alias West Africa in Future.

(1) Excavations at Ile-Ife by the German Prof. Frobenius in 1912, and his work "The Voice of Africa," vols. I. and II. Ife relics of ancient Yoruba civilisation at British Museum and at Berlin.

(2) "The Peoples of Southern Nigeria," by Amoury Talbot; "Antiquities from the Benin and West Africa," by Read and Dalton; numerous other works by both Africans and Europeans.

(3) Rev. J. M. Webb: "The Black Man, the Father of Civilisation."

CHAPTER I.

WEST AFRICA IN ANCIENT TIMES.

1. Government.

There is yet very little to say about West Africa during this period by way of written evidence, just as all other nations past and present also have very little to say about themselves at this same period. But it is now a familiar knowledge that the ancient Egyptian civilisation spread throughout all the then known world. The ancient Egyptians, Phoenicians, the Abyssinians and the Carthaginians are known to have had close contact with West Africa through trade several centuries before Christ, and whatever may be the detailed results of this contact, the fact is that in addition to the testimony of the few written records we have at present, internal evidences as revealed to us by the various systems of purely African governments, education, trade, industry and religion of the people of West Africa, in these modern times, go to prove that the history, traditions and customs of those ancients were practically the same as those of West Africa from the very earliest times.

There was one form of government common throughout those countries, namely, monarchy limited in authority by law, custom and a powerful priesthood, a system which some prefer to describe as a theocratic monarchy *i.e.*, a system in which the king exercised the executive, legislative, judicial and spiritual functions. This system of government, which was fundamentally Egyptian in origin might have been introduced into West Africa during the reign of one of the early Egyptian kings called Psammetichus, who reigned B.C. 671 to 617, during which, we are informed a great military caste of Egypt emigrated into Ethiopia⁽¹⁾. It was in the reign of his son, Pharaoh Necho, B.C. 617 to 601, we learn about the incident recorded in those famous passages from Herodotus⁽²⁾ concerning the circumnavigation of Africa by the Phoenicians in his service during which or a little earlier, it is believed, the Yoruba and the Hansa people and most of the present West African tribes, like the Ashantees and Fantees in Gold Coast, the Dahomeans, the Gambians, the Sudanese, and others seem to have been planted all about the basin of the River Niger and other parts of the West African Coast. We also learn about the effort of Hanno, the Carthaginian, in cir. B.C. 1000, to colonise the West Coast of Africa when he sailed from Carthage in a fleet which consisted of 60 quinquiremes with 30,000 persons and succeeded in founding the colonies of Thymaterian, Coriconticos, Agra (probably Gold Coast), Melitta, and a few others⁽³⁾. It must further be noted here that both the Greek civilisation and the Hebrew Theocracy were already in existence at this same period, for it was at this time that Pharaoh Necho fought and defeated Josiah, King of Judah⁽³⁾.

(1) Sanderson : " Outlines of the World's History," 5th Edition, chap. II., pp. 31 ; also the " Encyclopaedia Britannica, 11th Edition, Vol. I., pp. 86-96., and 32.

(2) Herodotus : Book IV., chap. 42.

(3) Sanderson : " Outlines of World's History," chap. II., p. 32.

All these historical coincidences seem to go to prove the sources where the present West African native governments originally derived their systems.

There is no evidence to show that at this period the aboriginal inhabitants of West Africa at this period were subject to any higher Power. They were free and independent.

2.—Education.

Education consisted at this time chiefly in learning the arts of masonry, weaving, sculpture, painting, embalming, and works in metals, leather and wood. Also in learning about agriculture, architecture and textile industry. In short, there was no doubt that Egyptian culture and education spread southwards to Abyssinia and westward to the Sudan and Nigeria, and other parts of West Africa, as it had already spread eastwards to Arabia, Palestine, and all along the countries bordering on either side of the Mediterranean Sea (1). The fact that the Negroes who to-day inhabit the whole or the greatest part of Africa, were once, according to history, the rulers of Egypt during the 12th or 13th dynasty, and the fact that they also played a very prominent part in the construction of those world-famed Pyramids, seem to be a conclusive evidence that West African indigenous culture and education had from time immemorial much of Egyptian element, which might have been later modified by the Greek and Roman civilisations.

3.—Trade and Industry.

This has been already touched upon above and all the chief industries at this period were those enumerated in the said paragraph. The Phoenicians in the service of Necho, as pointed out above, carried on trade with almost every part of West Africa during which the said colonies were founded all along that coast. The chief articles of trade were gold, ivory, grains and pepper. We also learn that during the 12th dynasty in Egypt, trade was being carried on in a large scale between Egypt and the Negroes or Ethiopians in the south (2).

It is not quite clear how labour was supplied at this period, but it would seem from what we collect from Exodus, chapters I. to XII. as regards the relationship of the ancient Egyptians and the children of Israel, that labour seems to have been usually supplied by the domestics or by the persons captured as prisoners of war, otherwise by the working class of the people.

We learn from Herodotus that about 800 B.C. or at least during the period that the Phoenicians used to carry on trade with the people of West Africa, the method of trading between them and the aborigines may be described as a silent trade under the system of barter. The Phoenicians first deposited their goods on the shores and withdrew into their ships, then the West African traders deposited on the opposite of those goods

(1) Sanderson : " Outlines of the History of the World," pp. 30.

(2) Sanderson : " Outlines of the History of the World," pp. 30 and 31 ; cf. with the " Encyclopaedia Britannica," 11th Edition, Vol. I, pp. 82-96.

quantities of gold or ivory, grains, or pepper, as the case may be, for exchange, and they, too, retired somewhere without uttering a word. If the Phoenicians were satisfied they took away the gold and left the goods brought by them and the West Africans took these away. (1)

I must call your attention here to two important points, namely, the dominant feature in the method of trading at this time, *i.e.*, satisfaction on either side. There was no room at all for any party taking the lion share in the benefit of the trade. The other point is that this sort of trade went on for years and perhaps for centuries, and there is yet no evidence to show definitely that human beings formed part of the commodities of commerce.

4.—Religion.

At the earliest historical period, the world itself did not seem to have possessed any revealed religion of any kind and it would then seem that there was no religion of a higher sort than that of the ancient Egypt, *i.e.*, the worship of God through various inanimate objects together with the system of ancestors worship.

Later, the first revealed religion, the Jewish religion, which started with Moses in Egypt, seems at first to have exerted very little influence over the world at large before Christian religion came which gained within a short time a speedy influence over a large part of the then known world. Christian religion had its strongest foothold in the whole of Northern Africa during the first five centuries of the Christian Era, for during this period there were not less than 300 African bishops managing the North African Church. We are all familiar with the names and history of those mighty Christian fathers of the early Church, most of whom were pure Africans; namely, Tertullian, Origen, Cyprian, St. Athanasius and St. Augustine. There is therefore every reason to believe that Christianity was as it were, part of the Common Law of North Africa at this period. This includes the Negro or Aethiopian Kingdom of Abyssinia, south of Egypt where Christianity was introduced by St. Athanasius in A.D. 330 (2) and also parts of the Sudan, and it was apparently at this period that Christian influence and principles penetrated right through to the heart of Nigeria and crept in into the religious and institutions of the Yoruba people in Nigeria, as internal evidences of their religion actually show. (2)

In Europe, at this period, Christianity had also gained ground in Greece and Rome, but in such places as Great Britain, France, Germany, and such like, being remote portions of the Roman Empire, Christianity had not had much influence there. It would then seem that at this period the really civilised portion of the globe comprised North Africa, Abyssinia, parts of the Sudan as far as what is known to-day as West Africa, and in so far as Europe is concerned, strictly speaking it embraced only Greece and the Roman Empire.

(1) Dr. Claridge: "History of the Gold Coast and Ashanti," Vol. I., chap. I.

(2) Vide "The Myths of Ife," by J. Wyndham; "History of the Yorubas," by Johnson; "History of Abeokuta," by Ajisafe; "Abeokuta," Vol. I., by Burton; (C. M. S. Salisbury, Esq., London E.C. 4.: "Nigeria the Unknown")

(3) The "Encyclopaedia Britannica," 11th Edit., Vol. 1., pp. 82-96.

CHAPTER II.

WEST AFRICA IN MEDIAEVAL TIMES.

I.—Governments.

This period carries us from the 5th century A.D. to the end of the 15th century, and it was during this period that civilisation travelled in its world-wide circle down to North West and West Africa when trade shifted from Phoenicia, Egypt and Carthage, and the Levant to Timbuctoo, Mauritania (or Morocco) and later to the western shores of the Mediterranean Sea. This appears to have been the period during which Africa evolved a civilisation or developed the one she originally had to a point yet unparalled in her history. At this time the Greek and Roman civilisation had disappeared from the world's stage, and a thick darkness of ignorance pervaded throughout Europe. There was no such thing as a nation, a government or a constitution properly so called anywhere in Europe (1).

When we turn to Africa at this period, we find that there was no stagnation at all (2). In the first place we find that in the North West of Africa there sprang up Moorish civilisation which penetrated into all parts of Europe through Spain (3). Next was the Aethiopian highly organised government in the Eastern side of Africa, popularly known at this time as the kingdom of Prester John (4). Then we come to the ancient Sudanese organised monarchical governments all along the western parts of Sudan, especially in what we now know as Northern Nigeria (5), next to these were, the Yoruba limited monarchies in what we now call Southern Nigeria, then the Dahomian, the Ashantee and the Fantee mighty kingdoms, the Congo and other organised governments in other parts of West Africa.

I propose to state briefly here something of two or three of the above by way of illustration.

MOORISH ANCIENT CIVILISATION.

The Moors inhabited Mauritania or Morocco in the North West of Africa, and Moorish civilisation was set up and developed in Africa about the 7th century by the Saracens, who overran the whole of North Africa, the Sudan and Northern Nigeria during the course of which Christianity was ousted and Islam took its place. By A.D. 711 the Moors had crossed the Strait of Gibraltar, occupied and conquered Spain and South of France and ruled this portion of Europe for more than 700 years, *i.e.*, till A.D. 1492. It was at this period that Africa took this advanced civilisation to Europe through the Moors whereby Spain and South of France were civilised first, and through Spain and France, Great Britain, Germany and other European countries were indirectly civilised, so that eventually that "Darkness" of Europe, commonly known in history as the "Dark Ages," which lasted

(1) Sanderson : " Outlines of the History of the World," chap. IX.

(2) Hughes & Dalton : " Antiquities from Benin City and other parts of West Africa.

(3) Sanderson : " Outlines of the History of the World," pp. 362-365.

(4) Encyclopaedia Britannica," 11th Edit., Vol. I.

(5) Mungo Park. Hakluyt. Purchas : " His Pilgrims (1526 A.D.)."

from the 5th to the 11th centuries, was turned into light by the end of what is known as the Middle Ages. It was the Moors who at this period, introduced into Europe geometry and physical science. They established in Spain schools, libraries and universities. Moorish professors lectured in literature, rhetoric, astronomy, and pure mathematics, subjects hitherto unknown anywhere in Europe. They also taught in all schools and universities zoology, botany, chemistry, and especially medicine, things or subjects quite new in Europe at this period. It was to Moorish or African civilisation that Europe owes to-day the mode of notation in arithmetic, called the Arabic figures, and the words algebra, alchemy, nadir, zenith, elixir, syrup, cipher and many others are included in the debt of Europe to Africa. It was the Moorish scholars who first taught the world that the earth was round in contradistinction to the theory hitherto taught by Rome and Constantinople scholars. It was the Moors who first built in Europe observatories for astronomical research and the towers which the Moors built at Seville with this end in view, was turned by the Spaniards, who drove them out, from this place, into belfry because they did not know what else to make of it. Alhambra in Granada in Spain is one of the best living monuments of Moorish civilisation in Europe. It was decidedly this Moorish civilisation that made Spain the first, the leading, the champion, nay, the most powerful of all the European nations during the period immediately following the mediaeval times. As regards the effect of this Moorish civilisation so far as Europe is concerned as a whole, a great English scholar, Prof. Rawlinson, says, "it is a fact that Europe, long delivered from the ages of darkness and brought out into a marvellous light, has never to this day made any fitting acknowledgment of the great debt due to the Mahometan conquerors of Spain (*i.e.*, the Moors, the children of Africa)" (1). Therefore the necessary inference here is that the European renaissance and the modern forms of governments which began in the 15th century were the direct products of Moorish or African civilisation.

As to the Ethiopian highly organised ancient government, this is a familiar story and we all know about the great impression, in admiration and attraction it had created for the early European explorers of West Africa during the 14th to the 16th centuries, whose glowing desire was to know the famous Prester John, the mighty Emperor of Ethiopia, at this period (2).

Let us now turn our attention to the Sudan ancient monarchies. We are now, properly speaking, in Negroland ; we are in Negro Africa.

The Saracens, who penetrated into Africa about the 7th century and overran the whole of North Africa, also penetrated into the Sudan at the same period ; converted every aboriginal government which had either adopted Christian or pagan religion into Islam and introduced Arabic civilisation as in Morocco. Hence, like the Moorish kingdoms, the Negro kingdoms of Bornu, and Songhay were converted into Islam by the 10th century, so also were the kingdoms of Melli, Ghana and others. The Moorish and the Negro kingdoms were all rivals of each other and each was very powerful

(1) Sanderson : " Outlines of the World's History," 5th Edit., pp. 362 and 363.

(2) Cf. " Encyclopaedia Britannica," 11th Edit., Vol. I., pp. 82-96 ; with Hakluyt's " Voyages to the Guinea," Vol. VI., pp. 141-176.

and highly organised. Negro civilisation at this time seems to have been at its zenith when the empire of Timbuctoo was established during the reign of the Negro Emperor Abuacre Izchia, whose capital was at Timbuctoo. There were then 15 powerful Negro kingdoms all situated along that most important and famous West African River Niger. They were also members of the Timbuctoo Empire, each retaining her own internal sovereignty and enjoying complete local autonomy. The Negro emperor stationed in each of these tributary states an Imperial representative or commissioner, responsible directly to him and seeing after the regular payment of the imperial rates and taxes. The Negro states forming this empire were the kingdoms of Ghinea, Melli, Cabra, Gogo, Guber, Cano, Katsena, Zegzeg, Zanzara, Guangara, Borno, Gaoga, Nubia and Gualata. In each of these the king and his council constituted the executive and the legislature, the two not being quite separate as yet. But the judiciary seems clearly distinct, since in each there was a judge quite separate from and perhaps independent of the king, and the priests, maintained at the king's costs to administer justice to all ⁽¹⁾. All judges were appointed by the emperor at Timbuctoo to decide all controversies. Purchas told us in his account that when he went to West Africa in or about the close of the 15th century he saw as an eye-witness at Cabra that the king's brother was the judge at the time. It may be useful here to quote verbatim what he states :—" Abu Bacr, the king's brother, was the judge when I went there, I saw him, he is black in colour but most beautiful in mind and conditions." ⁽¹⁾

The king of each state had a great and magnificent palace walled round with several inner departments and offices where several state businesses were performed such as the Royal Courts for settling disputes. The king also had several councillors, secretaries, treasurer, factors and auditors. He had a standing army composed of a large number of horsemen and footmen ⁽¹⁾.

Next to the Northern Nigerian Negro States, we have the ancient Yoruba States in Southern Nigeria as disclosing one of the best representative types of Negro civilisation in West Africa at this period. The Yoruba civilisation seems to have been an independent one that grew within the heart of the Niger basin several centuries ago ⁽²⁾. All evidences external, internal or otherwise seem to point out that either the Yorubas, several centuries past, migrated from some part in the east and under varying conditions and circumstances managed to get to Nigeria and settled in the Kakanda district with the Ife City (Ile Ife) as their capital city, or that they had been planted there by one of the earliest circumnavigators of Africa. Their civilisation may be shortly described as a mixed form of both Egyptian, Roman, Greek, and some other ancient Oriental civilisations ⁽³⁾, which, perhaps, owing to the locality, the surrounding circumstances and such like, appears to have become very much decayed by the 15th century of the Christian Era. It seems to have developed slowly for several centuries and gradually penetrated through several parts of West

(1) Purchas : " His Pilgrims," cir. 1526. (Extracts from Books of John Leo ou Africa).

(2) Cf. Mungo Park. Frobenius : " Voice of Africa." Vols. I. and II.

(3) *Wass*, Nos. 3 and 4, March and June, 1927.

Africa, and according to recent scientific researches, excavations and discoveries at the said Ile-Ife, both by the German and British eminent men, it seems now a *fait accompli* that this is another separate sort of civilisation Africa had since given to the Family of Nations, which a German professor describes as an "Atlantic Civilisation." (1) An evidence to confirm this may be gleaned from the few Ile-Ife relics now lying in the British, German, and probably many other European Museums.

Their governments consisted in theocratic monarchies limited by an admirable institution known as the Ogboni system, the most representative of all their institutions and in respect of which Sir Richard Burton, as an eye-witness, suggests as functioning, in a way, the part of the English House of Commons in the Yoruba polity (2). Every king had a royal household and a council of state. The constitution of a Royal household differed both in number and character from that of the council of state. The common feature (perhaps now a distasteful and unnecessary one) was the extraordinarily large number of women usually termed the king's wives.

CONSTITUTION OF THE EXECUTIVE AND COUNCIL OF STATE.

The Yorubas seem to have gone a step further in another direction and that is in matter of civil government, because in time of peace the king's minister at the head of the affairs was and is a civil lord holding a civil title termed the Otun or Bashorun, and whose office was analogous to that of a premier in a western civilisation constitution, while in time of war, the commander-in-chief of the army termed the Balogun or Are-Ona-Kakanfo always exercised greater powers. The council of state was composed of the king's chief ministers. The number varied in each of the West African kingdoms, but generally not less than four and they formed the executive for all purposes. They were usually the minister functioning the office of a premier, the commander-in-chief of the army, four other military officers next in rank to the commander and a few other civil lords (3). In a Yoruba, whether Egba, Oyo or Benin constitution, civil lords, *i.e.*, members of the Ogboni (Ogwane (6) in Benin dialect) lodge were always in the majority in the king's council. The number was usually not less than sixteen (representing the 16 "Ifa" gods of the Yoruba people) (4). It appears that in either the Ashantee and Dahomey constitution the military lords were always in the majority, hence some are of opinion that the Ashantee or Dahomey form of government was characterised with a military despotism (5). The same council constituted the legislature of every State. It does not appear that there was as yet a separation between the executive and the legislative bodies in any of the West African native States.

(1) Frobenius : " The Voice of Africa," Vols. I. and II.

(2) Burton : " Abeokuta," Vol. I.

(3) Hughes & Dalton : " Antiquities from the Benin City and other parts of West Africa.

(4) Dr. Dennis : " The Nigerian Studies."

(5) Sir Richard Burton : " Abeokuta," Vol. I.

(6) An apparently modified tonation of " Ogboni " in Yoruba language.

CONSTITUTION OF THE OBA HOUSEHOLD.

The king's household ministers were usually composed of the Chief Eunuch, the Chief of the Palace Guards, and the Royal Store-keeper or Treasurer. Each of these had an assistant. There were other minor classes in the king's household, such as bards the Minstrels, the sattu-lites and other domestics (1).

THE JUDICIARY.

This seems to be at a very backward state in every West African community at this period; but among the Yorubas we find that the Ogboni played a great part in the judicial system of the country. The Ogboni houses served as the public courts where all important disputes were being settled. Each Ogboni house had a prison department attached to it. Apart from this, every great chief, civil or otherwise, used to hold a court in his own house to settle minor differences falling within his jurisdiction, but this should not be construed as a clear cut jurisdiction. Such chief had a prison attached to his house with power to imprison (2). Litigants (used advisedly) that were not satisfied in the decision of one court might appeal (4) to any other but the decision of the king and his council, sitting as a court of justice, was final. There was no system of paid judges as in Northern Nigerian States, every cost of the dispute was usually distributed among the members of the Ogboni who constituted the particular court. In short, it would seem that the state and condition of the Yoruba Judiciary at this time might fairly compare with that of England about the 13th century in certain respects.

2.—Education.

As regards education in the northern parts of Nigeria and the Sudan it is quite evident that Arabic education was in vogue at this period. This was the same as the Moorish education carried to Spain in 711 A.D., for the Moors and the Negroes were not only neighbours but kinsmen, *i.e.*, from the common stock (3).

There seems to have been a definite system of teaching as in Spain at this period, *i.e.*, there was a system of elementary, secondary, and even what is known in modern times as or may be described (for want of proper term) "university education" in every Negro city because we are told that there were great stores of temples, priests and professors who read their lectures only in the temples because they had no (what are now known as) colleges, that the priests and *doctors of law went about apparelled in white cotton* and that the *doctors, judges, priests and most of their learned men were beautifully maintained at the king's cost and charge* (5). As in Moorish schools close by and in Spain there were apparently Negro pro-

(1) Hughes & Dalton; "Antiquities from the Benin City and other parts of West Africa.

(2) Ajisafe: "History of Abeokuta," chap. 67., pp. 157 and 158.

(3) Hakluyt's "First Voyage to the Guinea, 1553."

(4) There was no such a thing as "appeal" in the African Customary Law as is used in the European juristic sense of that word.

(5) Purchas: "His Pilgrims, cir. 1526."

fessors not only of law and medicine but also of mathematics, zoology, botany, and other kindred faculties of knowledge as introduced by the Saracens at this time.

When we turn to Southern Nigeria and take up the question of education among, for a typical instance, the Yorubas, we are faced with the suggestion that the whole system appears to be wholly customary except that Arabic education came to be introduced at a much later date ; but recent discoveries of relics of an ancient civilisation very strongly suggest the probable existence of writing which has not yet been definitely discovered. The Opa Oranyan at Ile-Ife in Yorubaland is an evidence (1). The Vai characters found among the aborigines of Gambia (2) supply another evidence in another part of West Africa.

I shall give here a short description of a Yoruba customary education as an illustration of the type of education which existed in all parts of West Africa at this time other than the Sudan and Northern Nigeria before the subsequent introduction of Arabic education from the north.

At the outset I should like it to be understood that the term education as employed here refers to the wider meaning of that term as conveyed to us from its Latin root *educere*, *i.e.*, to lead forth or to draw out the faculty of a child ; to impart into a child such knowledge as may assist him or her to live completely.

Yoruba education began with the family composed of only the father, mother and children. This is family education and the house was the school. As soon as a Yoruba child has begun to walk about, if a male, the father began to educate him in all agricultural (provided he was a farmer) and domestic matters. He made him a tiny hoe, took him to his farm and made him watch how he (the father) made use of his own hoe in turning up the soil for planting and other purposes. The father left him to use his tiny hoe just as he liked. Everything the father did he made the child to watch while he took great care to give answers to all questions the child asked on any subject. On the way back to their village home retiring from their farm, the father would tie up a small bundle of sticks and asked the child to carry this home for domestic use. The same procedure was gone through if the father was a mechanic or otherwise. The same sort of training was given on the part of the mother to the female child, and in accordance with the complimentary temperaments of the fair sex. As women had more to do with trading and domestic affairs, girls' education was more in that direction. Every evening the mother taught the children (both male and female) together before they repaired to their beds, moral lessons from folk lores and other customary legends. Thus the laws and customs of the land were being gradually imparted into the children through constant speaking to them by means of the customary philosophic or wise sayings by the parents especially the father. This continued till the age of about 10. During this period the children received also what may be described as the education of the family compound. This was practically the same as that of the former. The only differences was that the child was allowed to extend his or her contact from the immediate parents to every other member of the whole compound. A Yoruba typical compound

(1) Johnson : " History of the Yorubas."

(2) *Wasu*, Vol. I., No. 1.

was usually very large, built in the rectangular style, *i.e.*, a building with various rooms and halls surrounding a very spacious and open court-yard. (There was no need for storey houses).

From 10 to 20 (if female) 30 (if male) the education became district or township education. It was during this stage he or she received what may be described as higher education to fit him or her for his or her vocation in life. Female education was intended, in the first instance, to make her fit to be a good wife and mother, while that of the male was to equip him with all that was required to make him fit to take part in all public affairs, especially in the military service as well as in the politics of their age.

It seems proper to note here the following axiomatic propositions of the customary law.

- (1) That all women in every community were either married or would be ultimately married before they reached the age of 30.
- (2) That women during the period of child-bearing could not be heard or recognised in any public affairs such as politics.
- (3) That all women were to be under the protection of men and were therefore subject to men to that extent.
- (4) That there was no system of paid servants and that there were neither serfs nor slaves, nor caste system.

Between the age of 10 and 30 all lads entered into an association termed "Egbe," where they received the said vocational education. An elderly man was always to be the president of the association, called "Baba Egbe."

All lasses, on the other hand, between 10 and 20 also entered into an equivalent association under the presidency of an elderly lady termed "Iya Egbe." The two associations occasionally met together for social purposes. The duties of the "Baba Egbe" were to teach the boys some rudimentary principles in the art of war and of civil government. For this reason each member must bear a particular title, civil or military, *e.g.*, the Babogun (commander-in-chief of the army), Jaguna (captain of war), Aro, Odofo (Ogboni civil lords) and such like (1).

The president was also responsible to teach the boys the politics of the age by means of customary philosophy and parables. He must teach them the elementary principles in the art of war. This part of the education was of the utmost importance.

The duties of the Iya Egbe were to teach all the girls, in the first place, their duties at their future homes, and how to be successful "help-meets" for their husbands. They were to know the art of trade, for much of the trade of the country was carried on by women.

During social meetings between these two associations it invariably happened that most boys, before the age limit for their education, had courted girls as their fiancées and so when marriage took place the women association dissolved and disappeared, while that of the boys simply passed into the more developed and political one of the Ogboni, where it was entirely merged in.

(1) It may be interesting here to remark that in the writer's own time he was the "Apena" (the secretary of state), and his brother (Mr. Lufotebi Solanke) the "Balogun" (commander-in-chief of the army).

Part of the boys' education was to know how to conduct the "Oro" and the "Egungun" offices. The "Oro" and the "Egungun" institutions appear really to be the archaic police system of the ancient Yoruba people (1). Women were not allowed to participate in this portion of the education. Men alone, as a general rule, went to war, but there were instances of women taking part in the war. It was part of the duties of women especially the titled ladies of every community to settle disputes in their official capacity, therefore women received much of the education relating to civil government. The titled leader of women was and is called "Iyalode." She is assisted by twelve other titled ladies who either all or some of them together form with her a court for all purposes.

Question of Poligamy.

I need to say a few words here on the subject of poligamy in Africa. It would seem that the causes that led to poligamy should be looked for in the analysis of an African domestic economy. Take, for instance, an African typical and complete household and its management. It was composed of the "Bale" or head of the household, which is analogous to the Roman "Paterfamilias." He had a very large compound of the description already stated above. He had large acres of farm lands. The farm and the compound or household had to be economically kept up. Customary law recognised no system of serfdom nor of paid servants, while all the citizens were fully free and independent. The children of the paterfamilias were not sufficient to do the whole work, and in fact, when they grew to the age of 30 they became very much relieved from the father's "pōtestas" then it is said "O siwo lenu oko baba re" or "Baba re da loko." That is the father had got to set him free so as to begin to learn how to stand by himself. Hence the philosophical saying "Akedun ki ku ki akedun teni fi" (*i.e.*, every child must start to practise the principle of self help before his parents should die). Besides this, female children were naturally more in number than male but these again according to the customary law were fully free and independent after the age of 20. The customary law further put all women under perpetual tutelage of men. Thus it happened that labour for the paterfamilias' compound and farm lands became absolutely impossible to be secured anywhere at a certain stage in the economic life of the family if no other course was open. The device then came that the customary law gave sanction to a system of polygamy whereby the paterfamilias seeking in truth and in fact to secure servants for the upkeep of the house and farm lands, contrived to have more than one wife, and accorded to each and everyone the dignity and honour of a lawfully married woman. But the customary law stepped in and made some distinction between the first wife and the rest subsequently married, by conferring on the first wife the title of "Iyale" (the mother or mistress of the household), giving her greater privileges and rights than and superiority over the rest (2) to whom it gave the title of "Iyawo," the literal meaning of which seems to suggest "servants of the household" in the European idea. It must not be supposed that these "Iyawo" are

(1) Vide Mungo Park, chap. VII, pp. 56-58. (The Mumbo Jumbo System).

(2) Ellis: "The Yoruba Speaking Peoples," p. 176 et seq.

treated exactly like servants in the European sense of that term, but this is not the place to discuss this subject fully (1).

The education of the "Iyawos" was in the hands of the "Iyale," and it was generally out of the many "Iyales" in a particular district that an "Iyalode" was usually elected.

The Yoruba systems of "Owe" and "Aro" contained much that directly imparted into the children agricultural education.

It is possible that a good deal of Moorish education might have been imported into Yoruba during the time Timbuctoo was the greatest centre of trade in Nigeria. The system of the "Babalawos" (Ifa professors) in Yoruba country, having several disciples or pupils whom they taught systematically in the art of healing, memorising long verses and passages of "Ofo" (incantation) and such like, seems to be in a way comparable with that of the Moorish and of the Negro professors in temples in Northern Nigeria, Sudan and North West Africa, as already dealt with above.

The education by the court bards, minstrels, and the king's jesters at the court or palace of each Oba is also noteworthy here.

3.—Trade and Industry of West Africa in Mediaeval Times.

Timbuctoo, in the Sudan, appears to stand at this time to all the traders and merchants from Europe, the Barbary States and other Mediterranean coasts as London stands to-day to all traders and merchants of the world at the present time. It was the centre of all caravan routes to the Sahara, the Barbary, Europe, the Sudan, Egypt, Abyssinia, the Yoruba States, and all trade routes to the east. Sugar, corn, ivory, gold, pepper, grains, hides, leather, cotton, and cloths, were among the chief commodities sold and exchanged. Hither were also brought *divers manuscripts or written books out of the Barbary States to be sold for money* (2). The coin used at this period was of gold without any stamp or inscription, but in matter of small value certain shells known as cowries, brought to West Africa from Persia, were used as well. There was also iron currency called manilla (3) for matters of small value. We learn also that prisoners of war and criminals were often exchanged for Barbary horses. It would seem that these were those whom some writers want us to believe as the commercial slaves and that such single instances constitute the slavery alleged to have been common in Africa before this period. Iron and glass industries (4) were regularly carried on among the Negroes and there were mining centres. In this connection I think it important to quote a passage from the account of one of the writers of the time, who was also an eye-witness:—

"They worke many pretie things of the barks of trees. In some of the houses they worke yron and make faire darts and divers other things to worke their boates and other things withall, and the women worke as well as the men. All their cloth, cordes, girdles, and cappes of their own making they can worke things very prittily and yron worke

(1) Vide the paragraphs dealing on "The African Political Economy" in the Essay on "Land Question in Africa," by Ladipo Solanke.

(2) Purchas: "His Pilgrims, c. 1526."

(3) Hughes & Dalton: "Antiquities from Benin and other parts of West Africa."

(4) Hughes & Dalton: "Antiquities from Benin and other parts of West Africa."

they can make very fine of such things as they doe occupy as darts, fish-hooks, yrons, yron heads and great daggers some of them as long as a wood-knife which be on both sides exceeding sharpe and bended after the maner of Turkie blades, and the most part of them hanging at their left side.

Their targets bee made of such pils as their cloth is made of and very closely wrought and they bee informe foure square and very great and somewhat longer than they bee broad so to cover their whole body. Their bowes be short and of a pretie strength. Their golde also they worke very well. We shewed them all our other things which we had but they did not esteeme them."

Transport was by camel, oxen, donkeys and human carriers.

The people of Southern Nigeria carried on a large internal trade between themselves at this period; for instance, among the Yoruba States the Apomu town was one of the chief centres of inter-tribal trade (1). Large centres of trade appear to have been established all along the coast towns of West Africa (2). There was a good deal of international trade carried on between the Northern and the Southern nations of Nigeria at this period; especially between the Yorubas, the Nupes, and the Hausas, and it was through this and other circumstnaces that Islam religion was introduced among the Yorubas.

No doubt the Southerners and the Northerners traded together with the caravans from and to Timbuctoo at a large scale. It was at Timbuctoo that traders had carried back to their respective nations or tribes the Saracenic or Moorish civilisation through contact.

The chief industries were iron works, agriculture, pepper, ivory, cloth weaving, leather making, carvings, bead works. Out of iron several things were being manufactured, both for local use and for export purposes, such as agricultural implements, iron ornaments, weapons of war, utensils and such like. The two great mining areas were in Nupe territory and in the Kakanda district at Ile Ife in Yorubaland (3). Another mining field was near Ilorin (4), whence that great city "Ilorin" *i.e.*, "Ile or Ilu Irin" (the abode or region of iron works) derives its name.

Glass industry was carried on chiefly in Nupe (6). The art of sculpture seems to have reached its zenith of development at this period (5).

The chief industries at Ashanti and Gold Coast and Dahomey were gold, diamonds, precious stones, ivory, pepper, agriculture, bead making, and carvings. Corals were obtained from the sea and of these all West African royal crowns, beaded thrones, beaded staves and all other works of beads were usually manufactured. The rights of mining belonged to each and every individual inhabitant of West Africa although it might seem that some portion of any precious metal mined or dug out used to be offered by the owner as a present to the king.

(1) Johnson: "History of the Yorubas."

(2) Read & Dalton: "Antiquities from the Benin City and West Africa."

(3) Burton: "Abeokuta," Vol I.

(4) Johnson: "History of the Yorubas."

(5) Frobenius: "The Voice of Africa," Vols. I. and II.; Talbot: "The People of Southern Nigeria."

(6) Read & Dalton: "Antiquities from the Benin City and other parts of West Africa,"

4.—Religion in West Africa during the Middle Ages.

Islam became really part of the Common Law of all the West African countries in the Sudan and northern parts of Nigeria, including the Moorish territory before the close of the Middle Ages, because in the case of the Moorish kingdoms, Islam was adopted since the seventh century (1) while in the case of the other Negro kingdoms in Sudan and Northern Nigeria all or most of them seem to have been converted to Islam since the 10th century (2). Their law and the methods of administration of justice were based entirely on the Koran.

It does not appear that Islam from the north had yet interfered with the various aboriginal religions existing in the south at this period. The Yoruba religion seems to have been very little influenced by any external religion at this time. The Oyo-Yorubas who dwelt at this time nearest to the Moslem Negro kingdoms in the north of Nigeria did not begin to adopt Islam till about the seventeenth century, nor the Ashantees, nor any other parts of West Africa till the 18th or about the same time. A close and scientific study of the Yoruba religion suggests that the religion was originally a corrupt form of copitic Christianity (3).

Yoruba people should be understood here to include not only the Egbas, the Oyos, the Benins, the Ijesas, the Ijebus, the Ifes, and the Ondos, but also other tribes in Southern Nigeria that are more or less related to the former, *e.g.*, the Dahomians, the Gas of Gold Coast, the Jekris, etc. Yoruba or Aku civilisation which was essentially based on their religion and whose centre was at "Ile-Ife" seems to have been of an independent sort and origin. It would also appear that it grew slowly in the Kakanda district in the heart of Nigeria and gradually spread far and wide throughout West Africa.

Yoruba religion acknowledged only one god who was so far, so good, holy and great that he could not condescend to interfere directly in the affairs of men except through His manifold intermediaries termed "Orisha," through whom in turn the people worshipped the only God (4).

A typical case to illustrate this view was given by one of the earliest European missionaries to Yoruba country (Rev. Mr. Hinderer), once he came in contact with a so-called pagan Ibadan gentleman, who during a religions discussion, told him that he must worship his forehead. When Mr. Hinderer was trying to show him that this statement was inconsistent with the previous one he had made, in which he (the pagan) declared that he (the pagan or animist) believed in only one god who made all things including man and that it was He alone who preserved his life, the so-called pagan, indignantly replied, "Do you white men think us so foolish as to suppose our forehead itself can save us? No! but God made forehead and he saved me through my forehead and so I worship him." (5) It is a com-

(1) Sanderson: "Outlines of the World's History"; Ameer Ali Syed: "A Short History of the Saracens"

(2) Mungo Park.

(3) John Wyndham: "The Myths of Ife"; "Nigeria the Unknown" (by C.M.S., Salisbury Square, London); Dr. Dennett: "Nigerian Studies"; Johnson: "History of the Yorubas"; Burton: "Abeokuta," Vol. I.

(4) Burton: "Abeokuta," Vol. I.; "Nigeria the Unknown" (C.M.S., London).

(5) Miss Tucker: "Sunrise in the Tropics or Abeokuta" (footnote), p. 36.

monplace matter that whenever the so-called pagan Yorubas are reproved of idolatry they always try to maintain seriously that they worship God, termed "Olorun," meaning one supreme Being, or the Owner of Heaven, the Creator of all things but that they worship Him through Orishas who will pray to God for them and obtain blessings they desire. Obviously this conception is by no means the same as among the ancient pagan Greeks and Romans. The gods are not emanations from or personifications of the one God as Appollo Venus, Minerva, etc., but they are distinct beings acting in capacity of a mediator, and I agree with the opinion of Rev. Mr. Townsend who states that this religion is fairly comparable with that of the Roman Catholics, and he adds "These (*i.e.*, Yorubas) sin only against the light of Nature—Rome against that revelation which tells of the one only Mediator." (1)

It might seem appropriate to refer here to an incident which happened at the Benin city in the 15th century when the Portuguese first came there. The Portuguese urged upon the King of Benin to allow them to introduce white man's religion there. The King agreed and the Portuguese sent for the missionaries who, of course, were Roman Catholics. We must bear in mind that at this period Reformation had not begun in Europe as yet, so that Romanism was at its very low water mark, full of idolatrous practices of the worst type ever known to Christendom. When the Portuguese missionaries got there ; they worked for several years but not a single soul was converted to Christianity, and at last they had to pack up and go. (2) It is unfortunate to find that the account suddenly stops here without giving us the reason for the failure. It was afterwards understood that when the King and his people found that there was apparently no difference between their own native religion and the said white man's religion they could find no reason why they should substitute the foreign for their own. Islam does not seem to have been introduced into either Yoruba or any of the other West African countries before the 17th century, while it had for centuries become as it were an aboriginal religion of the northern parts of Nigeria and the whole of Sudan before the 16th century. It would then seem that up to this time Yoruba religion had not yet become so corrupt by any external aggression. European Christianity came last and only during the period now known as "Modern Times." Yoruba religion teaches the doctrines of the life hereafter and of Hell and Heaven.

Special observations from the foregoing.

From the foregoing few facts of the past history of West Africa, it is quite obvious to observe

- (i) that from the earliest times down to the 15th century West Africa appears to have all along had organised governments of her own creation whose standard was either equal to or at least comparable with any other of the then known world. Law and order was maintained ; organised and disciplined armies existed everywhere.

(1) Tucker : " Sunrise in the Tropics or Absokuta," pp. 32-36.

(2) Rend & Dalton : " Antiquities from Benin City and West Africa," pp. 1-4.

- (ii) that as regards education, Moorish and Yoruba types of education prevailed. Although Moorish system seems to be more advanced than or at least different to that of the Yoruba, yet Yoruba system solved in its time two great economic questions, namely unemployment and labour and greatly encouraged the social question of marriage.
- (iii) that as to trade and industry we notice that in the
- (a) first place the whole matter was in the hands of and under the entire control of the aborigines of West Africa.
 - (b) The next and apparently equally important point is that the natives of West Africa were not merely raw material growers but also manufacturers and miners, and were as competent in these industries as any other of that period. All the accounts written in that period as already examined above and elsewhere establish this.
 - (c) Another point is that there was no such thing as land question as our generation in West Africa now begins to experience it, and our brethren in South and East Africa and Congo are experiencing it, nor did labour question exist, and slavery or slave trade was absolutely out of question. Everyone had enough land to cultivate and neither were rents paid nor services rendered to any superior lord or landowner for the land possessed or owned. In other words there was no feudal system ⁽¹⁾ in matter of land tenure and hence no system of landlordism. Every owner of land had all the rights which an English fee simple owner had except that he (the West African owner) could not alienate his by way of sale. It was a grant to him for perpetuity to revert to the community only upon failure to continue in the issue of the original grantees.
- (iv) As regards religion we observe that apart from Islam the aboriginal religion does not seem to have been inferior in quality or standard to that of Romanism. Even the doctrine of the Sacraments in Christianity finds some analogous expression in the so-called pagan religion, and the oft referred to doctrine of cannibalism in Africa finds some explanation or expression in the doctrine of transubstantiation.
- (v) Last, but not least, we observe that in Europe at this period there was as yet neither a nation properly so called, nor a constitution, nor a Parliament, nor even courts of justice in the sense we now-a-days understand these institutions to mean. Europe was, even at the close of this period, just on the eve of her renaissance and reformation. The very fact that Spain, who first became the first and most power-

(1) Feudalism is from "feuds,"—"stipendiary lands" (2 Bl. Com. 46), i.e., lands held of a lord on condition of rendering suit or service; the antithesis are Allodial lands, i.e., lands that pay no fines or services.

ful of all European nations in the subsequent period, was still serving her apprenticeship under the mastership of the Moorish or African civilisation affords a conclusive evidence of the exact position of Europe at this time. (1)

CHAPTER III.

WEST AFRICA IN MODERN TIMES.

I propose to divide this period into the following sub-heads :—

- 1.—Evidence suggesting the non-existence of slave traffic in Africa before the advent of the Europeans in the 15th century.
- 2.—Cause or causes that led to the introduction of slave traffic into Africa.
- 3.—Slave traffic period and the part played by both parties respectively in it.
- 4.—Effects of slave traffic in Europe, America and Africa respectively.
- 5.—Abolition of slave traffic and its effects in Europe, America and Africa.

1.—No Slave Traffic before European advent—15th century.

The following evidence appears sufficient and satisfactory to establish the cogency of the argument that slave traffic did not exist *as part of African institutions* before the Euro-Negro slave traffic which began in the 15th century.

- (i) Up to the 15th century reference to slavery or slave trade in West Africa or Africa as a whole by writers or explorers was very meagre. Each of the few instances we possess when closely examined seems to establish the opinion that the term used by these writers does not mean "slave" or "servus" in the Roman law idea, nor "Ton andrapodon" in the Greek idea, nor "Eru" in the Yoruba idea of the 18th and 19th century, but it means "servant" in English idea, "minister" in latin idea, "Hoi douloi" or "oiketai" in Greek idea, and "Omo-odo, amewa, iranse; janma, onse" in Yoruba idea.

Roughly speaking they were what may be termed the working class of the community, but their position was much better than that of a European serf of the Dark Ages. Their position seems to have been fairly described by the Koranic Law.(2)

- (ii) We have already noticed above that there were up to this period organised nations in Africa with powerful armies and strong governments such as those of the 15 Negro kingdoms of the Timbuctoo Empire, the Moorish kingdoms, the commonwealth of the Yorubas, including that of the Benin, the Ashantee, the Dahomey, the Kongo;

(1) Sanderson : "Outlines of the World's History," pp. 362-363, 292-295.

(2) Ameer Ali Syed : "History of the Saracens"; Mahamed's "Sermon on the Mount Jab-al-ul-Arafat."

and other West African kingdoms (1). There is no doubt that wars occasionally took place between one tribe and another as it was the case at the same period in Europe, and even among the so-called civilised nations of to-day, but there is no evidence to show as yet that indiscriminate and extremely barbarous internecine wars were common among them, otherwise such great centres of trade as Timbuctoo, Apomu Market, and others of that class, could not have sustained their great fame for promoting such international commerce as we have already noticed above. Trade can hardly flourish in a country torn into pieces by civil, tribal, national or inter-national wars. There must be some *causa belli* of some tangible nature before one organised nation marched against another. It was not likely that at this period one nation waged war on another simply for the purpose of celebrating, as it were, "slavery festival" as part of the common law of the land. Even in recent times after the Euro-Negro or European Commercial Slave Traffic had done its worst in Africa and internecine wars were rife no nation or tribe ever so barbarously marched against the other without a *causa belli* of some sort, and further, we have abundant evidence of amicable diplomatic settlements being first of all sought for, and no war would be begun before such courses had absolutely failed. The Ashanti, or the Yoruba tribal wars supplied copious instances of this course (2).

The true position of things is as follows :—It was the custom of the king or a great chief to increase the members of his household or court with his prisoners of war for the purpose of doing the menial works and services of that court or household. Out of these were usually created the bards, the jesters, the satellites, the eunuchs, the minstrels, and the body guards for his court. They were not in the condition of slaves properly so-called but of what may nearly be likened to a European serf. They were regarded *prima facie* members of the household or court (3), but according to the customary law there was some formal difference between their status and the status of the natural children. These prisoners of war in the household or court became what we may term "domestics" or economic servants of each household or court. They were at any rate not "andrapodisis" or "commercial slaves," *i.e.*, there was no "commercial slavery" such as was later introduced into Africa by the Europeans in the 15th century. Because their status was slightly inferior to that of a fully free citizen the customary law prescribed some simple form of emancipation whereby everyone could acquire full citizenship. The whole system was Oriental and was governed as such. The Koranic law recognises its true nature.(4)

(1) *Ibid.*, pp. 7-15.

(2) Dr. Claridge : "History of Ashanti and Gold Coast" ; Johnson : "History of the Yorubas."

(3) Miss Tucker : "Sunrise on the Tropics or Abeokuta" (footnotes to pp.9-15) ; Ameer Ali Syed : "A Short History of the Saracens."

(4) Ameer Ali Syed : "History of the Saracens" ; Mahamed's "Sermon on Mount Jab-al-ul-Arafat."

- (iii) We further notice above that when the Moors held the rule over Spain, Portugal and the south of France from 711 A.D. to 1492 Negroes were not imported as slaves into these countries to supply agricultural labour which was the greatest political as well as economic problem in all European countries during the whole of the Middle Ages ; on the other hand, as a matter of fact, to effect this was the first effort of the Portuguese and the Spaniards immediately they came in contact with Africa in the 15th century. A simple question here at once arises, and that is, how is it that the first five Negroes taken to Europe by the Portuguese in the 15th century was the first recorded occasion Negroes ever came to Europe as slaves in history ? (1)
- (iv) Hakluyt, one of the earliest European explorers of and chief traders with West Africa in the early part of the 16th century informs us in his account that up to about the first half of the 16th century, there was carried on only that legitimate trade in gold, ivory, pepper, grains, and such like (2). All accounts agree that it was the Portuguese who first started this iniquitous traffic in the 15th century in Africa, that the Spaniards, the French, and the Dutch followed suit and that the English joined late in the 16th century. (3) The question that arises from this again is : if the people of Europe at this time regarded slave traffic as a legitimate trade (a lame and preposterous argument which most Europeans advocates always advance so as to justify their guilty action in the slave traffic) and if slave trade was already in existence in Africa before these human traffickers first came in contact with Africans, why then did it take such a long time before they joined so as simply to continue the alleged existing and common practice ? This fact obviously very strongly suggests at once a complete absence in Africa of such trade or institution when the Europeans came there in the 15th century.
- (v) Again, what does the following passage in Hakluyt's account mean ? "They that shall have to doe with them must use them gently for they will not trafique or bring in any wares if they be evill used." (4) Obviously this is the testimony of an eye-witness as to the civility or urbanity of the Negroes in the 15th century. This is among the chief characteristic features of the people concerning whom we have been asked to believe they had neither law nor order, but that slavery, slave trade, internecine wars, bloodshed, crimes, cannibalism and a thousand and one other vices were the order of their day and generation. But Mungo Park, another eye-witness, furnishes us abundant testimony to the truth that the Negro race possesses the highest humane character. (5).
- (vi) Furthermore, the story of how slave trade was started shows plainly that there was no such thing in Africa before the Europeans introduced it in the 15th century. Hakluyt tells us something of this

(1) Hakluyt's " First Voyage to the Guinea," Vol. VI., p. 173.

(2) Hakluyt's " Voyages to the Guinea," Vol. VI., pp. 141-176 (1553).

(3) Mungo Park.

(4) Hakluyt's " Voyages to the Guinea," Vol. VI., pp. 141-176 (1553).

(5) Mungo Park, chaps. vii-xi.

and states that in 1554 or thereabouts the first English company among which Hakuyt himself was perhaps the director or captain, took away with them to England 5 black men under the definite understanding with the native authorities that they were simply going to train them in English language and other matters and then bring them back to West Africa for purposes of promoting the legitimate trade in gold, ivory, etc., existing between them and West Africans up to this time. In 1556 when another English company came out to West Africa the natives demanded the return of these five black men. The company assured them again that the five Negroes were quite in good health and properly cared for and trained in England, that as soon as their training was completed they would be returned to West Africa. The natives then cautioned them against any trick and pointed out that the Portuguese had done the same thing but they were found to be liars and never returned the Negroes but used them as slaves in their country. At last the English, too, practised the same trick, and all the West African traders all along the coast boycotted both the Portuguese and the English until each should have brought back the Negroes they took away under pretext of educating them. The West Africans took strong objection to this action of enslaving their brethren, viewed it as a crime and began to shoot at them whenever their ships arrived. (1)

- ii) Hakluyt supplies us further evidence on this question. This was in the case of the Benin City. When the English got to Benin City and to the presence of the king in 1553, the king first of all asked him and his company what they came for. Hakluyt told the king they were merchants and they came in the interest of trade to exchange their commodities with what the king and his people had. The king asked to see theirs and asked them to examine his (the king's) own wares which consisted of a store of 30 to 40 hundredweights of pepper and other things. The king at once issued out a general command that all his people should collect from every part of the country pepper and about four score tons were immediately collected and the king saw their ships laden with them and further credited them for what their merchandise failed to supply in return. Here again there was no mention of slaves as being supplied by the King of Benin in place of pepper, even for the deficiency, portion of which he could not supply in return, and yet it is quite plain that a mighty and historic king like that of the Benin city at this time must have had thousands and thousands of slaves for sale had the slave trade been in vogue in that country at or previous to that time.
- iii) Again, we are further informed that when the Portuguese promised the natives solemnly to give up slave dealing, the natives resumed trade relationship with them and boycotted the English until the English complied to the same thing. For some time the natives employed this tactic successfully to surpress the establishment of slave trade, until at last their efforts were defeated through the combined efforts of the English, the Portuguese, the Spaniards, the

(1) Hakluyts " Voyages to the Guinea," Vol. VI., pp. 141-176 (1553).

Dutch, the Germans, and other European enslavers under conspiracy, and thus under an organised and an overwhelming force this horrible traffic was finally established in Africa. Of course, it cannot be denied that there was no international unity and co-operation among the West African nations at this time with a view to presenting one united front against such a common foe as these European enslavers turned out to be. But this has nothing to do with the fact that commercial slavery was not the common practice in Africa before the 15th century.

- (ix) It is sometimes said that slave trade was introduced into Africa by the Arabs by way of the Sudan and Northern Nigeria. But this again seems quite erroneous when we remember that when the Arabs otherwise known as the Saracens overran North Africa, the Sudan and the Moorish Kingdoms in the 7th century and that they together with the Moors overran Spain, Portugal and south of France at the same period and ruled those European countries for almost 800 years, *i.e.*, down to the end of the 15th century. Africa or rather West Africa or let us say the land of the Negroes which abuts that of the Moors was not depopulated by wars and slave trade, and in fact there was not a single case of a Negro taken as a slave to Europe during that period yet the trade at Timbuctoo was an international one between the African nations and the European nations at this period. On the other hand, as early as 1447 the Portuguese had started to establish slave trade in the Songhay Empire. It is therefore most highly improbable that the Arabs had anything to do with the introduction of slave traffic into Africa or at least into West Africa. As a matter of fact, it was the Arabs or Saracens who saved Spain and Portugal from slavery and serfdom of the Dark Ages. Islam is opposed to slavery. (1).
- (x) Again, leaving the coast towns and proceeding to the interior towns of West Africa, taking, for instance, such area as the Yoruba country, we find that up till the beginning of the 18th century not a single Yoruba was as yet captured and sold out of the country and no tribal wars yet begun among them. The population of the Yoruba Country at that time may be fairly estimated to be about 10 millions. (2) Slave raiding was first introduced into Yoruba by way of the north only towards the end of the 17th or early in the 18th century by the Foulahs and the Hausas, to whose territory it had been introduced by the Portuguese since 1447 as already pointed out above. It was even later still before slave trade reached Southern Yoruba, *i.e.*, among the Egbas, and it is a significant fact to note that the 1st batch of the Egbas captured as slaves was in 1825. (3) In view of these facts, slavery as an established institution in West Africa before the Europeans came to West Africa seems highly improbable.
- (xi) Furthermore, when we come to examine closely the question of African domestic as well as its political economy it may be still

(1) Ameer Ali Syed : " A Short History of the Saracens."

(2) Church Missionary Gazette, 1885-1886, pp. 90-93.

(3) Tucker : " Sunrise within the Tropics or Abeokute," pp. 15 (footnote).

clearer that there was no provision for the institution such as slavery in its customary constitution before the Europeans brought in slave traffic. In an African domestic economy, we find that the head of the family had a large compound built in the style already described above in the paragraph dealing with education. (1) He had also a large farm for proper cultivation and he wanted labour for the upkeep of these establishments. His numerous wives and children, according to the customary law supplied labour in the first instance, as already explained above. (1) His prisoners of war joined later on but the position of this latter class was formally lower than that of the wives or children. They were in the position almost like that of serfs, whilst the women and children were under the "protestas" of the "paterfamilias." The peculiarity of the customary law is that these prisoners actually formed part of the family and were addressed as children, although legally their status was not equal to that of the de jure children. They held the same position as "slaves" held among the Saracenic Society. (2) This description is substantially the same in the case of the political economy. Hence we find an eye-witness like Miss Tucker, who writes, after many years' experience and study among the Egbas or Yorubas:—"How true it is as the natives themselves express it? The root of the slave trade is in white's country, not in black man's—for if white man did not buy black man would not sell." (3) Again, in another place, she states:—"The captives taken on such occasions were condemned to domestic slavery, but it was of the mildest kind. The slave was then and still is considered as part of the family, is often called 'my son,' and a stranger would scarcely discern the difference between the freeman and the bond slave." (3) It is significant to note here that in the Yoruba or Egba country in Nigeria, during the reign of His Majesty King Okukeau, the first Alake of Abeokuta, in 1848, having experienced the horrors of this European slave traffic for not quite a century, took the initiative in sending a national petition to her late Majesty Queen Victoria to assist him in putting a stop to slave trade both outside and within his territory. As I have made frequent reference above to the Oriental law relating to slavery, I think it is necessary to state it very briefly here so as to be able to drive the point home, that the Arabs or Saracens could not have been responsible for the introduction of slave trade into Africa, although of course they might have taken a great part in it after its introduction by the European traders. In the first place, according to the Sermon on the Mount, Jabalul-Arafat, Mohammed taught—"And your slave! see that ye feed them with such food as ye eat yourselves, and clothe them with the stuff ye wear; and if they commit a fault which ye are not inclined to forgive then part from them, for they are the servants of the Lord and are not to be harshly treated." (4) (Koran).

) Ibid, p. 17.

) Ameer Ali Syed: "A History of the Saracens"; Mohamed's "Sermon on the Mount Jab-no-al-Arafat."

) Tucker: "Abeokuta, or Sunrise within the Tropics," p. 9 (footnote), p. 14 (footnote).

) (Koran). See also Ameer Ali Seyd: "A Short History of the Saracens."

I see no difference in this and Paul's teaching and idea on the subject when he wrote to Philemon concerning Onesimus, once Philemon's slave, who ran away from his master (Philemon) to St. Paul. In the letter to Philemon, Paul exhorted him to receive Onesimus back for ever, not now as a servant but above a servant, a brother beloved specially to me, but how much more unto thee both in the flesh and in the Lord." (1)

Please note in the Greek original the use of the two terms " Ho doulos " and " ton andrapodon."

It is therefore clear from the foregoing that the term "slavery" is hardly applicable to the persons who hold that status in Islam for slavery in Muslim bears no analogy to that practised during the 500 years of slave trade in Africa. The same is to be said in the case of Christianity as cited above. The two greatest Oriental prophets forbade *human chattelhood*. They were opposed to children being separated from their parents or relation being separated from another. Islam teaches that "slaves" (advisedly) should be fed and clothed and never to be ill-treated. They should also be allowed to ransom themselves or to work out their emancipation. Enfranchisement of "slaves" was declared to be one of the highest acts of virtue. The so-called "slaves" were in reality members of the household, (2) thus occupying an identical position in which the African customary laws have also placed them.

On the other hand, it is equally clear, as history discloses, that it was out of feudal system of Europe that economic and commercial slavery was evolved during the Middle Ages, and at the close of that period it was then first introduced into Africa in the 15th century by the Portuguese.

The history of the conquest of Spain and south of France by the Arabs or Saracens or Moors in the 8th century and their rule till the close of the 15th century seems to confirm the proposition. The Saracens found Spain and the whole of Europe under feudal oppression, taxation and all public burdens imposed by the rich, the noble and the privileged classes especially the clergy. The cleric lived in palatial buildings, while the cultivation of the soil was by the serfs attached to the soil or a miserable herd of slaves, who worked under the pitiless lashes of cruel overseers. There was no hope of freedom for them. Neither serf nor slave might possess anything he could call his own. In short, the whole of Europe was sunk in the grossest superstitions with moral state as much depraved and degraded as their material condition under the oppression of the kings, the clergy, and the nobles, these three classes forming the regular ancient triumvirate of the notorious feudal bureaucracy.

When the Moors or Saracens ruled Spain and France for 800 years the results of their ruling were (1) they swept away the power of the privileged classes, especially those of the clergy and the nobles, (2) the heavy public burdens that had crushed the industry and ruined the

(1) (Bible). Philemon, v.v. 15 and 16.

(2) Ameer Ali Syed: "A Short History of the Saracens."

strata of the population were at once removed, (3) the servile classes now assumed their position as human beings. Slaves and serfs were enfranchised and converted into tenant-farmers with a living interest of their own in the soil. Christian slaves that adopted Islam became free by operation of the law, and any complaint or ill-treatment under any Christian master towards his slave became a sufficient ground for his emancipation according to the Moslem law of the conquerors. (1)

There was also evidence to suggest that Europe alone was responsible for introducing slavery not only in Africa but also in Asia. For instance, during the Middle Ages, Europe used to trade in slaves, exchanging the wares and the manufactured articles of the Saracenic markets with European slaves. (2) The Saracens might have thus acquired a taste for this iniquitous trade from the Europeans at this time.

Again, during the Saracenic conquest of Northern Africa, Mauritania, Spain and south of France in the 8th century, it did not appear that they penetrated as far as West African coasts. (3)

- xii) Comparing the marriage and land systems of Europe, Africa and Asia together, it would appear that it is only in Europe that slavery so-called could be found to have been an aboriginal institution, most likely as a necessary part and parcel of feudal system, while in others, *i.e.*, in African and Oriental systems, it took quite a different form altogether if it existed at all, most probably because the African and Oriental systems were originally democratic or communal.

MARRIAGE SYSTEM.

The conception of marriage in Africa is very much similar to that of the Orientals, and at the same time widely different from that of the Westerners.

The first and most striking difference would be the manners in which wives were acquired—for it is at this point that both the validity of marriage and the position of women in the particular community might be properly determined.

The late Hon. J. M. Sarbah, Mr. Casely Hayford, Messrs. R. S. Blay, J. B. Danquah, and other Gold Coast scholars and writers have sufficiently proved that there was no marriage by purchase among Gold Coast communities.

As regards Nigeria, in the northern provinces the law of the Koran prevailed from time immemorial and still prevails now. In the south, among the Yorubas there was no such a thing as marriage by purchase. No woman was or is regarded a mere chattel. No man may lawfully take a woman to himself as wife unless he has gone through certain very imposing and elaborate customary ceremonies which of course necessarily entail expenditure on the part of both the man and the woman but more so on the part of the man. The two recognised and most important cere-

(1) Ameer Ali Syed : " A Short History of the Saracens," chap. ix.

(2) Sanderson's " Outlines of the History of the World's History," p. 342.

(3) Sanderson's " Outlines of the History of the World's History " and Ameer Ali : " History of the Saracens."

monies were and are still (1) the "Ijohun" meaning literally "consent" ceremony and (2) the "Idana," *i.e.*, the ceremony immediately preceding actual marriage, which some writers choose to term "dowry," others imitating English or European idea term them marriage settlements; but in my opinion these names seem quite inapplicable to these African marriage ceremonies, but whatever name you like to give them, they by no means convey any idea of marriage by purchase or what some choose to call "bride's price."

The customary law on this point is virtually the same in Gambia, Sierra Leone, Togoland, Cameroon, among the Bantus, and almost everywhere in Africa.

In the "Ijohun" ceremony you find what we may term marriage by consent, but this consent was primarily given by the family of the bride and secondarily by the parties themselves. This is not the proper place to deal with this point in *extenso*.

The following are the other African customary laws relating to marriage which play some important part in our consideration of the real point in issue here :—

- (i) Marriage, in the African idea, is the union of man and woman for life.
- (ii) All women must be protected through customary marriage and therefore no woman may be without a husband.
- (iii) All women within child-bearing period remain silent in all public affairs but in family life they are to be, as it were, helpmeets to their husbands.
- (iv) No system of paid servants, but the labour of such servants is partly supplied by women in communal sense.

How these rules bring about the difference as well as the similarity as referred to above will be explained below.

Position of women in the family.

From the foregoing, the following are the results as regards the position of an African woman in the family :—

- (i) She is a wife and mother of the family with certain rights and duties, as such, exclusively assigned her.
- (ii) She is under the protection of the husband and at death of husband under the protection of the deceased husband's family or relatives, particularly that of her sons (if she has any).
- (iii) She is a separate and distinct entity in the family for all purposes, her personality not being merged in that of the husband.
- (iv) She can own property, trade, enter into contact with anyone, sue and be sued apart from her husband.
- (v) She has the custody of the children up to their age of discretion, when naturally the male children go over to the more direct notice and supervision of the father and the female remain with the mother.
- (vi) To the wife's control is much of the domestic work and the customary education of girls is generally directed with a view to acquiring such knowledge as would enable them to discharge efficiently the domestic work of their respective future husbands. All work done by women is natural and adaptable to their sex. African economic life being simple and communal there was no system of paid servants, con-

sequently much of the work ordinarily done by paid servants in the European system was usually done by the class of women in the family called the "Iyawos" in Yoruba language; but at the introduction of slave trade into Africa the "Iyawos" are free from this menial work, this being performed generally by the so-called slaves of the family or by the prisoners of war.

Wives being acquired *not by purchase* but by the customary ceremonial law as already explained above, the status of the African woman was and is almost as equal as that of the man in the family with the exception that she is subject to him for protection just as any protected person within the British Empire is subject to the Crown of England in so far as the protection afforded him by the Crown is concerned; and as the King of England neither regards nor treats such protected person as his slave or serf so the husband in the family does not regard nor treat his wife or wives as slaves or serfs. The fact that she is capable of holding property, trading, contracting, suing and being sued, nullifies or dismisses at once all notion of slavery on the matter of women's position in the family.

Position of women in the State.

Women that have passed the age of child-bearing, as a rule, take very large part in public affairs. These women are generally titled ladies, with varying state or district customary duties.

In Egba or Yoruba country the highest civic title or honour conferred on ladies is "Iyalode," the Lady President, or "Prima inter pares" of the women in the community or district. She has usually twelve titled co-adjutrices or assistants who ordinarily form with her a court to settle petty disputes among the women within her jurisdiction. Iyalode is always at the head of the women at all state occasions and also in time of war when women take part in it. (1)

Women are governors in many parts of Africa. It is a commonplace matter to find a whole village or district under the control of one woman for its administration. Thus we find that the position of women in the State is comparatively higher and more responsible than their position in the family circle alone.

From the foregoing it is quite evident that the only clear mark of the woman's subjection to man in Africa seems to be that of the consideration for the protection afforded her by the man and this of course is also the result of the father right which prevailed and still prevails in Africa. Thus it is clear that the condition of slave or serf as regards the status of women in Africa does not arise.

Similarities between the African and the Oriental systems of marriage.

The following are some of the marks of similarity observed between the African customary system of marriage and that of his Oriental brother, all tending to prove the fact that the African and the Oriental idea of marriage is very much alike while widely different from that of their European brother:—

- (i) Polygamy is a common feature in both systems.
- (ii) The status or position of women is not that of a slave or chattel but as already explained above.
- (iii) The Chinese rule, which recognises, in every family, one being a chief wife while the rest are secondary, finds a counterpart in the Egba rule of "Iyale" and "Iyawo." (1)
- (iv) The rule that the parents or families of the parties to marriage are primarily concerned in the arrangement or negotiation of the match is the same as found in the Babylonian code of law in the time of Hamurabi, cir. B.C. 2250-1950. (2)
- (v) The Yoruba and perhaps African archaic customary law of early intimation of young people bears much resemblance to that of the Japanese. I am referring here to betrothals in childhood. (3)
- (vi) The right of women to trade, contract, sue, and be sued, and to own property apart from their husbands, is the same as that of the ancient Egyptian.
- (vii) The Oriental rule that where the wife pledges herself, if she afterwards leaves the husband, she must restore all his gifts tenfold, seems to agree with the Egba (African) 'Oji,' i.e., something similar to the damages claimed in the European system, from the woman's corespondent. (4)
- (viii) The archaic special privilege enjoyed by the African kings and chiefs in maintaining a large harem (as is popularly nicknamed) is in accord with the custom of the Hebrews, the Arabs, the Egyptians, and other peoples in the East. (5)
- (ix) The idea or rule that all women must be under the protection of man and this through marriage seems to find a counterpart in a similar rule enunciated in the Manu code of law relating to the three obediences to which women are to be subject, namely (1) when young to their parents, (2) when married to their husbands, (3) when widows to their sons. (6)
- (x) The rule that the widow belongs to her husband's family or relations and that any of the deceased husband's brothers may legally take her to wife, finds counterpart in the Mosaic or Levirate Law. (7) This is also found to be the same in the Manu Code. (8)
- (xi) The following appear to describe fully the African conception of marriage for the most part. The editor of the "She-King," writing about Chinese law of marriage, says "Young people, and especially young ladies have nothing to do with the business of getting married. Their parents will see to it. They have merely to wait for their orders. If they do not do so but rush to marriage on the impulse of their

(1) Cf. "She-King," Part I., Book VII., Ode 8; with Ellis: "The Yoruba Speaking Peoples, p. 164-176.

(2) Hobhouse: "Morals in Evolution," p. 179.

(3) "She-King," Book IV., Ode 7; *The Daily Mail*, 19th Nov., 1924.

(4) "Revillout," p. 1002.

(5) Maspero: "Dawn of Civilisation," pp. 270 et seq.

(6) Manu Code of Law V., 147 and 148.

(7) *In re Boaz and Ruth, the Book of Ruth.*

(8) Manu Code of Law, ix., 60.

own desires and preferences they transgress the rules of heaven and violate the law of their lot." (1)

The following Chinese ode relating to the same point, finds identical expression in the African mind and marriage law :—

“ How do we proceed in taking a wife ?
Announcement must first be made to our parents,
Since such announcement was made,
Why do you still indulge her desires ?
How do we proceed in taking a wife ?
Without a go-between it cannot be done.” (2)

- xii) The African rule that the head-wife, termed in Yoruba “ Iyale,” should show no jealousy of her junior mate or mates, but rather than that, should display her affectionate devotion to the husband through them, finds better expression in the following concluding verse of a Chinese ode on this point :—

“ When your arrows and line have found them,
I will dress them fitly for you
When I know those whose acquaintance you wish,
I will give them of the ornaments of my girdle,
When I know those with whom you are cordial,
I will send to them of the ornaments of my girdle,
When I know those whom you love,
I will repay their friendship from the ornaments of my girdle.” (3)

- xiii) The rule that the elder of two sisters should first be married before the younger is in accord with the Hebrew or at least Padanaram custom. (4)

Coming now to passing few observations on the European system relating to marriage and position of women among their communities we may find how their conception in these matters was originally and for a long time widely different from that of either of the African or of the Oriental. A short glance over the history on the matter may make this clear at once.

In the first place, one can safely lay down the following proposition as being nearest to if not the whole truth, that a doctrine of inferiority of the female sex seems to have been from time immemorial most pronounced in the Western social system.

The Greek philosophers, including Aristotle, assigned a far inferior position to women in Greek civilisation. Aristotle went so far to deny the existence of any virtues like courage, temperance, justice and such like in women. (5) Rome adopted Greek philosophy in a modified form but in so far as the position of women was concerned their condition was only a little better when their Empire adopted Christianity as their national religion in the 4th century A.D., although before that time, through various enactments, many privileges had been accorded them.

(1) “ She-King,” Book IV., Ode 7, stanza 3, note.

(2) “ She-King,” Book VIII., Ode 6, stanzas 3 and 4.

(3) “ She-King,” Part I., Book VII., Ode 8.

(4) In re Jacob’s case with Leah and Rachel (Genesis).

(5) Sanderson : “ Outlines of the World’s History,” p. 164.

The European nations now known under the names of Germans, French, English, Irish, Spanish, Portuguese, etc., were all polygamists at the time the Roman Empire first came in contact with, conquered and ruled them ; but when they became Christians monogamy seems to be the rule. But the idea of the inferiority of women was all along prevalent. Women in Europe seem to have experienced the worst condition of status during the Dark Ages, and even throughout the Middle Ages down to the beginning of the 16th century. But it would seem that through contact with Oriental nations, especially the Saracens or Arabs, during the crusades to the Holy Land as well as with the Moors who ruled Spain and south of France during this period, the position of women in Europe began to change for the better. However, chivalry which did much in this change was introduced into the European feudal society after the crusades. This might be due to contact, during the crusades, with the Saracenic civilisation in which, according to the Koran, slavery or serfdom was a forbidden practice. (3) It is also noteworthy that it was immediately after the crusades and during the Saracenic rule in Spain and France that feudalism began to decay, love of freedom and liberty began to grow all over Europe and religious scepticism started. Hence Sanderson says as regards the effect of crusades on feudalism, "the edifice of feudalism was undermined in the alienation of the estates of proud, martial, and oppressive barons, and in the frequent extinction of their race by death in war"; (1) and Gibson says "their poverty extorted from their pride those charters of freedom which unlocked the fetters of the slave secured the farm of the peasant, and the shop of artificer, and gradually restored a substance and a soul to the most numerous and useful part of the community." (1)

It is a fact of history that at this time the Oriental nations especially the Arabians were far superior in knowledge, industry, science and art to the European nations, and it was from and by them revival of learning, the breakdown of feudalism and its servile incidents, the reconstruction of Europe upon constitutional, in place of, feudal governments, and in short the modern civilisation was started. (2)

An evidence of this was that it was at this period, after the crusades, on the return to Europe the famous Magna Charta, the charter of freedom from feudalism, the foundation of the English constitution was demanded from the feudal King John of England. Henceforth the desire and love for freedom of the person, speech, opinion and particularly of service began to grow up not only in England but everywhere in Europe. Spain being at this time the foremost of all, and Spain was the seat and centre of the Saracenic civilisation in Europe. Here in Spain and France the Saracens first surpressed the tyrannies and oppressions of the feudal system especially slavery and serfdom in the 8th to 10th centuries, and thence the decline of feudalism spread throughout Europe. (4)

The idea that wives were or are acquired by purchase as though they were forks and knives in the market stalls seems to be peculiar to Europe, for

(1) Sanderson : " Outlines of the World's History," pp. 329.

(2) Sanderson : " Outlines of the World's History," pp. 328-337, and pp. 362-363.

(3) Ameer Ali : " A Short History of the Saracens,"

(4) Ameer Ali Syed : " History of the Saracens," chap. ix ; Sanderson : " Outlines of the World's History," pp. 328-337, 362-363.

it does not appear to be in any African or Oriental systems of marriage. But this idea does not sound strange in consideration of the feudal system, whose chief characteristic feature was servility and whose spirit and tendency was always to enslave certain class or classes of the community in which it existed.

The following instances seem to furnish us with some idea of what is meant by the customary idea of acquiring wives by purchase:—

“The Rumanian peasant who offered to sell his wife recently (*i.e.*, 1924) for ten bottles of beer, valued her so low that his customer doubled the price. But even he thought her worth more than the husband who sold his wife at Alfreton, Derbyshire, in 1882, for a glass of ale! It was once a common belief in England that a husband could make such a sale legally provided he led the wife with a halter around her neck to a public market and there auctioned her. As late as 1887 a man sold his wife at Sheffield for 5s. In 1797 a butcher put his wife up for sale in Smithfield Market, and disposed of her to a hog-driver for three guineas and a crown. Commenting upon this and on the sale of an ostler's wife for twenty-five guineas, a daily newspaper of that period said: “We hear there is to be a sale of wives soon at Christie's. Their price has risen in Smithfield Market from half-a-guinea to three guineas and a half. In 1802 a mixed lot consisting of a wife, a child and some furniture was sold in Derbyshire for eleven shillings, and in the following ten years wives were sold in all parts of the country at prices varying from four shillings and a bowl of punch to six pence and a pound of tobacco.”

One of the women sold was described as being “from twenty to twenty-three years' old, good looking, but she was eventually exchanged for one pound and a Newfoundland dog.”

A husband who sold his wife for five guineas, gave her one guinea to buy herself new clothes, and then went to a neighbouring town and had the church bells rung to celebrate the occasion. These transactions, which date from the time when a woman became the “chattel” of the man whom she married were looked upon by the poorer classes as a kind of voluntary separation between the parties. Indeed so great was the faith of the poorer classes in the legality of these public sales of wives that when a man was sent to prison in 1837 for trying to sell his wife his case raised a public outcry of surprise and indignation.” (1)

Clearly the above, in so far as England is concerned, was not the law of the country as far as the law enacted by Parliament or declared by the courts, but it was certainly the customary law of England and Europe, and the only value of it here is that it gives us just an idea of how an idea of acquiring wives by purchase in this way easily leads one to the same conclusion in a foreign society in which something almost similar to that occurs.

However, the emancipation of women in Europe went on gradually. During the Middle Ages the position of women was very inferior, for the husband had the power to chastise, kill, or sell his wife. The wife was acquired by purchase from her relations without any reference to her own desires and by the purchase she passed out-and-out of her family. She could acquire no property, nor sue or be sued, nor contract. She was

(1) W.H., the *Daily Express*, 6th August, 1924.

subject to the Chinese rule of three obediences as mentioned above, plus the rule of feudal lord. Blackstone tells us that the English woman if not altogether the husband's slave was his liege subject. Her personality merged in his. She was not responsible for her crimes committed in his presence. (1)

It would seem that the Bible has also taken part in imparting this doctrine of women in all Christian people in Europe for canon law upholds the Pauline doctrine of "Wives obey your husbands," and gives effect to it in the church matrimonial service.

But the Chancery Court came to their relief in a certain way in the matter of holding separate properties under the doctrine of the wife's separate property with a restraint in anticipation. Their position gradually advanced until in 1882 the Married Women Property Act and subsequent Acts almost entirely freed them from the old feudal bondage; and in 1919 they became politically free.

From the foregoing it is quite obvious that in so far as aboriginal institutions and customs are concerned in Europe, Africa, and Asia, both both external and internal evidences go to prove conclusively that the slave system or policy was part and parcel of European economic, social and industrial system and that it is the contrary case in either the African or Oriental system. This is proved by the analysis of the Land and Marriage Systems of the three races.

In view of the above remarks and with all due deference to Sir Frederick Lugard's authority, I venture to differ entirely with his view as expressed in a passage at page 5 of the introduction to his "Dual Mandate," and I submit that there was no commercial slavery nor slave traffic of any kind in Africa before Europe came in contact with Africa in the 15th century, when the Portuguese was the first to start the abominable practice and Great Britain played the most prominent part when she joined later.

2.—The Cause or Causes that led to the Introduction of Slave Traffic into West Africa.

Professor Coupland (2) and all other writers and thinkers agree that the real cause of the introduction of slave traffic into Africa by the Europeans was labour supply for the European plantation in America and West Indies. Europe first emerged from physical slavery during the Dark Ages to economic slavery under the feudal system in which villeinage or serfdom was a curse. With the 12th century ended the period of the Dark Ages and Europe next emerged from the system of serfdom to that of free and properly or fairly remunerated labour which began to develop about the 15th century, so that it became impossible, after the discovery of America in that century, to get white labour as cheap as in the days of either physical slavery or serfdom. It was impossible to obtain labour from among the Red Indians, the natives of America at this time; then it came to the minds of the capitalists of Europe to turn to Africa and take their chance to introduce into any part of Africa where they could, the system of traffic in human beings, *i.e.*, commercial and physical slavery, through

(1) Blackstone : Vol. I., pp. 430-433, 1765th Edition.

(2) Coupland : "Wilberforce," a narrative, pp. 68-74.

which they themselves had passed through and found to be inimical to the progress of any nation or race. It was pure chance taking at the commencement, and they knew perfectly well they were going to meet with all opposition. When they captured at a certain occasion some black men who were taken to England, they found that three of them were Moors, they returned these three to the Moorish country, which, of course, is abutting Negroland. The reason for this is not hard to see that the Moors until very recently were ruling the Europeans themselves in Spain and south of France.

3.—Slave traffic period and the part played by Europe and Africa respectively.

Professor Coupland (1) again tells us that there were usually three ways of obtaining slaves for shipment to America and West Indies, namely : (1) by the Europeans themselves in armed forces falling upon defenceless villages and towns suddenly by night, and capturing men, women and children. Of course, there is no need to dwell on this masterpiece of barbarity, for the Europeans themselves have admitted it ; (2) the second was by buying them from Arab slave dealers ; and (3) by instigating the chiefs of the country to march against his innocent neighbouring towns and villages in an unprovoked war and raiding them to be sold to European slavery. Professor Coupland clearly shows that in so far as these chiefs are concerned the methods by which the enslavers instigated them to participate in the business which was actually immoral and ruinous ultimately to their own interest, coupled with other surrounding circumstances, actually made it extremely difficult for any such chiefs to escape the temptation to yield to the enslavers' requests. We have also noticed above that the Africans themselves at the very commencement tried all their best to resist every effort and attempt to establish this horrible business in Africa but they failed ultimately. However, in my opinion the African chiefs at this time who took part in the traffic must have their share of verdict to European enslavers. As regards Europe, it is generally argued that slave trade was regarded by the men of Europe at this period as a legitimate trade, and therefore they were not conscious of the fact that what they were doing then was a wrong. An argument of this sort, in my opinion, seems quite untenable in the face of the following facts :—

- (a) It has been already observed above that Europe herself had once passed through physical slavery in her history and because it was immoral she gave it up. How then could she plead ignorance now in the case of slavery of the 15th century which happened several centuries after her own ? (2)
- (b) The story of how this trade was started as related above shows plainly that they knew it was an immoral thing. (2)
- (c) If both Europe and Africa were to be taken to be ignorant of the immorality of this sort of business then it stands to reason that Europe and Africa at this time were equally barbarous and none was more civilised than the other.

(1) Coupland : "Wilberforce," a narrative, pp. 64-78.

(2) *Ibid.*, pp. 40 and 41.

- (d) The capitalists, who financed this business were mostly sons of gentlemen trained at the various European universities at the time, can we take it that these did not know at that time that Christianity was opposed to slavery? What sort of capitalists, statesmen, churchmen, and teachers the Universities of Oxford and Cambridge and Paris and Berlin, etc., used to turn out for the space of 500 years that none could be found to realise that this was an immoral trade? But what sort of Christianity said to have been taken to Benin in 1471!!! Christianity that said "dearly beloved brethren, arise, let us go and enslave our brethren, the Africans!!!"

I can only conclude this portion of our enquiry by quoting the following ethical or equitable rule of Christianity which I am sure the Europeans were aware of at this period :—

"And that servant which knew his Lord's will and prepared not himself, neither did according to his will shall be beaten with many stripes. But he that knew not and did commit things worthy of stripes shall be beaten with few stripes. For unto whomsoever much is given, of him shall be much required, and to whom men have committed much of him they will ask the more." (1)

4.—Effects of slave traffic in Europe, Africa and America.

As regards Africa, for about 500 years she was slowly, systematically and completely ruined. All her institutions were disorganised. She and Europe seem to have been exactly or fairly at the same stage of economic progress when both first met in the 15th century, and had both continued the legitimate trade that first started between them in the 15th century, there is no reason why both should not have been moving at exactly the same pace to-day. In short Africa had no opportunity to make the slightest possible improvement in anything whether political, educational, commercial, social, or otherwise.

On the other hand Europe and America robbed her to improve and enrich themselves, so that by the end of 500 years Europe and America were found to have gone very far in the way of advancement in civilisation, while Africa had retrogressed almost to the primitive stage of any human civilization. One of the inevitable consequences of this has hitherto been the great difference existing between the economic life of an African and that of his European brother, which constantly renders commercial and industrial dealings on equal footing between each other extremely difficult. This is the cause of race problem and colour prejudice. This is the cause of all frictions between the Africans and the Europeans. Take, for instance, the question of palm oil industry which, at present, is taxing the brains of all concerned in the matter, government, merchantile, the Native administrations and others. This question would have been solved by the Africans themselves perhaps 300 years ago had there been no slave traffic, because both Europe and Africa had reached the manufacturing stage in their respective economic advancement about the 15th century so that it would seem to be unfair to start now to devise means whereby the Africans should be mere raw materials producers.

(1) St. Luke, xii., 47 and 48.

5.—Abolition of America.

Slave traffic was introduced into America. The missionary honestly did. But the religion presuming not practice. Its abolition was at first not purely from the viewpoint, but in hope of obtaining still larger quantity and better quality of labour from the same race of people while they should be personally free. In America the contrary happened, the enslavers were much disappointed and competition having been apparent, race prejudice started.

In Europe the family of nations started a campaign for the partition of Africa by entering into unequal treaties with the Native chiefs who were not only illiterate but had not recovered in any measure from the shocking effects of the 500 years' European slave traffic; for apart from illiteracy one could only expect that all or the majority of the generation of chiefs that gave their signatures to all treaties made since the abolition of slave traffic up to this time are still more or less affected mentally with the shock and horrors of the 500 years' slave traffic. When a scramble over Africa came, in order to prevent frictions between the powers, the Berlin decree of 1885 gave licence to the family of nations to partition and exploit Africa in another method which would not bring about any differences between themselves alone. Then came in the doctrine and law of trusteeship, introduced into Africa, an unknown to and in fact, an incompatible question with the African customary law. From this doctrine various problems never before known in Africa have to-day derived their sources. (1) I shall mention here a few of these problems:—

- (i) The land question (1) I shall only refer you to read the following in order to understand the great problem involved under this heading:
 - (a) The Crown Land Bill of 1894 (Gold Coast).
 - (b) The Lands Ordinance of 1897 (Gold Coast).
 - (c) The Forest Bill of 1911 (Gold Coast).
- In all of which Messrs. Casely-Hayford; the late Hon. J. Sarbah figured most prominently.
- (d) The judgment on the "Foreshore Case" of 1911 (Lagos), and the debate in the Legislative Council at Lagos on the Ikoyi Lands Ordinance of 1908 by that able and great lawyer, the late Hon. Sapara Williams.
 - (e) The Oluwa case of 1921 (July), in which Mr. Herbert Macaulay figured most conspicuously.
 - (f) The recent decision of the Privy Council in the Swaziland Land Question (April, 1926).

The question of land produces naturally problems attendant upon it, namely, labour, trade, and industry and education, and, in fact, every other problem possible, for a landless race should better depart out of existence altogether than remain on earth either as a scandal to mankind or as a race of beggars.

- (ii) We are all aware of labour question in East and South Africa and in Kongo. The question is slowly coming on in West Africa, but we are still not aware of it. It is creeping in imperceptibly.

(1) Vide Essay on Land Question in Africa, by Ladipo Solanke.

- (d) The capitalists who finance men trained at the expense of the masses take it that they are disposed to. teach them to mine otherwise, in other words, market finally, not to be suppliers of materials and labour.
- (iv) The policy adopted in the matter of trade and industry determines the quality and quantity of education a race destined to eternal and noble order of peasantry should have. I need not expatiate on this than to say that the Family of Nations do not seem to mean that Africans should become lawyers, engineers, medical men, inventors, scientists, and such like, for they fear there may be none to till the land for *the masters*.

CHAPTER IV.

WEST AFRICA'S THREE "R'S," NAMELY, ITS RESTORATION, REGENERATION AND RISE ; ALIAS WEST AFRICA IN THE FUTURE.

This chapter I propose to divide into the following sections :—

- 1.—The part already played by the Family of Nations up to 1925.
 - 2.—The part already played by the Africans themselves up to 1925.
 - 3.—The part that ought to be played by the Family of Nations in Future.
 - 4.—The part that the Africans themselves should play in future.
- 1.—The part already played by the Family of Nations up to 1925.

The Family of Nations may be represented here as composing the missionary bodies, the European merchants, and the political officers who went to Africa for the alleged purpose of developing it.



The Right Rev.
Bishop TUGWELL, D.D.,
late Bishop of Western Equatorial
Africa.

After the abolition of slave trade and up to 1925 the missionary honestly did all he could to educate the African and give him a religion presuming all the time that he (the African) had no religion of any kind. But the religion the missionary gave is that which he himself cannot practice. The education he gave him was not national at all. He was taught to regard everything African as fetish and bad. His dress, his food, his customs and institutions were all supposed to be fetish and useless, and thus he was made to abandon them. The religion, not having been grafted in the African tribal life and institutions, must ultimately come to the same grief as that of the former ancient North African Church.

The merchant did not disguise his aim and that was to get out of the African as much profit as he could through trade dealings. He therefore did all he could to encourage the African to abandon his African dress and food as well as his customs, and to adopt everything European. The result was the smashing up of all African indigenous industries and trade and the reducing of the African himself to a mere wage-earner and a miserable proletariat. The merchant further aimed at capturing the African right to land, alleging that his lands must be seized because the presumption is that he himself is incapable of developing them.

The political officer thought he had no law, nor order, nor any form of government before, and therefore whatever appeared to be bearing any image of law, order and any form of government according to his own traditional fashion and creation must be scrapped up and a foreign one substituted.

Thus, all the three departments of the Family of Nations honestly, it may be, started at the wrong ends up till 1925. Please note that these three departments are the direct successors of the European ancient feudal triumverate, viz., the King or Crown, the Clergy, and the Nobility. (1)

2.—The part already played by the Africans themselves up to 1925.

After the abolition of the slave trade the unlettered chiefs and authorities in West Africa and elsewhere had played their part most nobly. Most had fought in the interest of their fatherland. (2) One sole policy ran through all of them and that was the spirit of independence. Not to be under any Power or influence of any kind whatever. Each fought for complete sovereign right, his ancient and undoubted rights, but as they were not aware of the extent to which the 500 years' European slave traffic had reached in so far as they and the outside world are concerned together, they were baffled and they had no alternative but to come to some temporary compromise with the Family of Nations, the foreigners in their soil with hope that the Family of Nations would fulfil their faith and pledge and thereby ultimately assist them to restore, regenerate, and give a complete and lasting rise to their Motherland Africa. Hence they made no hesitation in entering into those various and unequal treaties.

(1) Sanderson : " Outlines of the World's History," p. 328.

(2) e.g., Nana Prempeh, the Omanhene of Kumasi ; the Oba of Benin ; the King of Dahomey.



NANA PREMPEH, the Omanhene of Kumasi, the Paramount Natural King of the Ashantees, Gold Coast. The great-souled Son of Africa (Divus Magister).

The educated, having been wrongly trained have hitherto not known exactly where they are. The greatest evil that had hitherto resulted from the system of education given seems to be that of disunity and non-co-operation first among themselves and secondly between themselves, as the educated company of West Africans and their natural rulers. The next evil seems to be a corollary of the first, that is, that of individual efforts unconnected, and no centralised efforts. Another evil seems to be want of constructive policy. Another was want of action even where a good policy was formulated, and last but not least, was lack of continuity.

A short description of the present political status of the African or Ethiopian States.

CLASS I.—FULLY SOVEREIGN STATES.

This includes :—

- 1.—Abyssinia—now a member of the League of Nations.
- 2.—Liberia—now a member of the League of Nations.
- 3.—Egypt—not yet a member of the League of Nations.
- 4.—Morocco is as yet an international zone.

CLASS II.—SEMI-SOVEREIGN STATES.

This includes all European Protectorates in Africa, among which the most prominent are :—

- 1.—The Emirates of Northern Nigeria which preserved their full independence up to 1900.
- 2.—The Yoruba Commonwealth. This includes the Egbas who maintained their full sovereign independence up till as late as 1914 ; the Oyos and the other Yoruba towns up to 1893 ; the Benins up to 1897 ; the Dahomians up to 1896.
- 3.—The Ashantees who maintained their sovereign independence up to 1900, and the Mendes and Timnees up to 1898, the Ibos and the Mandingoes.
- 4.—Swaziland in South Africa ; Uganda and Zanzibar in East Africa.

CLASS III.—ABSOLUTELY DEPENDENT STATES.

This includes all European Colonies and Mandated Territories in Africa.

- 3.—The part that ought to be played by the Family of Nations in future.

The missionary, having found out the errors in both education and religion, should now correct them. He should now give national education to the African. He should study the native religion now that he is aware that the Native had one before, containing germs of truth. He should simply try to graft in the native-religion those beautiful Christian ideas



The Right Rev.
Bishop MELVILLE JONES, D.D.,
The Bishop of Lagos.

which are more sublime than those of the native. In short, he should give a religion which is compatible with his national aspirations. In this connection I should like to make special reference to dress and food. The missionary should discourage European dress and encourage the native dress and teach the Native how to develop and acquire love for his own dress in accordance with his circumstances and climate. He should discourage the Native from acquiring any taste for any foreign food or diet; but rather encourage him in keeping to his own diets which, by nature, are more nutritious, healthy and adaptable to his condition and welfare.



The Right Rev.
Bishop LASBREY, D.D.,
the Bishop on the Niger.

All foreign names should be discouraged and ultimately abolished, root and branch. The African, unlike the European or Westerner, has some sort of excellent store of civilisation to offer to the world through his meaningful name. In order to further the development of this store the African should be taught to actually detest being addressed in any foreign names. Besides this, these foreign names should be entirely abandoned for the simple reason that they often bring to us the sad memory of the slave period which we and the present descendants of our enslavers desire to forget as soon as possible.

The missionary must remember that he originally went to Africa for philanthropic purposes and that the credit of the present progress in Africa is wholly due to him. In order not to mar this great and inestimable good work he has hitherto done for Africa, he should try to go quietly about his religious business alone in Africa, and never to attempt to join the British capitalist in any commercial schemings and devisings. (1) It was an error on the part of the missionary to join the British capitalist in the resolution passed at Knocke, in Belgium, a little while ago, touching the African land question and education. Let the missionary keep himself aloof from the British capitalism. Let him have nothing to do with British Imperialism. If he can carry out the above there is no reason why we should not juggle along together in West Africa in peace.

(1) e.g., Case of China, vide "No More War," Vol. VI., No. 9, June, 1927, p. 2 (The Christian Press and China); British Imperialism in East Africa.

Concerning the Christian Church Let his
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The late Right Rev.
Bishop CROWTHER, D.D.



The late Right Rev.
Bishop JOHNSON, D.D.



The late Right Rev.
Bishop PHILLIPS, D.D.



The Right Rev.
Bishop HOWELLS, D.D.,
Assistant Bishop on the Niger.



The Right Rev.
Bishop OLUWOLE, D.D.,
Assistant Bishop of Lagos.

In ancient times Christianity was introduced into Africa by peaceful means and the Church in North Africa then contained not less than 300 bishops. For centuries Christianity was part of the Common Law of Africa. The names of the following first African bishops, popularly known as the Early Christian Fathers, are still fresh in our memory:—Tertullian (A.D. 160-240); Origen (A.D. 186); Cyprian (248); St. Athanasius (296), founder of the famous Nicene Creed. But ultimately the North African Church disappeared because it was not properly grafted on African life and institutions. In the mediæval times Islam came, ousted Christianity and became part of the Common Law of Africa by the end of the 10th century when not less than 15 Negro kingdoms adopted it. Islam, having been better grafted in the African life and having promoted in a large measure universal brotherhood among the aborigines, continues till to-day to flourish in Africa with an alarming rapidity.

In modern times, Christianity again made its appearance in Africa by way of the West but it would seem that having been introduced at this time by three "B's," viz., the Bible, the Bruise or liquor, and the Bullets, its progress has been greatly hampered, firstly, because the first "B" was not properly grafted on African tribal life and institutions, secondly, because the other two "B's" are impossible co-workers with the first "B" and ultimately the second African Church may go the way of the first. We therefore most earnestly appeal here to the present Right Revd. Fathers of the present African Church to give us a real African National Church.

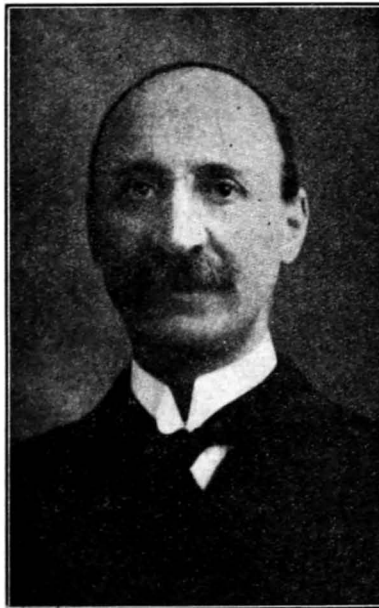


LORD VISCOUNT LEVERHULME,
the Governor of Lever Bros., Limited.

The merchant should in the first place give up scheming and devising ways and means to defeat our land rights in West Africa. He has done enough of this in East and South Africa. He should know that we are quite aware of his activities in this matter for the past three or more years. We keenly and closely follow him in his propaganda work relating to this matter everywhere in this and other countries. We have read and con-

tinued to read his plans to effect the same. Let him know at once that we do not want to fall into the same errors that they had fallen in their own civilisation in which a few hundreds possess land rights of some form in their communities, whilst millions have constituted practically a landless race or class.

Let him realise that there is no feudal system in Africa and therefore the "feudal individual ownership" in lands does not suit us. We have "Ogboni Individual Ownership" system which we intend to develop by ourselves into an up-to-date and perhaps a superior system in which both individual ownership in lands will be recognised and at the same time wealth will be so fairly distributed that an extreme aristocracy which is a curse to Western civilisation will be ultimately avoided.



Mr. ROBERT MILLER,
the recently elected Chairman of the African and Eastern Trade Corporation, Ltd.,
a distinguished West African Magnate.

The British capitalist should now recognise that we had before, mining rights, and let him also concede to us our ancient rights of controlling or dictating the prices of our wares. Let him realise that we had long ago left both the hunter's the fishing and the pastoral stages of political economy and have long arrived at both the agricultural and the manufacturing stage, and our political creed is enunciated in the doctrine of "Free Trade."

Let him know that we do not want the Congo system he has hitherto been advocating to be adopted and that his alleged Sumatra and Jarva

palm oil competition has not so much to do with us as he often presumes. Let him be patient with us and we shall develop the land by ourselves. If these are done, there is no reason why the merchant should not juggle along together with us in West Africa in peace and happiness.

The political officer should assist the uneducated that is the present Natural Rulers to regain their full sovereign rights by encouraging, advising and giving them opportunity enough to educate the masses of their people. He should restore their military institutions and teach them to bring them up to the modern standard.⁽²⁾ He should encourage them to unite and co-operate with the educated elements among them who are their own children instead of trying to sow any seed of disunity and hatred as it appears it is occasionally done. ⁽¹⁾ There should be no restriction as to the education of the Africans, and encouragement should be given to all capable ones by giving them responsible government posts. He should seek to unite and co-operate with the educated elements to assist in the development of the country. No change in the land policy detrimental to the African should be embarked upon. He should not drive the African too fast simply because the economic conditions of foreigners must be satisfied. He should guard himself against the error and temptation of allowing himself to be used as a tool by the foreign or European capitalists in the scheme to defeat African land rights, as had already occurred in East Africa. ⁽³⁾ He should remember that he goes to Africa not to trade but to maintain law and order, not as a Unionist or Socialist but as a policeman and judge. He should not join in conspiracy with the missionary at this 11th hour of the day, to give the African only a rural paltry education in order to reduce the African to a mere peasant proprietor.

He should give up the idea (if any) of regarding every educated element as his enemy. He should regard him as his friend under his protection having neither power nor force nor any jurisdiction as a cause for jealousy. He should give him honourable employment either in the service of the Crown or under his own Natural Ruler in the Native Administration in as much as he claims to be his protector and guardian, he will supervise him either directly under the Crown Colony Government Service or under the Native Administration Service. Let him seek his co-operation in his indirect rule, over the protected people of His Majesty the King. Let him realise that without him he cannot properly discharge his duties of the so-called trusteeship. If he wants to understand the natives properly he can only do so through the educated element. Let him embrace the educated as his brother, his co-partner in the duty of guardianship of Africa. Let him avoid any mischievous propaganda against the educated. ⁽⁴⁾ It will

(1) Vide Report of Hon. Mr. Ormsby-Gore's tour to West Africa (cmd. 2744), 1926; also the controversy between Colonial Office and the Coast lawyers (West Africa), 26th February, 1927, p. 195, cf. with "West Africa," 11th Dec., 1926, p. 1677.

(2) Vide the "Dual Mandate," the introduction, where Sir Frederick Lugard records the fact that the African Natural Rulers were deprived of their military institutions by the Family of Nations in a clause in the Berlin Decree of 1885.

(3) Labour Research: "British Imperialism in East Africa."

(4) The Report of Hon. W. G. Ormsby-Gore's visit to West Africa (cmd. 2744), p. 117; the speech of the Hon. C. A. Rhys (Parliamentary Under Secretary to Hon. Mr. Ormsby-Gore, the Under Secretary of State for the Colonies), made in the House of Common July 29th, 1926.



THE RIGHT HONOURABLE MR. L. S. AMERY,
the Secretary of State for the Dominions and the Colonies. (Assumed to
represent in this work the Government, and the Family of Nations).

serve no useful purpose. It can only foment hatred and ill-will between the two classes. Let him remember that sooner or later the educated and their Natural Rulers will know themselves better and will thereby ultimately become one and undivided body, when they both will either un-animously show their hearty appreciation of his wise leadership in the past (if good) or kick at him (if bad).

He should try to work with the educated in the careful study of the African languages and cultures which must ultimately assist him to know how to advise the Natural Rulers best in the due administration of their

respective native territories. He should realise that his duties as trustee of Africa are of the most difficult, delicate and responsible one for the simple reason that British Imperialism and African Nationalism are two conflicting aspirations, theories and practices, and that unless he is prepared to think less of the British Imperialism whenever the African interests conflict with it he can never be able to administer properly his trusteeship as he assumed to do. He should, in short, remember at all times, in every step he takes, the 22nd article of the Treaty of Versailles, that these African States, no less than the Mandated Territories, being "inhabited by peoples who are not yet able to stand, form a sacred trust to civilisation," and it is his duty to administer them as such. The late Dr. Backie's code of creating disunity among African Chiefs must be for ever abolished. (2) I shall close this portion with the golden advice (1) recently offered to the British Administration in West Africa on this subject by one of the English or British writers, Mr. Jekyl Chalmers, a man of great experience and authority on West African matters :—

"The duty of the British Administration should be to keep the peace, organise the reformed Native Courts so that substantial justice should be done between man and man, *not* to administer that justice by the hand of British magistrates. The law of the land should be the codified tribal laws, brought into proper relation with the changed conditions of to-day. And that law, outside British-owned enclaves, should apply equally to everyone in the country, white or black. . . . But it is on these wide lines that the wheels of progress should run. Avoid the example of India like the plague ; cut down our bureaucracy every year, and replace it by Africans working under the Native Rulers."

If the above policy and advice is adopted and executed there is no reason why the political officer and ourselves should not juggle together in West Africa in peace and happiness.

4.—The part that ought to be played by the Africans themselves.

To all the Paramount or Native Rulers of West Africa I send, in the first place, my heartiest and most loyal greetings. I wish to state that it is of the paramount importance that our Natural Rulers should co-operate with both the political officer and their educated trustworthy patriotic sons ; and while doing this, their primary duty is to see the perfect security of our land tenure. They should be made to realise that the land system in Europe is bad and quite unsuited to our own condition in Africa in very many respects. Let them know that owing to this wrong system in their land tenure, unemployment and all its attendant evils have hitherto inflicted an incurable disease upon the Western civilisation. We do not want this in Africa but attempts to introduce these among us had from time to time been made and are still being made and in certain respects they have been successful. Let the Chiefs and their Councils advise the British Government to check the undue propaganda work and activities of the British capitalists to defeat our land rights so as to force upon us a system which is inimical to our interest. Let our Natural Rulers

(1) Jekyl Chalmers : " Supplement to African World," 28th May, 1927, p. 11.

(2) Vide " West Africa," issue of 30th June, 1924.

remember that it was the European capitalist that was the author of slave traffic in the 15th century, and it was through his undue propaganda work that the horrible trade was not stopped in time.

Our Natural Rulers should advice the British political officer to assist them this time to defeat the capitalists' new scheme of economic enslavement.

The British capitalist says :—

" Large areas (in Africa) are lying *perdu* because the native has neither the knowledge nor the means properly to develop them. The claim that land belongs to the native is just and sound, but where it is in excess of his requirements or his powers of development it is difficult to see any injustice in those entrusted with the safeguarding of his welfare providing the requisite ways and means to meet the growing world demand for tropical products, there is an urgent call for the revision of our Colonial legislation in the direction indicated " (1)

Let the Natural Rulers of West Africa note the above, for that represents the line of policy of the capitalist in this country in his activities to seize our lands in West Africa as he has done in East Africa. (2) The Natural Rulers must not suppose that he cannot succeed, and in fact, he is getting on in his effort to enlist the sympathy of both political officer and the missionary on his side, for the resolution passed at Knocke, as already referred to above, together with the present official announcement by the political officer of his intention to make a change by legislation in the present policy of land tenure in West Africa is a conclusive evidence that the British capitalist is on his high road to success.

The Natural Rulers of West Africa, together with their Councils must think twice before they accept 99 years' lease as a new feature in our land tenure. This is the same in East Africa, but to-day all the East African natives are packed together in what is termed " Native Reserves," as it were, like mackerel in a tin. When Europeans take leases of our lands for 99 years, and invest their moneys in them we have to become wage earners and have to live in the Reserves.

Let the Natural Rulers and their Councils know that after 99 years' lease has expired and improvements have been made on our lands through these capitalists we may need to have our lands back but become then unable to pay for the heavy improvements already made during the whole of the 99 years. What are we to do ?

Let the Natural Rulers remember that we have arrived long ago at the manufacturing stage in the progress of our political economy and our children will soon know all that the British capitalists know now and the 99 years may not yet expire when we want these lands back. What then will follow ? To my mind, the length of every lease of land to any European capitalists should not be more than 30 years the longest, renewable at the expiration of each term on special conditions. The Natural Rulers should harp into the political officers' ears that for the sake of justice, equity and good conscience our lands in West Africa should be left alone for us, seeing that all other parts of Africa have been already seized from us.

(1) L. H. Moseley, the *Times*, 1st Oct., 1926.

(2) Labour Research : " British Imperialism in East Africa."

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KABIYESI! OBA ALAIYEUWA ADEMOLA II.,
the Alake of Abeokuta, the Paramount Natural King of the Egbas, Nigeria
(the "Egba Augustus Caesar" and a XXth century Rebuilder and
Restorer of Africa).

Erin fela mi! Ekun kan!! Omo re kan!!! (1)

-
- (1) It is unfortunate that I know of no European language that can adequately bring out the true sense and meaning of these African national bardic appellations. I shall thank anyone who can assist me.

The Natural Rulers should harp into the ears of the political officer that it was the fault of the capitalist to have practised slave trade in Africa for about 500 years, whereby he prevented the Africans to develop the lands as they should have done so as to meet the present so-called " world demand for tropical products " ; he must therefore wait patiently until the Africans develop the lands by themselves.

The Natural Rulers again have to watch the political officer's attitude and movement in the matter, for he is apt to err through temptation to side his countryman the capitalist, and partly because he himself is directly interested in it and this is exactly the point where his interest conflicts with his duty of the so-called trusteeship and so makes his position very difficult. On this point I beg to refer all the Natural Rulers of West Africa and their Councils to the following documents :—

- (1) The various Colonial Ordinances attempted to be passed through on Land Question and read closely together with these the various pamphlets written by the trusty sons of Africa (1) on the question.
- (2) The activities of the British settlers in this matter in East Africa. (2)
- (3) The highly diplomatic and very interesting discussion on the Land Question in Egbaland, which took place between His Highness the Alake of Abeokuta together with his Council and the British diplomatic representative in March last (3) during which the African diplomacy in dramatic and sweet gestures commendably played its part with that of the British with its hoary head.
- (4) The decision of the Privy Council in the Land Question of Swaziland in April, 1926. (4)

From the foregoing our Natural Rulers will find that it is on the perfect security of our Land Tenure that the solution to all our social, political, industrial and commercial problems depends. If it is safe and sound our existence is safe and secure, but if otherwise we are doomed to perish everlastingly.

Education.

Intimately connected with the Land Question is our education in West Africa. Education of the masses of the people of West Africa is now most urgently necessary and we look up to all our Natural Rulers to give effect to this in their respective territorial spheres. But this is not sufficient at all ; we need, along with this, university education for all youths of ability throughout West Africa, in all the departments of knowledge for the purpose of developing West Africa by ourselves.

We need to know how to build railways as the Japanese did just a few years ago. It is quite an easy thing if we have the money because the good people of Great Britain, Germany, France, and America are quite willing and ready to teach us. We need to know how to build merchant boats though not gunboats, to build aeroplanes for transport civil services, but not for military operations. The time to acquire all these cannot be more than 50 years if we begin now for the Japanese acquired all within the

(1) Casely-Hayford : " The Truth about the Land Question in West Africa," etc.

(2) Labour Research : " British Imperialism in East Africa."

(3) The Egba National Harper, Vol. I., No. 7, 1927.

(4) Sobhuza II., King of Swaziland's Land Case (App. Case), *Times*, April 16th and 17th, 1926.



UBA ALAIYELUWA, ADEMILUYI,
the Oni of Ife, the traditional High Priest King of the Yoruba Commonwealth.
(One of the most ancient dynasties in Africa).

MESSAGE FROM THE ILE-IFE VATICAN TO THE UNION :—

“My dear children,—Unity is Strength. If you unite and co-operate together you shall do many mighty things for your God and your country. I wish you God’s blessing.”

same length of time. They are a coloured and an Oriental race as we, too, are. It took the white race a thousand years to arrive at their present level of advance ; it took the Japanese, a Mongol race, 50 years to catch up with the white race, there is no reason why we West Africans, a Negro race, should not catch up with the Aryans and the Mongols in one quarter of a century. Our education must be so directed that in a few years' time African engineers and mechanics will be able to build and operate in African soil the necessary railways and other necessary locomotive transport without which we cannot hope to achieve an independent West African Nationality. We together with our brethren in America and West Indies must join and start to build our own steamships and man them. Our trade and commerce will for ever remain in external hand if we failed to direct and control the transport and distribution of our land and ocean-borne trade and commerce. Nay more, we must learn to build, control and direct our air communications. Fully to control and develop our own destiny as a progressive people, it is incumbent on us to study the science of aeronautics, to build and man our own aeroplanes which will in time enable West and East, North and South Africans to come together and grow with the growing and progressive unity of the rising African peoples. Nor must we, in the light of modern conditions forget the science of chemistry or the immense benefits of the scientific laboratory. In these connections every West African needs learn several of the European languages, especially English, French and German, while we must not neglect to know as many of our own African languages, such as the Hausa, the Yoruba, the Fanti, etc. All we need is a strong self-determination to take up and money to back up. We have already the capacity for it, but without the united efforts of, confidence in, and active co-operation between our Natural Rulers and their trusty educated sons, nothing can ever be achieved.

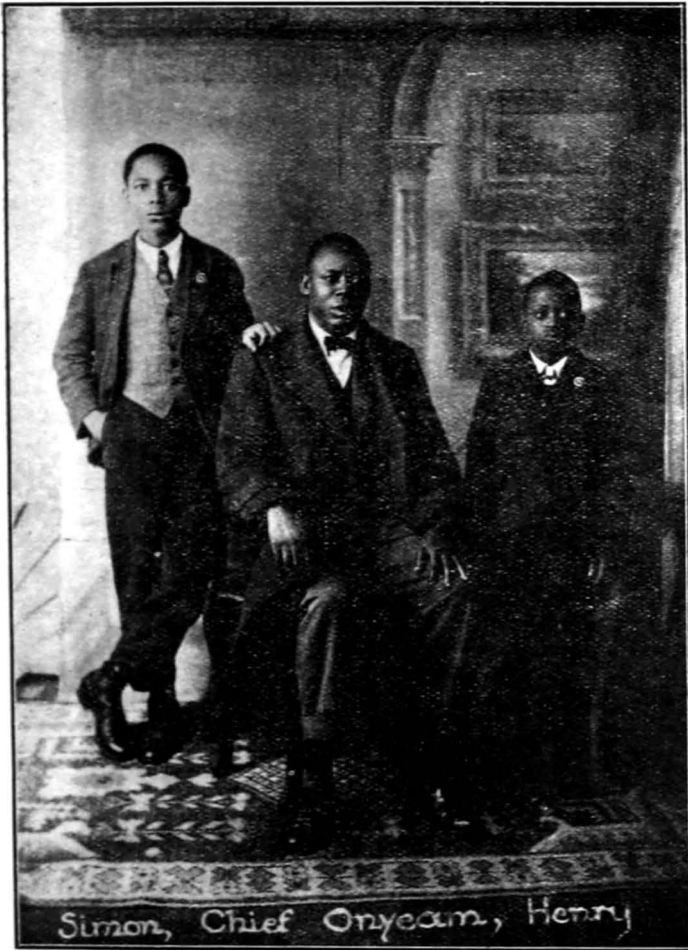
Although the Europeans are about 500 years ahead of us, through the obstacle set in our way by reason of the iniquitous slave traffic yet our ability is commensurate with our singular God-given physique, for, as evidence of this, we started afresh only about a quarter of a century ago and we have covered already the ground of progress of more than 200 years.

Re West African National Education Fund.

It is therefore hereby most earnestly recommended that our Natural Rulers should institute various scholarships in their own territories for both higher education abroad and for local educational advancement: They should see that their own children are given university education. They should assist their educated truly patriotic sons to raise the necessary funds for a West African National Endowment Fund for educational purposes. Furthermore, we look up to them for the passing of legislation for compulsory education of all youths of West Africa, beginning at an early age. (1)

All Native Courts need to be so improved as to bring them up to the same level as those of the other foreign civilised ones in order to be able to

(1) Abyssinia had since 1907 enacted that all male children at the age of 12 must be educated. (Vide Encyclopaedia Britannica, Vol. I., 11th Edition, pp. 82-96).



Simon, Chief Onyeam, Henry

CHIEF S. H. ONYEAM,
one of the most progressive of the Natural Rulers of the Iboland.

administer through these courts efficient justice between man and man, whether white or black or otherwise. Native laws need to be codified and improved. There is no other way to effect this properly and efficiently except through men trained in law. Native Courts need both practising barristers and jurists of all grades to assist in the due development of the Native Laws and Courts. Lord Sumner, in his recent Presidential speech at the University College, London, at the Rhodes Lectures, delivered



HERBERT MACAULEY, Esq., C.E.

(Champion and Defender of Native Rights and Liberties).

by Professor J. H. Morgan, K.C., said, that the success of the Judicial Committee of the Privy Council in giving satisfaction to all Colonial appeals, lies entirely in the support given by practising barristers and that the Judicial Committee owes to them in this respect a great debt. He said that the Acts of Parliament, rules, customs and regulations in this and other countries, so numerous, so varied that it is impossible for the Privy Council to recollect even one-tenth of them to apply but for the assistance of the practising barristers who often bring these to their notice on every occasion of performing their judicial function. All English jurists never fail, in all their writings about the history of the development of the English Courts procedure and the development of their Common Law by it, to emphasise the fact that it was wholly due to the practising barristers or pleaders of each period of development. (1) The truth of the

(1) Holdsworth : " History of English Law."

above and its present urgent necessity cannot be too strongly emphasized. But it is just at this point our Natural Rulers need most the assistance of the truly patriotic educated sons of West Africa closely and actively co-operating with them under the supervision of the British Government, for, the surest test of the soundness of the progress of any nation as well as of the efficiency of its political institutions, lies primarily in the standard of its courts and in the quality of justice administered in such courts.

The task of the educated elements of West Africa seems to be the most onerous of all. In the first place, the educated African must realise that he has neither power nor force behind him other than that which he may enjoy through his happy co-operation with the political officer and the Native authority. Whatever organisation he may attempt to promote should then seek support and recognition from the British Government and the Native Administration. He should realise that since the passing of the Berlin decree of 1885 the force in West Africa has been rendered divisible between the European political officer and the Natural Rulers of West Africa; and that the greater portion is at present under the control of the political officer. He should recognise and respect the portion still left with our Natural Rulers, however small and shadowy that may be. His recognition of this and his hearty co-operation with our Natural Chiefs, under the supervision and advice of the political officer will eventually lead to the success of our Natural Rulers regaining their complete sovereign rights in the ordinary constitutional manner.

The educated African has next to make himself absolutely trustworthy in order to secure the confidence of our Natural Rulers and allay the usual fears of the Political Officer. This is the keynote of the feasibility of the active co-operation between the three parties (namely, the Natural Rulers, the Political Officer, and the educated African).

For his own self-qualification and equipment the educated West African needs to acquire very sound education and culture. University or higher education is most urgently needed for the proper development of West African affairs. University education is now very cheap in Europe and America and every West African youth of ability and ambition is hereby strongly advised to acquire it as soon as he can.

The educated West African needs next to acquire the taste and habit of active unity and co-operation with his West African neighbour in everything relating to the affairs of West Africa. He is yet lacking much in the practice of this art. Without acquiring this habit first, he can effect nil in the field of activity for "The more we are together the merrier we shall be."

The educated West African must needs embark next upon a sound, definite and constructive policy in all his undertakings; and to my mind, there is no other that I can recommend than the principle of "Self-Help." Self-help, mind you, does not mean non-co-operation. All it suggests is taking the initiative in all things. It further includes being ever pushful, ever persevering, and ever daring, nothing discouraging, nothing daunted, and ever to look forward to ultimate victory in all noble undertakings.

The educated African must realise that we are a race with great history and traditions behind us and must always seek to study all, otherwise, he may easily be led to that popular but mistaken belief that we as a race

have no past history or that we are an inferior race. There is no such thing as an inferior race. We have history as any other race and it is characterised with the usual pictures as any other history is, *i.e.*, we have the bright as well as the dark side just as any other race has.

Re West African National Institute.

It is the task of all the West African educated elements to see to the education of the masses of West Africa. This should form the first active and constructive step in the practice of the principle of "Self-help." To effect this, it should be their strong determination to raise voluntarily, first among themselves a large sum of money to create a West African National Education Fund and with the active support of our Natural Rulers as well as the moral sympathy of the British Government various scholarships, for purposes of training all youth of ability in higher education, will at last be feasible. The institution of a West African National Institute on the lines of Tuskegee is an absolute necessity.

The educated West Africans can never achieve this end until all the existing organisations among them, political, religious, social, commercial, or otherwise have found a means of connection and co-operation between one another, for "The more we are together the happier we shall be."

Research Work.

The task of creating a West African civilisation devolves in a very large measure on the educated West Africans, and to effect this they yet have much to do by way of a spade work so as to be able to lay a sure, proper and lasting foundation for its edifice. African customs, laws and institutions must be respected, loved and promoted by all West Africans. African literature need to be produced by the Africans themselves. But it would seem that the most important of all is the research work into our customs and institutions. I myself have been engaged in this sphere for the past two years and I have discovered it to be one of the most effective means of promoting scientific progress, racially, nationally and internationally. For instance, through research work Jesus was found to be a Negro by blood (1) and through it the Kings Tut and Solomon were also discovered to be Negroes by blood.(1)

Research work seems to fall more properly within the sphere of the duty of all West African students who are acquiring higher education. The medical student, remembering the history of our great West African heroes, like Sango, Lisabi, Ogun, Sodeke, Ogudipe, Akodu, Timi, Gbonka, Ogedengbe, Nana, Prempeh, Bai Bure, and a host of others, who in their days had such a remarkable empirical knowledge of herbs and roots as well as of the control of nature as to make their people not only entertain respect for but also go to the extent of deifying most of them, after death—should try to probe deeply into that portion of his science which may disclose to him how to analyse these leaves and roots so as to discover their scientific connections and powers and improve them for the benefit of mankind.

(1) Rev. James M. Webb : "The Black Man, the Father of Civilisation."

The Law student, too, remembering that his race, as a member of the ancient races, has several customs and institutions of immemorial standing, should betake himself into the deep knowledge of Law with a view to systematising those customary usages and institutions of his country and thereby attempt to evolve a sound African jurisprudence. The students in agricultural science, engineering, practical economy, commerce, and other faculties should also do the same in their respective sphere of avocation.

Re West African Students' Union.

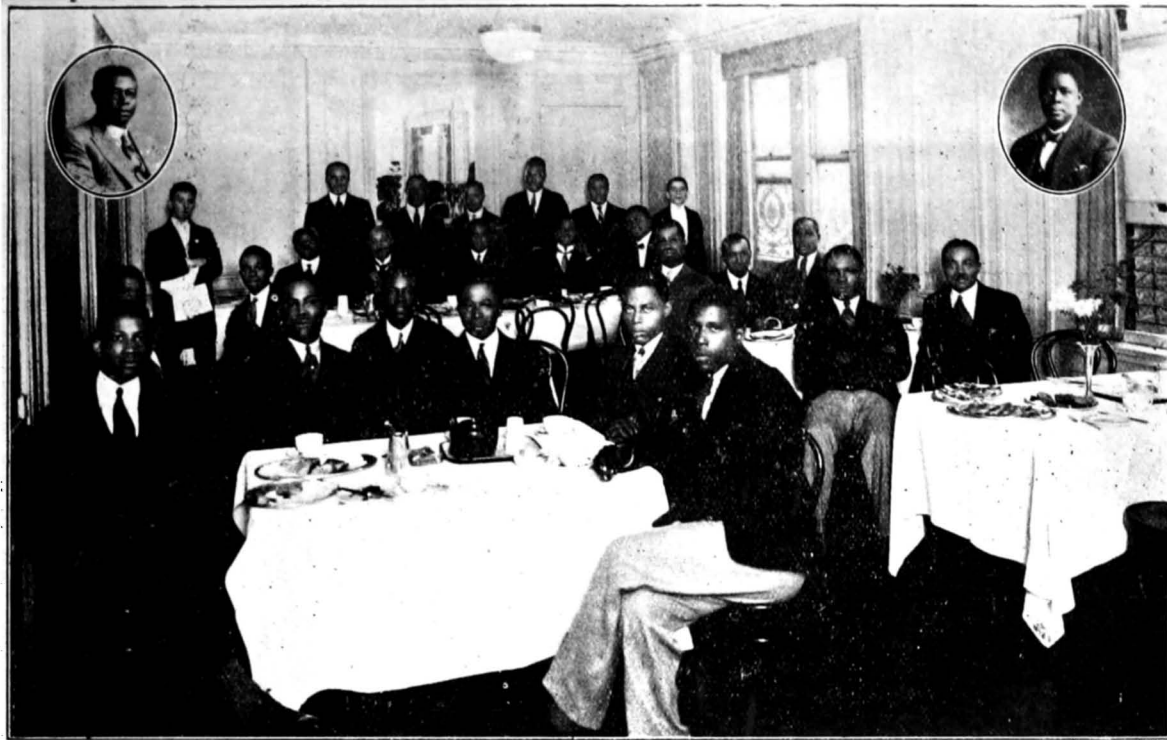
Last but not least, it is the duty of all West African students abroad, especially in Great Britain and Ireland to give their whole-hearted support to the organisation they have recently succeeded to form in London, *i.e.*, the West African Student's Union. By experience, I have discovered that a union of this kind if it receives the support due to it, has many possibilities, and there is yet a great future before it. The Union serves, in the first place, as the training ground for practical unity and effective co-operation between all West African Students. West Africa, according to history, was a united one in ancient times, it was one in the mediæval times and is now going to be one and an impregnable whole in these modern times; but the means to effect this lies greatly in the hands of all West African students. If any organisation of an entirely African origin and genius is necessary at all in London, I think that the West African Students' Union is of paramount necessity. To join this Union should be the first duty of every new student from West Africa as soon as he arrives in England.

The time has now come when West African nationality must find a permanent foothold in Great Britain. West African individuality must be asserted in this country, West African honour, respect and glory must be pressed and pushed forward and until it has reached its goal of ambition it may not stop. Progress! I repeat, Progress!! West Africa, onward to the goal!!!

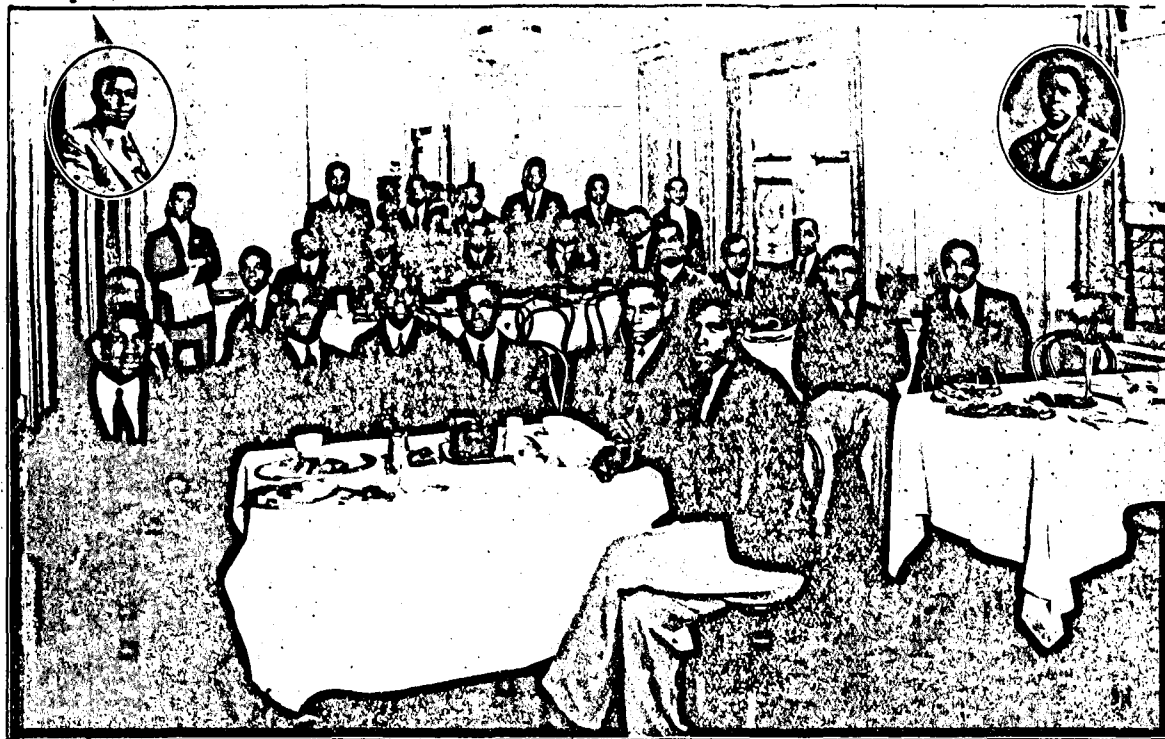
Re the Wasu.

I must yet remind you of your other recent institution, and perhaps the greatest tradition you have yet created in this country, and that is the journal of the Union, named *Wasu*.

You have to give it your whole-hearted support. Make it your most powerful force in this country for the betterment of our country and race. Remember the meaning of its name—"Wasu" *i.e.*, to preach or proclaim. Through it, you have to preach the doctrines of the West African Students' Union in this and other countries. One of the greatest doctrines of our Union is that of Unity and Co-operation. *Wasu* has to "wasu" this among the West African students themselves in the first instance and next among our people in West Africa. *Wasu* is out to proclaim aloud the doctrine of SELF-HELP, first among the members of the Union and next among the various peoples of West Africa. It is through *Wasu* we have to educate the various races of the world that congregate in this country and elsewhere in matters relating to the welfare of our race. Most of them are ignorant of even the most elementary knowledge of our



WEST AFRICAN STUDENTS' UNION OF GREAT BRITAIN AND IRELAND.
With their first Patron, Mr. Casely Hayford, M.B.E., and President of the National Congress of West Africa.



WEST AFRICAN STUDENTS' UNION OF GREAT BRITAIN AND IRELAND.
With their first Patron, Mr. Casely Hayford, M.B.E., and President of the National Congress of West Africa.

race and country. (2) *Wasu* is to effect better feelings of brotherhood and to promote better international relations between us and the other races of the world. It is through *Wasu* we have to make known to our Natural Rulers and elders in Africa all our wants and there is no doubt that they will come to our aid as soon as they know them.

Re Hostel for African Students in London.

Before I conclude, I need hardly say that the West African Students' Union is in urgent need of a home to dwell in. West African Students want a hostel in London where West African delicious and most palatable dishes may be served, not only to West African children but to all Londoners and other races in this country and to compete side by side with those of the Indian, Chinese, and other Oriental hostels. It is a shame to West Africa, an Oriental country by history and tradition, to find that her sister Oriental countries are serving out their own delicious dishes to their children in this country but she has not hitherto found her way to do the same to her own children, who at present have to go almost as beggars for a morsel of crumbs falling from the other Oriental tables, and even they would not allow them these crumbs in such places as Oxford Street, at the West End of London, where they are wont to shout on them, "Profani ab istite hic."

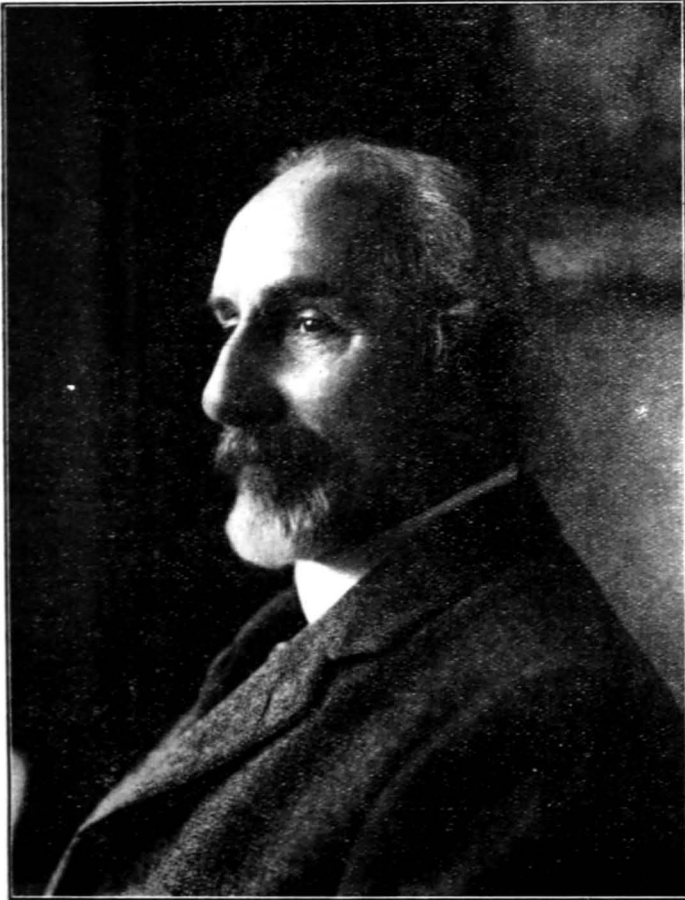
We therefore earnestly look up to all our Natural Rulers and elders in West Africa to put this matter into serious consideration, and make a worthy move in the proper direction, and I entertain no doubt that the Secretary of State for the Colonies will give us a lift as soon as we ourselves first take the initiative in the matter. (1)

With reference to the question of founding a hostel in London for African students, it is noteworthy to quote here the following passage as recorded from the speech of Sir Sidney Olivier (afterwards Lord) Olivier when contributing his quota towards the discussion relating to this question which took place at the reception held by the late Sir Victor and Lady Buxton in the Lincolnshire Room, Tothill Street, Westminster, on May 22nd, 1919, in which discussion the present Secretary of State for the Colonies (the Rt. Hon. Mr. L. S. Amery, M.P.) took part. When the question of the management of such an hostel became the central point of argument in the discussion, and some speakers tried to maintain that old illusory and imbecile doctrine of the incapability of the Africans to govern themselves, much less to manage a hostel, Sir Sidney, at once, boldly and very rightly disillusioned them by saying:—

"It is incredible that any person would say that the African race was incapable of self-government. All over, for centuries, the tribes had had their Chiefs who had administered affairs with shrewdness and wisdom. He (Lord Olivier) believed that guidance should be given in order to bring forward the more backward races to the methods of modern civilisation, but he was sure that such an idea as that Africans could not govern themselves was not in the mind of any one who had experience of Colonial government." (1)

(1) "West Africa," May 31st, 1919, pp. 400 and 401: "African Hostel in London."

(2) e.g., *The Youth*, "The Race Problem Again," Vol. II., No. 6, Aug., 1927.

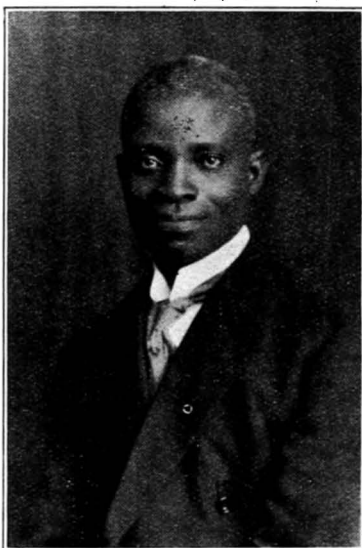


LORD OLIVIER (House of Lords),
one of the most famous champions in the cause and interest of the Africans.

The above quotation is self explanatory and there is no reason why the £2,000 already assigned long ago for the said hostel and most probably in the custody of the Colonial Office or some other trustees should not be handed over to the Africans as soon as the Africans have so organised themselves as to carry out the truth contained in Sir (Lord) Sidney Olivier's sentiments.

These things having been fully performed, complete Restoration, Re-generation, and second Rise of West Africa is sure to begin and there is no reason why the Family of Nations will not reinstate West Africa to her ancient and former glorious position before the year 1976 has passed off into eternity.⁽¹⁾ There shall then be a happy re-union of all the Negroes in Africa our Homeland from all the various parts of the earth where they presently sojourn and the world's universal brotherhood shall then become a "FAIT ACCOMPLI."

(1) H. J. L. Bostsn, *Wasu*, Vol. I. No. 1: "Fifty Years Hence."



The late Rev. JAMES EMMAN KWEGYIR-AGGREY, D.D., Ph.D., D.Litt., D.C.L., A.M., etc., etc., (dozen degrees), who in the forefront of Africa's advance has fallen in the path of leadership leaving behind him a worthy example of an ideal African; a patriot, a Christian, an educationist, and a philosopher; one of the greatest luminaries that have lightened up the horizon of Africa, and who by his personal example of self sacrifice and devotion to duty, has taught the world the distinctive qualities and attributes of the African race, thereby proving the capacity and capability of the African to contribute towards human knowledge and civilisation.

A Memorial Service, promoted by the West African Students' Union, was held in memory of Dr. Aggrey at St. Martin's-in-the-Fields, Trafalgar Square, London, on the 19th August, 1927, at which an admirable Funeral Oration was delivered by Rev. M. J. Elliott, D.D., and an African Funeral Dirge rendered by Ladipo Solanke. Representatives were sent by the Secretary of State for the Colonies, the Archbishop of Canterbury, and various British associations and other eminent persons too numerous to mention here.

Copies of the African Dirge can be obtained from the Hon. Sec., W.A.S.U., at 6d. each (8, Burlington Road, London, W.2.)

The Association known as the " RISING ETHIOPIAN DEVELOPMENT ASSOCIATION " has kindly undertaken to act as the central Agents for the sale of *Wasu* and other publications of the W.A.S.U. in the U.S.A. Applications may be made to Kwesi Sekyi, Secretary, R.E.D.A., 3522, Michigan Avenue, Chicago, Ill., U.S.A.

Kenya

EDUCATION DEPARTMENT
ANNUAL REPORT

1927

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SPECIAL ARTICLES.

- I. Annual Report of the Inspector of Schools, Kavirondo Province, by Mr. G. E. Webb, B.A.
 - II. Technical Education in 1927, by Mr. H. O. Weller, B.Sc., M.I.C.E. Hon. A.R.I.B.A., Supervisor of Technical Education.
 - III. Reports of School Medical Officers :—
 - (a) Nairobi.
 - (b) Mombasa.
 - IV. Principal's Report on Government Schools in the Machakos District.
 - V. The Masai School, Kajiado.
 - VI. The Masai School, Narok.
-

I.—STAFF OF THE DEPARTMENT.

The following was the personnel of the Education Department on December 31st, 1927 :—

(1) ADMINISTRATION.

(a)	i. Director	1	
	ii. Chief Inspector of Schools	1	
	iii. Supervisor of Technical Education ...	1	
	iv. Inspectors of Schools	4	
	Total ... —		7
(b)	i. Office Superintendent	1	
	ii. Clerks (Europeans) (1 temp. relief) ...	10	
	iii. Clerks (Native)	2	
	Total ... —		13

(2) EUROPEAN EDUCATION.

(a)	i. Principals (3 mistresses i/c.) ...	8	
	ii. Assistant Masters (2 temp. reliefs) ...	15	
	iii. Assistant Mistresses (2 temp. reliefs)	20	
	iv. Matrons	3	
	v. Assistant Matrons (1 temp. relief) ...	5	
	vi. Clerks	3	
	vii. Medical Officers (part time)	4	
(b)	<i>Farm School Teachers.</i>		
	i. School Masters	2	
	ii. School Mistresses	5	
	Total ... —		65

(3) INDIAN EDUCATION.

	i. Principals (European)	1	
	ii. Principals (Indian) (3 temp. acting) ...	6	
	iii. Principals (Indian female)	1	
	iv. Assistant Masters	51	
	v. Assistant Mistresses	6	
	Total ... —		65

(4) ARAB AND AFRICAN EDUCATION.

(a) i. Principals	...	...	...	...	10
ii. Assistant Masters (1 temp. relief)	...	...	...	...	14
iii. Assistant Mistresses (1 lady doctor)	...	...	...	...	2
iv. Clerk and Storekeeper	...	...	...	...	1
v. Interpreter	...	...	...	...	1
vi. African Teachers	...	...	...	...	136
				Total	... — 164

(b) *Loan Fund Staff.*

The following were not on the strength of the Department, but were chargeable to "Loan Fund Buildings" supervised by the Department:—

i. Artisans (European)	...	...	...	...	20
ii. Artisans (African)	...	...	...	...	6
iii. Motor Driver (African)	...	...	...	...	1
iv. Assistant Storekeeper (European)	...	...	...	...	1
v. Draughtsman (Indian)	...	...	...	...	1
vi. Porters	...	...	...	...	59
				Total	... — 88
					403

II.—CHANGES OF STAFF IN 1927.

2. (a) ADMINISTRATIVE AND OFFICE STAFF.

Director of Education, returned from leave, 19-3-27.

Chief Inspector of Schools (Mr. Biss), left for leave, 2-4-27; returned from leave, 17-10-27.

Inspector of Schools (Mr. Bradshaw), returned from leave, 2-9-27.

Inspector of Schools (Mr. Donovan), arrived first appointment, 1-10-27.

Office Superintendent, returned from leave, 23-1-27.

Miss Somen, left for leave, 30-4-27; returned from leave, 1-11-27.

Mr. Machin, left for leave, 9-7-27.

Mrs. Milne, left for leave, 29-10-27.

(b) SCHOOL STAFF.

	<i>Left.</i>	<i>Arrived.</i>
B. W. L. Nicholson	8-5-27 ...	9-11-27
R. McKay	— ...	19-3-27
R. H. Wake Bowell	27-11-27 ...	—
A. G. Southby	21-1-27 ...	13-9-27
A. G. Procter	4-4-27 ...	—
G. M. Bell	21-2-27 ...	—
R. P. Rounthwaite	— ...	3-2-27
C. W. Stubbs	8-6-27 ...	—
J. McMunn	16-10-27 ...	—
F. Ashton	9-1-27 ...	18-8-27
E. Jones	3-8-27 ...	—
W. Nutman	15-9-27 ...	—
Mrs. G. Humphries	1-8-27 ...	Retired.
Miss M. C. Tunstall	— ...	21-7-27
Miss L. V. Shelton	— ...	17-2-27
Miss G. Plaskitt	20-8-27 ...	—
Miss R. M. Reynolds	— ...	2-3-27
Miss G. H. Kerby	— ...	6-8-27
Miss M. E. Cloete	— ...	2-3-27
Miss G. M. Lacey	30-4-27 ...	9-11-27
Mrs. E. McKay	— ...	19-3-27
Miss M. Gabally	17-4-27 ...	13-9-27
Mrs. E. Stanley	— ...	19-3-27
Miss J. C. Bell	21-12-27 ...	Resigned.
Miss M. S. Shelton	— ...	17-2-27
Miss J. Davies	14-1-27 ...	6-6-27

(c) INDIAN STAFF.

Magan Lal	28-12-27 ...	—
Ram Labhaya	10-12-27 ...	—
Amar Nath	3-6-27 ...	2-12-27
K. D. Kapila	— ...	17-6-27
K. D. Punjani	28-12-27 ...	—
A. John	— ...	2-7-27
C. N. Patel	8-4-27 ...	4-11-27

III.—WORK OF CENTRAL COMMITTEES.

3. (a) i. The Central Committee on European Education, which met twice during the year, consisted of the following members :—

- The Hon. the Colonial Secretary (Chairman).
- The Hon. the Director of Education.
- The Hon. the General Manager, Kenya and Uganda Railway, Nairobi.
- The Hon. the Director of Agriculture.
- The Hon. Captain J. E. Coney (for portion of the year; his place was taken by Mr. O. R. Arnell).
- The Right Rev. the Bishop of Mombasa (his place was taken by the Rev. Pitt-Pitts for portion of the year).
- The Ven. Archdeacon Swann.
- The Rev. W. M. Askwith.
- The Rev. C. T. MacNamara.
- The Right Hon. Lord Delamere, M.L.C.
- The Hon. Mr. T. J. O'Shea, M.L.C.
- The Hon. Captain F. O'B. Wilson, M.L.C.
- Mrs. Harvey Anderson.
- The Principal, European School, Nairobi.
- Mr. R. H. W. Wisdom (Inspector of Schools), Secretary.

ii. The following were among the subjects dealt with during the year :—

- (1) The establishment of the Boys' Secondary School at Kabete.
- (2) Consideration of the possibility of the introduction of compulsory education in Kenya.
- (3) Provision of scholarships to English schools by Government for European boys.
- (4) Free education for poor white children.
- (5) Curricula of Elementary and Secondary Schools.
- (6) General Organisation of European Education.
- (7) Qualifications and method of appointment of teaching staff.

(b) i. The Central Committee on Indian Education held one meeting during the year. The following was the personnel of the Committee :—

The Hon. the Colonial Secretary (Chairman).
 The Hon. the Director of Education.
 The Hon. Mr. M. H. Malik.
 Mr. D. D. Puri.
 Mr. P. K. Ghandy.
 Mr. B. S. Varma.
 Mr. Shams-ud-Deen.
 Mr. Cassumali Jafferbhai.
 Mr. J. B. Pandya.
 Mr. Camar-ud-Deen.
 Mr. M. Suleman Virjee.
 Mr. R. H. W. Wisdom (Inspector of Schools),
 Secretary.

ii. The following were among the subjects dealt with :—

- (1) The inclusion of Gujerati in the Preliminary and Junior Examinations of the Cambridge University Local Examinations.
- (2) Conversion of Aided Schools into Government Schools.
- (3) Admission of new schools to the Grant List.
- (4) Arrangement of School Leaving Certificate.
- (5) Hours of School Attendance.
- (6) Organisation of Indian Boy Scouts.
- (7) Provision of Government Girls' School for Nairobi.

(c) i. The Central Committee on African Education met twice during the year. The following was the personnel of the Committee :—

The Hon. the Colonial Secretary (Chairman).
 The Hon. the Director of Education.
 The Hon. the Chief Native Commissioner.
 The Right Rev. the Bishop of Mombasa (Rev. Pitt-Pitts acted during the former's leave).
 The Rev. Father C. T. MacNamara.
 The Rev. Father Fassino.
 The Right Rev. Mons. Brandsma.
 The Right Hon. Lord Delamere, M.L.C.
 The Hon. and Rev. Dr. J. W. Arthur, O.B.E., M.D.
 (Mr. A. R. Barlow acting during his absence).

Mr. A. B. Chilson, B.A.

Mr. Lee H. Downing.

Mr. F. J. H. Harper.

The Rev. Canon H. Leakey, M.A. (*vice* Rev. Canon Britton, proceeded on leave).

Mr. R. H. W. Wisdom, B.A., Secretary.

ii. The following subjects were dealt with :—

- (1) Circular *re* encouragement of Native Education.
- (2) Appointment of Committees to regulate the spelling of vernacular language.
- (3) Syllabus for moral and religious instruction in African Schools.
- (4) Revision of circular *re* Jeanes School.
- (5) Circulation of central minutes to Senior Commissioners.
- (6) Security of tenure for village schools.
- (7) The teaching of English in African Schools.
- (8) Inspectors' and Examiners' Reports.
- (9) Local Native Council Schools.
- (10) Reducing schoolboys' holidays.
- (11) Examination of Jeanes Students.
- (12) Standards of education for compliance with Native Exemption Ordinance.
- (13) Holiday training course for Village Teachers at Jeanes School.
- (14) Inspection of Mission Village Schools.
- (15) Status of Vernacular Examination.
- (16) Co-operation with Medical Department in publication of posters and leaflets on hygiene.
- (17) Indentures of apprentices at Junior Secondary Schools.
- (18) Issue of examination certificates.
- (19) The establishment of religious centres in Native Reserves.

(d) i. The Central Committee on Arab Education consisted of the following members :—

The Hon. the Senior Commissioner, Coast (Chairman).

The Hon. the Director of Education.

The Resident Commissioner, Mombasa.

The Hon. the Liwali for the Coast, Sheikh Ali bin Salim, C.M.G., C.B.E.

The Hon. Arab Member of Legislative Council for the Coast.

The Hon. Member of Legislative Council for the Coast.

The Hon. Member of Legislative Council for Mombasa.

P. H. Clarke, Esq.

J. A. C. Burke, Esq.

Khamis bin Mohamed bin Juma, Esq.

The Principal, Arab School, Mombasa, Secretary.

ii. The following were among the subjects dealt with :—

- (1) Site of new building for Arab School.
- (2) Proposals for boarding house at Arab School, Malindi.
- (3) Compulsory education.
- (4) Koran Schools.
- (5) Carpentry classes.
- (6) Teachers' training.
- (7) Boarding School for Arabs, Mombasa.
- (8) Female education.
- (9) Sports.

IV.—WORK OF SCHOOL AREA COMMITTEES.

4. For European and Indian Education the Colony is divided into four School Areas :—

(A) EUROPEAN SCHOOL AREAS.

No. 1 Area (Eldoret).—The Committee met twice during the year, and discussed—

- (a) The site of the new European School, Eldoret.
- (b) Free education.

No. 2 Area (Nakuru).—The Committee met three times during the year, and dealt with the following subjects :—

- (a) The new school buildings.
- (b) Medical report on health of Nakuru School.
- (c) Admission of children to the free list.
- (d) Education of Dutch children in Nakuru Township.
- (e) School fees and the cost of education.

No. 3 Area (Nairobi).—The Committee did not meet, but the following matters were discussed by the Board of Governors of Nairobi School :—

- (a) Proposal of Government to charge additional fees for stationery, laundry, medical attendance and games.
- (b) Admission of pupils.
- (c) Arrears of fees.
- (d) Admission of children to the free list.
- (e) School rules.

No. 4 Area (Mombasa).—The Committee met four times during the year, and dealt with the following :—

- (a) Plans for the new European School at Mombasa.
- (b) Age limit for admission of pupils.
- (c) Constitution and aims of the new school.

(B) INDIAN SCHOOL AREAS.

No. 1 Area (Eldoret).—No Committee meetings recorded.

No. 2 Area (Nakuru).—The Committee met once and discussed the following subjects :—

- (a) Staff quarters, New Indian School, Kisumu.
- (b) Nakuru School application for grant-in-aid.

No. 3 Area (Nairobi).—There were three meetings of the Committee during the year. The following subjects were dealt with :—

- (a) School hours, Nairobi School.
- (b) Accommodation, Nairobi School.
- (c) Boy Scouts.
- (d) New Indian School building, Nairobi.
- (e) Education of girls.

No. 4 Area (Mombasa).—Four Committee meetings were held and the following business transacted :—

- (a) Question of Principal, Allidina Visram High School.
- (b) Grant in aid for school for young boys.
- (c) Formation of a class for London Matriculation.
- (d) New Ismailia School, Mombasa.
- (e) New Government Indian Girls' School.
- (f) Staff, Lamu School.
- (g) Site for new Government Indian Girls' School.
- (h) Education of girls and purdah.

(c) AFRICAN SCHOOL AREAS.

The following is a list of school areas, together with the dates of meetings held and business transacted :—

No. 1 (*Kiambu*).—March 27 : New Schools, scales of salaries. Sector work.

No. 2 (*Fort Hall*).—November 27 : Controlling of schools, Technical School (new), Technical Education generally.

No. 3 (*Embu*).—No meetings recorded.

No. 4 (*Meru*).—December 12th, 1927 : Parental authority over children ; a Scheme for a Central Industrial School ; African teachers' salaries ; Olympic Sports team for Nairobi.

No. 5 (*Nyeri*).—No meetings recorded.

No. 6 (*Machakos*).—No meetings recorded.

No. 7 (*Kisumu*).—April 27 : Estimates, 1928 ; Allocation of Local Native Council Grants ; Registration of Schools. October 27 : Payment of teachers' salaries from Local Native Council funds ; definition of " a school "—criticism of Ordinances ; Development of bush schools ; Compulsory education.

No. 8 (*Kericho*).—February 27 : A local African Technical School ; site of School ; Buildings for School. March 27 : Estimates for 1928. November 27 : New site for Government School ; Indenture of pupils ; Staff of School.

No. 9 (*South Kavirondo*).—March 27 : Allocation of Local Native Council Funds. Scales of Salaries. Teachers. School Sector plans. Registration of Schools. June 27 : Salaries of village teachers. Elementary B Examination. Shields for competition among village schools. Womens' education. Increase in grants-in-aid.

No. 10 (*North Kavirondo*).—August 27 : Catechumenate Centres. Inspection reports.

No. 11 (*Coast*).—No meetings.

No. 12 (*Nairobi*).—November 27 : Establishment of day and night schools. Estimate for Pumwani School. Fees.

V.—PUBLIC EXAMINATIONS.

5. The following examinations were held by the Department during the year either on its own behalf or on behalf of public examining bodies in England :—

(A) EUROPEAN EDUCATION.

	1927.	1926.
(1) Cambridge Preliminary Examinations—		
Number of candidates presented	34	31
Number of candidates passed	29	19
(2) Cambridge Junior Local Examinations—		
Number of candidates presented	24	27
Number of candidates passed	16	10
(3) Cambridge School Certificate Examination—		
Number of candidates presented	7	3
Number of candidates passed	5	2
(4) City and Guilds of London Institute: Examination in Technological Sub- jects—		
Number of candidates presented	8	—
Number of candidates passed	5	—

(B) INDIAN EDUCATION.

(1) London Matriculation—		
Number of candidates presented	8	—
Number of candidates passed	2	—
(2) Cambridge Preliminary Examinations—		
Number of candidates presented	43	31
Number of candidates passed	31	23
(3) Cambridge Junior Local Examinations—		
Number of candidates presented	32	12
Number of candidates passed	16	9
(4) City and Guilds of London Institute: Examination in Technological Sub- jects—		
Number of candidates presented	2	—
Number of candidates passed	1	—

(C) ARAB AND AFRICAN EDUCATION.

	1927.	1926.
(a) Elementary B (formerly Vernacular) Ex- amination, Std. IV—		
Number of candidates presented	868	941
Number of candidates passed	469	480
(b) Elementary B Teachers' Examination—		
Number of candidates presented	213	142
Number of candidates passed	168	81

(c) Elementary C Examination—	1927.	1926.
Number of candidates presented	162	238
Number of candidates passed	68	121
(d) Elementary C Teachers' Examination—		
Number of candidates presented	7	—
Number of candidates passed	4	—
(e) Junior Secondary Examination—		
Number of candidates presented	41	59
Number of candidates passed	11	15
(f) Junior Secondary Teachers' Examination—		
Number of candidates presented	13	17
Number of candidates passed	10	1
(g) Special Alliance High School Exit Examination—		
Number of candidates presented	13	—
Number of candidates passed	12	—
(h) Non-European Clerical Examination :		
March, 1927—		
Number of candidates presented	54	26
Number of candidates passed	31	13
September, 1927—		
Number of candidates presented	65	35
Number of candidates passed	27	21

VI.—STATISTICS OF SCHOOLS AND ATTENDANCE.

6. A study of the statistical tables carefully drawn up by the Chief Inspector of Schools shows the following number of schools included in European, Indian, Arab and African education :—

	1927.	1926.
(a) <i>European</i> —		
Number of schools	24	20
Average roll : Number of pupils ...	1,068	909
(b) <i>Indian</i> —		
Number of schools	32	22
Average roll : Number of pupils ...	2,947	1,947
(c) <i>Arab and African</i> —		
Number of schools	2,194	1,187
Average roll : Number of pupils ...	79,312	82,761

VII.—FINANCE.

7. (a) *Revenue*.—The following amounts were received in fees during the year :—

(1) European Schools—		
Tuition	... ..	£2,058-11-50
Boarding	... ..	£7,379- 0-78
(2) Indian Government Schools—		
Tuition	... ..	£2,839-10-75

(b) *Expenditure*.

(1) The total appropriation amounted to :—		
i. Recurrent	... ..	£140,962
ii. Special	... ..	£10,351
		£151,313
(2) The total expenditure for the year was :—		
i. Recurrent	... ..	£121,166
ii. Special	... ..	£9,507
		£130,673

The Department showed a saving of £21,000 which it was unable to expend for reasons stated in the following section.

VIII.—THE ADMINISTRATION OF EDUCATION.

8. The Executive of the Department consisted nominally during 1927 of :—

1. The Director.
2. The Chief Inspector of Schools.
3. The Supervisor of Technical Education.
4. Four Inspectors.

Of these, the Chief Inspector was absent on leave, his place being taken by Mr. F. W. Humphries, Headmaster of Eldoret. One Inspector acted as Personal Assistant to the Director, while another, Mr. G. E. Webb, remained at his post as Inspector in charge of the Nyanza Province. A third Inspector, Mr. H. L. Bradshaw, was also absent on leave during the year, while the fourth Inspector, Mr. C. E. Donovan, arrived on first appointment on October 1st.

9. The actual strength of the Administration therefore was :—

- The Director,
- The Acting Chief Inspector of Schools,
- The Supervisor of Technical Education,
- The Personal Assistant,
- One Inspector of Schools.

Two Inspectors were thus practically confined to the Head Office for a considerable part of the year. The administration work of organisation and departmental routine occupies two Senior Officers and a Personal Assistant. One Inspector only therefore was engaged wholly on inspection work. When the two Inspectors could be spared from the office they were detailed for the inspection of schools.

10. It must further be remembered that three of the Inspectors were appointed by special request of the Central Committee on African Education for the organisation and inspection of the education of 80,000 African children who are at present in school. Their services, however, are also used by the Director for the inspection of European and Indian schools. The distribution of the inspectorate is as follows :—

Head Office : Chief Inspector of Schools.

Nyanza Province : Mr. G. E. Webb.

Kikuyu Province : Mr. R. H. W. Wisdom.

Coast Province : Mr. C. E. Donovan.

Personal Assistant to Director : Mr. H. L. Bradshaw.

A report by Mr. G. E. Webb, which is attached to this report as a special article, shows the multifarious duties of an Inspector. These include the supervision of two Government African schools, of a number of Indian schools, of the educational activities of nine different missionary societies, which have 25 central stations under the charge of Europeans, and 1,271 elementary schools. He has to deal with four School Area Committees situated as far apart as Kakamega and Kisii, and with various committees appointed to standardise the orthography of the various dialects. He advises concerning the division of districts into school sectors, and deals with the allocation of funds voted by Local Native Councils for the improvement of schools. His report gives a fair example of the work of each Inspector.

11. *Accounts.*—The rapid growth of the Department has caused frequent appeals for an increase in the clerical and accounting staff of the head office. The organisation of examinations and the typing of examination papers could fully occupy one competent typist. Three typists find it difficult to keep pace with the work of four senior officers and the routine of the office.

In the Stores Department the handling of thousands of pounds worth of stores has proved excessive for one European. A second European has since been transferred from the accounts section in order to cope with the situation.

The accounts section especially needs strengthening. The continual calls for statistics which have occurred recently, *e.g.*, the cost of education per head in European, Indian, Arab and African education; the cost of boarding and tuition in the separate schools; the accounting for Loan Funds, and the various charges connected with building and technical education demand a large and well-trained staff.

12. The Department reviews with regret the lapsing of £21,000 which was sorely needed for education, but could not be used for the following reasons :—

- (a) The numerous allocation requisitions to Administrative officers and others scattered all over the Colony from whom it is difficult to obtain returns with the result that the head office has no up-to-date knowledge of the amounts expended.
- (b) The insufficiency of the accounting staff to keep check upon expenditure.

IX.—EUROPEAN EDUCATION.

13. In European Education, Kenya is in a state of transition, and signs are apparent that a new objective and new methods are required. In the early days of the Colony, 1911-1919, there was but one private school, the remaining schools being provided by Government. In those days the great majority of children were destined to complete their education in England or in South Africa, and the curriculum was framed accordingly. The absence of Inspectors caused the introduction of external examinations, with a view to satisfying the public that the schools of East Africa compared favourably with those outside the territory. The aim of the schools therefore was firstly to enable as many children as possible to become literate and secondly to prepare them for entrance to public schools in England or in South Africa.

14. The solution lies in the appointment of a strong body of inspectors who, standing away from the schools, can envisage the circumstances and the needs of the Colony as a whole. By means of conferences with the teaching staff, the inspectors can assist in restating the aims of European education and embodying them in the curricula of the schools. They

should be in a position to supply ideas to the teaching staff, and to direct them in accordance with a carefully considered policy. If the body of inspectors is sufficiently strong, then the time will come when the Department can be recognised by British Universities as a competent examining body, and join with the teachers in the annual examination of the schools. Until that time, the Department must rely upon external examinations, but however much the Universities of Cambridge and London may be willing to help by adapting their examinations and introducing fresh subjects by request, the education cannot be as full or as fruitful as it would be if the curriculum were based on local conditions. In the one case, the objective is the examination. In the other, it is the acquisition of knowledge and the rousing of the emotions by means of a locally adapted curriculum upon which the examination is based.

15. What then is the difference that is emerging to-day? The difference lies in the fact that an increasing number of children will remain in Kenya after leaving school. A fact which is too often forgotten is that the most important of all vocations in the community is that of the trainer of the young. In that able book, "The Science of Power," the inheritance of qualities is fully discussed. It is argued with conviction that, according to the ideal which is set before it, the aim of a nation can be completely altered through the teaching in the schools in a single generation. Examples are found in the action of the Emperor of Germany from 1888 to 1914 in urging the teachers in elementary and secondary schools and professors in the universities to impress upon the young the cohesion and solidarity of Germany. A similar object was attained by Japan by the same methods in her rise to power between 1867 and 1898. The power of the schools in directing the ideals of the young is irresistible, and *there is no doubt that the future of race relationship in Kenya lies in the hands of the schoolmasters and schoolmistresses of the Colony.* Of these the most important are the teachers in European schools, since they have an unparalleled opportunity of impressing upon the children of their race the need for courtesy and consideration towards other and especially towards the backward races of the Colony. The question indeed arises whether, as the rising generation becomes more and more "Kenyan," greater pride will not be aroused by an adaptation of European education to local environment. The courses of the proposed

secondary school at Kabete are already planned and possibly well planned. They make provision for the teaching of agriculture, industry and commerce, but it is a question whether the elementary schools should not include a greater knowledge of nature study, hygiene and manual training. In an agricultural country, to confine schools to townships seems almost a contradiction.

16. A word of thanks is due to Lady Denham for the organisation of the Girl Guide Camp in August, 1927. The Department attaches so much value to the meeting of girls from all parts of the Colony that permission has been given to count a week in camp as equal to school attendance. It is hoped that the Boy Scouts will follow suit.

X.—INDIAN EDUCATION.

17. In the larger schools of the Colony, Indian Education is proceeding so satisfactorily that little need be said about it. The Indian community is indeed fortunate in securing the services of Mr. J. H. Maxwell as successor to Mr. Duni Chand as Principal of the Government Indian Boys' School at Nairobi.

18. In 1927, two boys out of three passed the London Matriculation Examination, of whom both will proceed to England, one to study for the Indian Civil Service, the other to study law. Five other boys, private students, failed in the examination. Eight boys will sit for the same examination in June next. The Principal of the Nairobi School recommends that the standard be raised in 1929 to that of the London University Intermediate Examination or the Scholarship standard of our public schools.

19. The Allidina Visram High School has shown improvement. The numbers have increased to 405 pupils, and classes are now being opened to enable pupils to study for the London Matriculation Examination.

20. The schools which have been aided by Government promise well and much satisfaction has been expressed at the conversion of certain aided schools into Government schools.

21. In conclusion, the Department once more urges the Indian community to encourage the higher education of girls, and to keep them at school for the full course of education.

XI.—ARAB EDUCATION.

22. By Arab Education is meant exclusively the education provided at the Arab School, Mombasa, at Malindi, and the small village schools of Ganda and Mambri. It is a pleasure to be able to record an improvement in Arab Education. Under the leadership of Captain Hodkin, the Arab School at Mombasa has carried on the stimulus provided by Mr. H. L. Bradshaw. The school work has improved, but the most important feature is the direction of the attention of Arab boys to physical culture. The "street Arab" tone is being replaced by a real *esprit de corps*. For the purpose of school games, Mombasa has been divided into areas called "Houses," between whom matches are played for the Ali bin Salim Cup. In the competition for the Denham Drill Shield at Nairobi, the school, which made its first appearance, took third place. In the competition for the Football Cup, open to all Arab and African teams of Mombasa, the school reached the final match, which at the time of writing has resulted in a draw. Sports appeal to the Arab, and may rejuvenate the whole race of Arabs at the Coast. Much credit is due to Captain Hodkin for his energy in arousing the interest of the Arab in education. In his report he draws attention to the "dead end" which Arab education has reached in its present surroundings. That is true. What is required is a school which will open up to the Arab a vista of development in agriculture, industry and commerce.

23. At the Ali bin Salim School at Malindi some progress is being shown under the leadership of Mr. Rounthwaite, but the Arab in this remote spot is a more difficult problem. The solution lies in the provision of boarding accommodation and more European staff.

XII.—AFRICAN EDUCATION.

SELF TAXATION FOR EDUCATION.

24. The most remarkable feature of the year has been the earnest endeavour of the Local Native Councils to provide schools of their own, with the assistance of Government. From a letter of the Senior Commissioner at Kisumu, it appears that the idea was first suggested to the Kavirondo by the Acting Governor in May, 1925, since when each district has shown readiness in taxing itself to provide what it calls a "Government school." The African in two districts, *i.e.*, North and Central Kavirondo, declining to borrow from Government, has contributed £10,000 by a Sh. 2 tax per head of the taxable population for capital expenditure on buildings.

and also approximately £1 for £1 of recurrent expenditure. In other cases also substantial sums have been voted by Local Native Councils for educational purposes.

APPLICATION OF INDUSTRIAL TRAINING.

25. In the various grades of education the standard of progress is steadily maintained. It is very undesirable that it should be unduly hastened, and it appears that in certain instances the pressure which is being placed on the African should be relaxed. It is essential to remember that, from the village school upwards, technical, industrial, manual training—whatever the term may be—is not professional but educational. It is intended to train hand and eye and to develop the brain through action.

26. Civilisation has been attained through two agencies—

- i. Through words, *i.e.*, thinking, since thinking is merely talking to oneself, and without words civilisation would never have progressed. That is something that educationalists should ponder over. Without thought—and thought is possible only by words—there would have been no civilisation. Therefore, if we want to improve the standard of housing, the standard of hygiene, the status of women, if we want to abolish unhygienic native customs, if we want to decrease the appalling rate of infant mortality, we must increase the African's power of thought and extend his range of thought through his vocabulary and his experience though his reading.
- ii. The other agent of civilisation is the hand. If we give the African visions of better housing, of a healthier population, of a diminished mortality, we must increase his practical ability. We must direct the education of the child towards the mastery of material; we must guide him towards constructive work, *i.e.*, housing, sanitation, hygiene, clothing, transport—all on practical lines. But—and it is a big "but"—all such work in the schools is educational, and the four objects to which education leads are: the home, health, industry and recreation. To these objects the Education Department rigidly adheres.

27. It is an excellent thing for schoolboys to learn social service by placing their abilities at the disposal of the Local Native Councils for the building of council halls, medical dispensaries, village schools and better houses. The elders

thereby appreciate the value of education. But on the other hand, technical work of a routine nature without logical explanation—the work of mere bricklayers or the repetition work of the daily carpenter—is not education. What is chiefly required in education in Africa to-day is sanity and clearness of vision and a determination to give every child—European, Indian, Arab and African—a chance, not to keep the station into which it has pleased God to call him, but to make the most of his innate ability, be it spiritual, moral, intellectual or physical. The high ideals of the British Empire need all not all individuals, irrespective of race. No one knows beneath what skin a Henry Ford, a Bose or a Tagore may be concealed.

GENERAL PROGRESS OF AFRICAN EDUCATION.

28. The last year has seen considerable advance in African village education in the Nyanza Province, where the Department has had the services of its only full-time Inspector. A perusal of Mr. Webb's report shows the amount of work which has to be undertaken by one man in a Province which has 200,000 children of school age. Of this number, perhaps one-fifth are in touch with educational agencies of some kind. The extension of village education, the encouragement of competition between village schools by means of the Phelps Stokes Shield, the sectorisation of the Province and the planning of school areas, the constant striving between religious denominations—all mean a vast work that is going on unseen.

29. In Kavirondo, the Roman Catholic Missions have shown an unwonted activity. Such activity is all to the good, and the Roman Catholic Church is concentrating on the training of teachers. A visit to Eregi shows what progress can be made in teaching the African English when stern determination urges.

30. The Church Missionary Society, on the contrary, is in low water. More staff is needed at Maseno and at Butere, and teachers everywhere with a larger outlook and a wider vision. Strength is dissipated over a large number of low-grade inefficient schools, for which funds are available neither to pay the teachers nor to equip the schools.

31. Alongside of the Church Missionary Society, minor denominations are doing useful work, and are clamouring for grants. The Church of God is building excellent village schools of stone, permanent structures which exercise an

influence on the Reserve; the Seventh Day Adventist Mission, with its well-trained teachers and its well-ordered curriculum and neat work, flourishes almost unseen.

32. In the Kikuyu Province, the Church of Scotland stations of Kikuyu and Tumutumu continue their career of versatile activity. Mr. Gilbert, of Kikuyu, and Mr. Sinclair, of Tumutumu, have worked wonders in technical education, and African apprentices obtain a first-rate technical training in helping their own people. Agriculture and medical training are well to the front, and occupy an increasingly large portion of the programme.

33. In the Ukamba Province, the Government school of Machakos leads the way both in practical work and in the examination lists. This school will shortly provide the best educated teachers for its 14 village schools. Forty miles away the Roman Catholic Training College of Kabaa pursues its avocation of training teachers. This school sent its drill instructors to be trained at the Government School, Machakos, and then carried off the Denham Drill Shield from Machakos and seven other schools as well. The policy of concentrating on the training of teachers will place the Catholic schools ahead in a few years' time.

34. At the Government Schools of Waa, Kericho, Kapsabet, Narok and Kajiado, development proceeds steadily. The boys of Waa have done yeoman service in building the council hall and the district office at Kwale. The Masai lads of Narok and Kajiado combine with their class work service to their folk in the erection of dairies and the output of ghee. The chief criticism of Kapsabet and Kericho is their lack of staff.

35. During 1927, the organisation of technical education has been improved by the new indenture form by which Government has the right to promote selected boys to the Native Industrial Training Depôt, Kabete, for the completion of their training.

WORK AMONG AFRICAN WOMEN.

No nation can rise above the standard of its women. "Football and Christianity" may save Africa, but woman has proverbially the last word. Excellent work is being done for women and girls at the Church of Scotland stations at Kikuyu and Tumutumu, at the Church Missionary Society stations at Nguju in Kavirondo, and at Kabete. At the

Scottish stations especially, the girls gain in self respect and become the companions instead of the chattels of their men. With them lies the secret of the home, of hygiene, of infant welfare, and of a stronger and more promising race. At present the work is lamentably inadequate and needs workers and funds alike.

LESSONS OF 1927.

37. The lessons to be learned from the experience of 1927 are :—

- (a) The need for increased inspection over the hundreds of village schools coming into existence and for the sectorisation of areas and the orderly provision of schools where needed.
- (b) Better staffing of mission schools to cope with the great demands which are being made for education and the staffing of Government schools on a proportion at least equal to that demanded of Mission schools under the grant-in-aid rules.
- (c) The concentration upon a combined literary and technical education for schoolboys upon reasonable lines.
- (d) More encouragement of the education of girls.
- (e) Insistence upon the fourfold object of education : The improvement of the home, the improvement of health, the development of industrial skill, and the wholesome use of recreation.

XIII.—MEDICAL REPORTS.

38. Two valuable reports will be found among the special articles concerning school medical work in Mombasa and Nairobi. It is satisfactory that the Medical Department is about to start a school medical service. The work done by Dr. de Boer and Dr. Connolly is much appreciated by the Department.

XIV.—CONCLUSION.

39. It is not possible with the present staff to compete with the pressing demands for education from four races. It is not even possible to carry out the regulations of the Education Ordinance dealing with the registration of schools. The writer therefore desires to thank the inspectors and the clerical

staff of the head office, who have endeavoured to cope with increasing difficulties. He desires also to thank the Principals of schools and their staffs for their efforts to maintain—in spite of serious shortage of staff, and in spite of unsatisfactory buildings—a high standard of education in all the four races, and he feels that, making due allowance for circumstances, the schools of Kenya have no cause to fear criticism.

J. R. ORR,

Director of Education.

I.—ANNUAL REPORT FOR 1927 OF THE INSPECTOR
OF SCHOOLS, NYANZA PROVINCE.

EDUCATION IN NYANZA PROVINCE.

African Education.

There are at present only two Government schools in this Province, the Nandi Industrial School, Kapsabet, and the Government School, Kericho. All the remaining educational work is done by the Missions.

GOVERNMENT SCHOOLS.

Nandi Industrial School, Kapsabet.

This school was established in 1925. The Nandi are one of the most conservative tribes in Kenya, and various Missions have attempted to work among them without much success. Although the population numbers 40,000 there are only two schools in the Nandi district, the Government School and the Africa Inland Mission School. No village schools have yet been established. Mr. G. W. B. Huntingford was Principal of the Government School until August, 1927. He made a special study of the dialect, native customs and folk-lore. The main object of the school, however, was to train the boys in some form of useful industrial work, so that they might go back and improve the social life and conditions in the Reserve. A rapid advance has already been made in the construction of permanent buildings. Forty acres of land have been allotted to the school by the Local Native Council, boundaries have been demarcated, and a complete layout of buildings, playgrounds, and school gardens mapped out and approved by the Department. The following buildings are in various stages of construction: Principals' house, kitchen, boys' quarters and stores. The last-named is completed and has been fitted up with six benches as a temporary workshop.

Government School, Kericho.

The progress of this school has been retarded for three reasons: (1) lack of funds; (2) unsuitability of site; (3) frequent change of principal. The school was started in 1925 with a sum of £500—£250 for the Principal and £250 for maintenance. The site was not suitable, chiefly because it was in the township of Kericho, and there was a lack of both water power and fuel. At a meeting of the School Area Committee held on November 23rd, it was unanimously decided that the school should be moved to Mobego, about 17 miles from Kericho. Here there is good land for grazing and agriculture, plenty of water power available, and an unlimited supply of timber, stone, sand and other building material. It was agreed that a definite educational policy for the school should be drawn up and discussed by the School Area Committee before any definite building plans are begun. A tentative scheme has been submitted by the Acting Principal, Major Stanton, and it will be fully discussed at the next meeting.

MISSION SCHOOLS.

Nine different Missions are working in Nyanza Province, and there are no less than 25 Mission Stations.

At each station there is a school under the personal supervision of one or more Europeans. These schools are of different grades, but all Elementary, with the exception of the C.M.S. School at Maseno, which is a Junior Secondary School. To every Mission Station there is attached a number of Village Schools, over 1,200 of which have now been registered. The names of the various Mission Stations, with the approximate number of out-schools attached, are as follows:—

<i>Denomination and Name of Station.</i>	<i>Approximate No. of Out Schools.</i>
Roman Catholic—	
Mumias	230
Rangala	70
Kakamega	40
Eregi	0
Aluor	35
Kisumu	6
Nyabururu	60
Asumbi	90

Church Missionary Society—							
	Masenò	...	...	...	...	160	
	Butere	...	...	...	...	100	
						—	260
Friends Africa Mission—							
	Kitosh	...	...	...	...	50	
	Kaimosi	...	...	...	...	30	
	Maragoli	...	...	...	...	50	
	Malava	...	...	...	...	30	
	Lirhanda	...	...	...	...	30	
						—	190
Church of God—							
	Bunyore	...	...	...	...	45	
						—	45
Seventh Day Adventists—							
	Kamagambo	...	...	...	...	70	
	Kisii	...	...	...	...	40	
	Kendu	...	...	...	...	60	
						—	170
Africa Inland Mission—							
	Nyakatch	...	...	...	...	35	
	Litein	...	...	...	...	10	
	Kapsabet	...	...	...	...	0	
						—	45
Lumbwa Industrial Mission—							
	Kericho	...	...	...	...	10	
						—	10
Nilotic Independent Mission—							
	Ogada	...	...	...	...	10	
						—	10
Pentecostal Assemblies of Canada—							
	Nyangori	...	...	...	...	10	
						—	10
							1,271

Mill Hill Catholic Mission.

Under the energetic control of Monsignor Brandsma, Prefect Apostolic, this Mission is showing signs of great educational activity. I was able to send very satisfactory reports of work and progress both for Asumbi and Aluor, and I hope that grants-in-aid will be available for these schools in 1928. The school at Kibuye Station, Kisumu, has already received grants from Government, and I hope that particular attention will be paid to this school in the future. The work

at this station is very difficult owing to its proximity to the township of Kisumu, where there is a constant flow of native families to and from the Reserve as work demands. The Fathers in charge have their time mostly occupied with religious ceremonies and instruction for the 300 to 400 Catholic adherents who visit the station daily. The attendances at the school are necessarily irregular, and the instruction given reaches at present only the Elementary A grade. Two English qualified teachers have just arrived, and I understand that the services of one of them will be available for this school. I am very pleased to be able to record that a new and real interest is being shown by many of the Catholic Fathers, and that the extra duties involved in connection with the training of pupils up to recognised Government standards are being willingly and hopefully undertaken. Probably the most auspicious step which has ever been taken by this Mission in the interests of education, is the recent institution of a training school for teachers. After much trouble in searching for a convenient site, a suitable spot was found in the township of Yala, and a plot of land of 30 acres has been allotted. The Education Department has given financial assistance, and rapid progress has already been made in the construction of permanent buildings of cement blocks. It is hoped that the buildings will be ready for occupation within a year. Meanwhile, in order that the training of teachers shall not be delayed, a beginning has been made with about 40 young boys at Eregi in North Kavirondo, under the headmastership of Father Farmar. It is anticipated that the course of training will take from four to seven years, and that it will reach the Elementary C standard. An interesting feature of the work of the school is that all instruction is being given in English, and I am pleased to report that extremely good progress is being made under Father Farmar by the use of the direct method. As the pupils are drawn from all parts of Kavirondo, it was necessary to adopt a lingua franca, and English was chosen in preference to Ki-Swahili. Apart from other advantages, the use of English enables the teacher who has newly arrived to begin educational work immediately without having to learn a new language.

Village Schools and their Registration.

Up to the present, the Catholic Mission has not stressed the desirability of developing secular education in village schools. Although there are many hundreds of catechumenate schools, the teachers are for the most part unqualified and unable to teach anything more than the very elements of reading, writing and arithmetic. The teaching work in the

catechumenate schools is in fact often done as a form of penance by those who have been newly baptised. Usually no salary is attached to the post. There has been considerable discussion as to whether these catechumenates are schools in the meaning of the Education Ordinance of 1924, and whether they should be registered as schools or not. With regard to the right to establish such religious centres, irrespective of what other Mission may be working in that particular district, I agree with the Hon. the Chief Native Commissioner in his Circular No. 37 of 24th November, 1927, that "it would be undue interference with the liberty of conscience to prevent any man from allowing his private premises to be used for any kind of religious service or instruction." It has been customary for District Commissioners to give permits to build schools or catechumenates in any place where it is proved that such an institution is desired by the local natives. Formerly, as a working arrangement, "spheres of influence," with definite geographical boundaries, were arbitrarily agreed upon by the Protestant Missions, and the work of any one Mission was confined to its own sphere. The principle involved is no longer respected, and several cases of encroachment have been brought to my notice. The Catholic Mission has never agreed to spheres and admit no boundaries as far as their religious work is concerned. The futile attempts which are still being made to segregate the denominations only serve to encourage a feeling of enmity between the different sects, quite opposed to the true spirit of Christianity. Although complete freedom of religious thought must be allowed, no Mission policy which encourages religious intolerance and the complete destruction of all tribal law and custom should be admitted by Government, and any breach of the peace due to religious differences should be rigorously dealt with. I am strongly of the opinion that enforced registration of all catechumenate schools and regular supervision of all out-schools by the Mission Superintendents will be of the greatest help to the Administration in maintaining law and order. Other reasons for registration of catechumenates are —

- (1) When local desire is stated for such schools, the local natives invariably expect that secular education as well as religious will be given.
- (2) The buildings are often badly constructed and for health reasons should be kept in sanitary condition and open to inspection.

- (3) Secular instruction is already being given in many of these so-called religious centres, and the others are at any rate embryonic village schools only waiting for a teacher. Some knowledge of their positions and average attendances will be of the greatest value in developing the school sector policy.

I have therefore obtained full lists of all catechumenate schools under the various stations and sent in their names for registration.

Church Missionary Society.

The centre of the educational work of this Mission is at Maseno. This school was fully reported upon by the Acting Chief Inspector of Schools, the Supervisor of Technical Education and myself, after a visit paid to the school in May. The inspection showed that the work at the school was not altogether satisfactory. The weakness was largely due to lack of European teachers, and constant changes in the staff. The Principal of the school is Canon Stansfeld, and the head of the technical side the Rev. F. H. White. Since August, the Rev. A. Williams, formerly of the Buxton High School, Mombasa, has joined the staff. With his valuable help there is every indication that the school is now doing more satisfactory work. A great handicap to rapid progress in the past has been the fact that the pupils are drawn from both Luo and Bantu districts, and that up to the Fourth Standard all classes have been necessarily divided into two sections. Classroom accommodation has been very inadequate, and at the time of the inspection four classes of about 90 pupils were being held at the same time in one room, 66 ft. x 20 ft. Improvements in this matter as well as in many others, have been effected during the year and there are signs that a much more satisfactory report will be made next year. To avoid the language difficulty, it has been agreed that only Ki-Swahili and English shall be taught above Standard II and that the school should have its own Standard IV examination instead of the Elementary B (Vernacular) examination. The course of study will lead up to the Elementary C and Junior Secondary examinations. A word of praise must be given to Dr. Stansfeld for the special interest he is taking in the welfare and pursuits of the boys both outside and in the classroom. As a qualified doctor he deals daily with all their ailments and diseases; he planned and financed the construction of a large swimming bath, 150 ft. x 75 ft., and he has instituted evening classes and entertainments. On more than one occasion I have

attended a very successful social evening, in which the boys sing, recite and dance, or take their part with the European members of the staff in a historical play. The Rev. White's energy and good influence in the school is well known, but it is not only unjust but unwise to overwork the willing horse. The Mission should make every endeavour to get an assistant European instructor.

Church Missionary Society Village Schools.

An incentive was given to the work in the village schools by the competition held for the Phelps-Stokes Shield, which was to be awarded to the best village school. Twelve schools competed. I acted as judge and awarded marks under the following heads:—

- (1) Condition and cleanliness of school buildings, playgrounds, latrines, etc.
- (2) Manner and personal appearance of teachers and their ability to explain and demonstrate.
- (3) Schoolwork. Tests in reading, writing and arithmetic and general knowledge.
- (4) School equipment. Slates, blackboards, desks, forms, text-books, etc.
- (5) Time-table and school register.
- (5) School shamba and flower gardens.
- (7) Football field, games equipment, proficiency in drill.
- (8) Discipline and general tone of the school.

The school to obtain the highest marks was Maranda School, Sakwa, and the Shield was presented to this school on January 18th, 1927, by the Hon. Senior Commissioner. With a few exceptions, however, the out-school teachers have passed no qualifying examinations. Many of them sit regularly for the Elementary B (Vernacular) Examination, and, having had no training whatever during the year, are regularly failed. About 30 village school teachers took the examination this year at Maseno. They all failed, and as they were grouped with the Maseno School candidates, a very low percentage of passes was shown for this Mission.

Church Missionary Society Normal School, Butere.

This school was re-opened in January, 1927, under the Rev. and Mrs. Hichens. All the pupils are men who have served for some time as village school teachers, but who have not yet taken the Elementary B (Vernacular) Examination. The course is for two years. The men are of good type for

evangelical and social work, but they are mostly too old and set in their ideas to pass examination tests. Considering, however, the difficult material with which the Principal is working, satisfactory progress is being made, and it is hoped that a fair percentage of passes will be obtained in the Elementary B 1928 (Vernacular) Examination.

Church Missionary Society Girls' School, Ngiya.

Excellent work is being done by Miss Moller at her school in Ngiya. There is a fine school building, 60 ft. x 20 ft., of murrum blocks with cement-faced walls and floor, well lighted and ventilated, with good thatched roof. It is well-equipped with benches, forms, blackboards, pictures and maps, funds for which were obtained by Miss Moller from Australia. The school has, however, reached its limit of accommodation, as there is a roll of 230 women and girls, and an average attendance of 180. There are eight classes, and Miss Moller is assisted by seven native teachers, whom she has trained herself. In addition to reading, writing and arithmetic and drawing, a considerable portion of the time-table is given up to handicrafts such as sewing and mat-making. There are few girls' schools in the province, and there are none doing better work than this school. I recommend that the Mission tries to get a trained teacher to help Miss Moller, in which case I feel confident that Government would be prepared to assist in such important work.

Church Missionary Society Maternity Hospital and Training School, Maseno.

A two-storied building of brick is in course of erection on land near the C.M.S. Hospital, Maseno, and it is hoped that the central building and one wing will be formally opened about the end of June, 1928. The funds for capital expenditure and equipment have been provided as follows :—

	Sh.
Education Department	9,000
Local Native Council, North Kavirondo ...	6,000
Local Native Council, Central Kavirondo ...	6,000
Church Missionary Society	3,000
Medical Department	1,000

The Maternity Hospital is under the following Board of Governors :—

Provincial Commissioner, Nyanza Province.
 District Commissioner, North Kavirondo.
 District Commissioner, Central Kavirondo.
 Inspector of Schools.
 Medical Officer, North Kavirondo.
 Medical Officer, Central Kavirondo.
 Two Mission Medical Officers.
 The Matron.

The Friends Africa Mission.

The work of this Mission is confined to the eastern section of North Kavirondo. The Mission is unfortunately suffering from lack of funds and lack of staff. Mr. Chilson has left for home, and three of the five Mission Stations are left unoccupied; and I hear that Mr. Conover of the Kitosh Station will be leaving for America in a few months' time. Mr. Hoyt, who was formerly in charge of the technical work at Kaimosi, is expected back after a leave of about two and a half years, and efforts are being made by the Mission to obtain the services of a trained teacher and his wife for the Normal School. The educational centre of the Mission is Kaimosi, where there is a boys' school under the Principalship of Mrs. Bond. The literary work of the school is up to the Elementary B standard and quite satisfactory. The technical work has deteriorated of late owing to frequent change of instructors. Seventeen boys took the course of carpentry and building during the year.

Friends African Mission Village Schools.

The village schools under this Mission number about 200. Very accurate returns have been kept monthly of total enrolments, average attendances, teachers' salaries, etc., the work in this respect being more systematically kept than in any other Mission of the Province. It is worthy of note that the teachers' wages average as high as Sh. 12 per month, and that the whole of this money, about Sh. 2,500 per month, or Sh. 30,000 per year, is given voluntarily out of Native Mission Funds.

Seventh Day Adventist Mission.

This Mission has three stations in South Kavirondo, and controls about 170 village schools. The centre of the educational work has now been moved from Gendia (Kendu Bay) to Kamagambo, about 14 miles south-west of Kisii. The

Principal of the Kamagambo Central School is Mr. Warland, who is a keen schoolmaster, and has the advantage of being able to give all his time to educational work. He is assisted by Miss Clark, and five native teachers, all of whom have passed the Vernacular Examination. The school has received various special grants from Government, but it is not yet on the grant-in-aid list. A special interest is being shown by this Mission in the training of teachers and an application for a grant was made for 1928, but no funds were available. As a temporary measure, 30 teachers at a time are coming in for training for two-monthly periods. It is hoped that money from Government will be available in 1929 for a proper Normal School.

Church of God Mission, Bunyore.

This Mission is under the energetic control of Mr. H. C. Kramer and his wife. The staff has recently been augmented by the addition of Mr. and Mrs. Ludwig, both of whom take a keen interest in educational work. No special vocational work, except teaching, is being taught as part of the school curriculum, but a considerable amount of building is being done at the station under the supervision of Mr. Kramer and paid *fundis*. Many boys are therefore receiving sufficient training to go back to their villages and put up permanent houses of stone or brick. There are about 45 out-schools under this Mission, about 25 per cent. of which are of permanent structure, either finished or in course of erection. All the schools are badly in need of equipment. No agricultural training is at present being given at the Central School, neither do the village schools have their own shambas. Simple courses in agriculture should prove of the greatest value to the natives, especially in this district, where there are over 1,000 people to the square mile and where land is too valuable to be used uneconomically. Practically all the teachers of the village schools have passed both the Elementary B (Vernacular) and the Elementary B (Vernacular) Teachers' Examination. This is partly due to the fact that the Bunyore location is small in area and compact, so that the teachers from practically all the out-schools are able to attend the station school for regular instruction under Mrs. Kramer.

GENERAL.

School Area Committees.

Regular meetings of the School Area Committees of the North, Central and South Kavirondo have been held throughout the year, and many interesting subjects were brought up

for discussion. Perhaps the most important matter which has been considered is the proposal to build two Government schools from Local Native Council Funds, one in North Kavirondo and one in Central Kavirondo. The natives in these districts have for a long time expressed a desire for Vocational Schools under Government, and in July, 1927, each Council voted Sh. 100,000 for the purpose. The Hon. the Director of Education was present, and details concerning the nature and functions of the Schools were discussed and an estimate made of the capital and recurrent expenditure required. Other interesting subjects which have been considered include : Compulsory education for children, registration of village schools and catechumenates, definition of a school, scales of salaries for village school teachers, allocation of Local Native Council Funds.

Education Grants from Local Native Councils.

In addition to the Sh. 100,000 voted by Central, and a similar amount voted by North Kavirondo, for Government Schools, varying amounts have been voted by all the Administrative districts for educational purposes. The largest grants for education have been made by the Local Native Council for Central Kavirondo, which voted Sh. 10,000 for elementary education in 1926, and Sh. 20,000 for elementary education in 1927. The 1926 grant was expended on the following elementary schools, in every case for buildings, furniture or equipment :—Church Missionary Society, Maranda School, Sakwa, Sh. 1,000 ; Uranga School, N. Gem, Sh. 1,500 ; Ramba School, Asembo, Sh. 500. Roman Catholic Mission : Rangala Mission School, Sh. 1,000 ; Aluor Mission School, Sh. 1,000 ; Jina Village School, Sh. 1,000. Nilotic Independent Mission : Masana School, Sh. 2,000. Nyangori Mission : Simbi School, Sh. 2,000.

The 1927 grant has not yet been allocated, but it has been recommended that half the amount be used for teachers' salaries and half for buildings and equipment of elementary schools already established.

School Sector Organisation.

A school sector is to be an area served by one school so placed that all the children in the sector can walk to and from it daily. The policy of the Department is to divide up the country into such sectors, and when funds and teachers are available, to aid or support only such schools as are required to serve these sectors. Naturally, for economic reasons, the

fewest possible schools will be chosen to serve the largest possible areas. For the same reasons, existing schools will be used when possible or enlarged if necessary. In order to facilitate the enormous task of sectorising the Nyanza Province I have circularised all the Missions, and have obtained definite and valuable information about each of the 1,200 village schools now registered. I have obtained information under the following heads: Name of location; Name of school; Name of teacher; Examination qualifications; Salary per month; Enrolment; Average attendance; Days on which instruction is given; Hours of instruction; Whether accessible by car. I have also drawn large scale maps of Central and North Kavirondo, taking the main physical features from the only map available, the Ordinance Survey Map of 1916. Information concerning the position of roads and location boundaries I have obtained from the District Commissioners and the Public Works Department, and with the help of Missionaries and from my own observations I have filled in more or less accurately the positions of not less than 500 village schools. When the whole of the Province has been thus mapped out, I propose to obtain the populations of the subdivisions of the Locations,—the *Milango*—insert their correct positions on larger scale maps, and definitely fix the boundaries of the school sectors. Owing to the great density of population in many parts of Kavirondo, and the absence of maps with detailed information, the work is likely to take a considerable time, and practical surveying with a prismatic compass will be necessary.

Language Committees.

Considerable difficulty is being experienced in the printing of literature in the vernacular owing to different methods of spelling being used by the various authorities. Quite recently also, the candidates for the Elementary B (Vernacular) Examination at a certain centre obtained very poor marks for the dictation paper because the paper was corrected by an outside examiner, who used his own method of spelling. Two language committees have therefore been formed to deal with the establishment of authorised spelling conventions, one for Dholuo and one for Kipsigis. In the case of the former, every endeavour is being made to arrive at a settlement and many important points of difference have already been settled. A report of the findings of this committee will be published as soon as definite spelling conventions for all classes of words have been arrived at. Up to the present, only one meeting of the Kipsigis language committee has been held.

Examinations.

281 candidates sat for the Elementary B (Vernacular) Examination in this Province, and 109 passed. There were 84 entrants for the Elementary B (Vernacular) Teachers' Examination, of whom 68 were successful.

CRITICISMS AND SUGGESTIONS.

1. I beg to offer the following criticisms of the educational work in Nyanza and some suggestions of a constructive nature, as a necessary supplement to a report which has been chiefly a plain statement of fact showing what educational work is being done here to-day.

2. As an Inspector of Schools over a large Province of six Administrative Districts, and as a Visitor to all the School Area Committee meetings, I have had exceptional opportunity of hearing problems of native education discussed from the three main points of view: Administrative, Settler, and Missionary. These points of view are by no means so diverse as might be imagined by the casual observer. On the contrary, I have found that the representatives of these controlling factors are most sympathetic towards the interests of one another. But although they all show a keen and real interest in the welfare of the native, broadly speaking the chief aim of the Administration is peace and economic development in the Reserve; of the Settler, cheap labour for work on the farms; of the Missionary, additional converts to his own particular denomination. The point is that not one of these considers education as the main issue, but only as a subsidiary one to his own ideal. The only person who is confessedly keen on education is the native himself. But as he is dealing with an unknown quantity, he can only hold out his hands like a child to the moon, without being able to say what he is reaching for or what he will do with it when he gets it.

3. Our educational policy in British Tropical Africa has, however, been clearly defined in a Memorandum by the Advisory Committee on Native Education, and although the means to the end may be difficult, there is no question as to what the ultimate aim should be. "Education," says this Memorandum, "should render the individual more efficient in his or her condition of life, and promote the advancement of the community as a whole through the improvement of agriculture, the development of native industries, the improvement of health, the training of the people in the management of their own affairs, and the inculcation of true ideals of citizenship and service." It is true that some progress has

been made, but so far only a very small percentage of the people have received any of those benefits enumerated above. A large number of the natives live in the same disgusting conditions of filth, poverty, superstition and ignorance as they did before the white man came to their country. From the point of view of moral training, most people will give due credit to mission work, but the question arises whether the degree of success which is attending the secular work of the missions is all that can be desired. After careful consideration of the question, I am of the opinion that the present system must be continued, but that at the same time it must be gradually interwoven with the State system of education embodied in what is known as the school sector policy. Only those schools which serve the recognised sectors will receive grants-in-aid from Government, and they will not be deemed to serve a sector merely from their geographical position, but efficient buildings will have to be erected, and efficient teachers found.

4. It takes a much longer time to make a good teacher than to erect a satisfactory building, and I therefore recommend that Government not only supports every effort to institute normal schools for teachers, but makes such institutions compulsory for all missions. These schools should be under the control of fully qualified European teachers. The teacher's training must of course be adapted to the recognised needs of the African, and should include such technical training as agriculture, carpentry, building, etc.

5. The Local Native Councils have for years expressed a desire for Government technical schools. In spite of the high cost, I strongly favour the recommendations put forward by the Hon. Director of Education for Government schools in the Administrative Districts of North and Central Kavirondo. I agree with the missions that we should aim for the general upraising of the masses, but I feel sure that an extensive and general culture of a people can only be brought about by an intensive and special training of a limited number. It is my firm conviction that the salvation of the native, morally, mentally and physically, will only be achieved by the instrumentality of trained native teachers and skilled native artisans.

G. ERNEST WEBB,

Inspector of Schools.

II.—TECHNICAL EDUCATION IN 1927.

1. Since writing the notes which appeared in the 1926 Report, having become more fully acquainted with the complex problems of the Colony, I am able to discuss Technical Education impersonally and in more detail.

2. As preliminary, it may be stated that progress during 1927, in African education, has been satisfactory, though it has not yet reached higher in technical training than instruction and practice in manual trades.

3. In respect to European education, where technical education must eventually receive the same emphasis which it is given in England, good provision is being made in the new schools at Nairobi and elsewhere for efficient teaching in Chemistry, Physics and Domestic Science. Manual training (elementary carpentry) is also taught as a part of elementary education.

AFRICAN EDUCATION.

Government Schools.

4. The Native Industrial Training Depôt at Kabete started the year with about 120 apprentices. By August, sufficient buildings had been erected (by the apprentices) to accommodate 300; the Depôt total was raised to that figure, and at the end of the year stood at 360.

5. As soon as sufficient European leading artisans (a new class of instructor, recruited for us in England by the Crown Agents) were available, apprentices were sent out in gangs under the Public Works Department, and to erect the new Jeanes School Buildings, under our own supervision.

6. Although these gangs necessarily included a large proportion of raw boys and the organisation was at first necessarily experimental, their work has been of considerable value to Government and to themselves.

7. Now the Depôt is in full swing, recruitment has become embarrassingly easy; there will be no difficulty in raising the numbers to the full strength of 600 (300 in Depôt; 300 out in gangs) by the end of 1929. The proportion of boys drawn from missions, after a preliminary three years' training there, has been small; but it will be some years before the stream of boys from that source will be large enough to enable us to keep the Depôt going, as is desirable, with short-course (two-year) apprentices only.

8. The engagement of Flight-Lieutenant G. J. Stroud, M.B.E. (late R.A.F., Halton), as Principal, has given a good impetus to the work of the Depôt. This school is now in a class by itself.

9. *The Machakos Native School, Machakos*.—(180 apprentices, to trades and teaching). This school under Mr. Francis has kept its high standard as the best disciplined African school in the Colony. Apprentices have been working in gangs from this school also, erecting Local Native Council buildings (schools, dispensaries, etc.) in the Reserve, in out-of-the-way places where it would be difficult to build by any other agency.

10. *The Coast Technical School, Waa* (about 100 boys).—The work of this school has been upset by proposals that it should be moved to a more healthy and convenient site, and the uncertainties consequent on such proposals. It was found impossible to take over a desirable site at Freretown; it has also been found inadvisable to move to Kwale, although almost the whole of the technical apprentices have been employed there in erecting Government buildings during the year.

11. The increased number of Technical Instructors available, however, has recently permitted this school to have its proper staff for the first time in its history.

12. *Government African School, Kapsabet* (90 boys).—This school has improved considerably; money has also been available from Government and the Local Native Council for the erection of permanent buildings, the progress on which is good. The share of the schoolboys (Nandi) in the work has been considerable, but they are not yet able to work without a proportion of outside skilled workers.

13. *Government African School, Kericho* (31 boys).—This school has been under a cloud for some years, owing to constant changes of Principal. There is hope that under a new man, recently engaged, the school will now progress; especially as money has been made available to move it to a better site, granted by the Local Native Council, Lumbwa, and to erect permanent buildings.

14. The work of building here will be carried out by gangs from the Native Industrial Training Depôt, with what help the local schoolboys are capable of.

15. *Masai Schools, Narok and Kajiado.*—A new Principal at Narok has brought that school into a state more equal to that of Kajiado. Kajiado has continued its good work; there are now 20 branch dairies based on Kajiado, and 13 at Narok; while Masai ghee (clarified butter) commands the highest price in the Nairobi market.

16. The schoolboys at Kajiado erect their own buildings; this stage of development has not yet been effectively reached at Narok.

New Schools.

17. On a grant of land made by the Local Native Council buildings have been started for a school at Tambach for the Elgeyo and Marakwet district, with some small assistance from Local Native Council funds. There are no schools of any kind, mission or otherwise, among this tribe, and the development of the Tambach school will probably proceed on the lines of those in the Nandi (Kapsabet) and the Masai (Narok and Kajiado) Reserves.

Proposed Local Native Council Schools.

18. A strong demand has arisen in the more advanced Reserves—Kavirondo and Kikuyu—for schools giving education with a technical bias; and large sums of money have been voted by Local Native Councils for this purpose. There are difficult questions of general policy involved in the discussion of these demands, however, and so far the only action possible has been to select suitable sites and place the voted money in deposit.

Missionary Education.

19. There are still only two societies permanently adopted into the grant-in-aid list—the Church Missionary Society and the Church of Scotland Mission; but it was possible in 1927 to assist very materially approved work done by the two Roman Catholic Missions, and to give help on a smaller scale to the Friends Africa Mission and the United Methodist Mission.

20. *Church Missionary Society, Maseno.*—With nearly 200 pupils, it is still badly understaffed on the technical side; the Rev. F. H. White, perhaps the most senior Technical Instructor in any Kenya Mission, is still working alone. A new instructor recruited for this station had to be diverted to

Kahuhia, on account of a difficulty which arose at that station. There is a fairly efficient native staff at Maseno; but it cannot be contended that one European instructor is able to run such a large school with full efficiency. The Society was warned, after an inspection of Maseno in the spring of the year, that unless early steps were taken to improve matters their grant would be endangered. A draft of boys from Maseno to the Native Industrial Training Depôt was received during the year; they were satisfactory.

21. *Church Missionary Society, Wusi* (40 boys).—The Principal, the Rev. V. V. Verbi, went on leave during the year. As the Society was unable to provide a substitute, a Government Instructor was lent to the station to carry on the work, especially to prevent obligations to pupils being unfulfilled. This school made an excellent exhibition at the Nairobi Show (Industrial Section) in August; its work has been of peculiar value, and should not be allowed to drop.

22. *Church Missionary Society, Kaloleni*.—With a senior Technical Instructor posted here, in addition to the Principal, who has himself technical qualifications, this school has progressed during the year.

23. *Church Missionary Society, Kahuhia* (20 boys).—Owing to a difficulty with staff, referred to above, the technical side of this school was removed to C.M.S. Kabare during a part of the year. It was afterwards returned to Kahuhia, where, under a newly recruited instructor, affairs appear to be progressing well again.

24. *Church Missionary Society, Kabare*.—This station is not on our grant-in-aid list; some incidental help has been given, but unexpected difficulties have been encountered in the development of the work along approved lines.

Church of Scotland Mission.

25. *Church of Scotland Mission*.—The two subsidised stations, Kikuyu and Tumutumu, are now well staffed; Kikuyu has three Technical Instructors and one Agricultural Instructor; Tumutumu has two Technical Instructors. The increase in staff has been reflected in the quality of work and training given. The Mission, moreover, has undertaken a large building scheme at each station, and is seriously taking its share of educational work under Government subsidy.

26. A first draft of pupils to the Native Industrial Training Depôt, for a finishing two-year course there, after three years' indentured work at the Mission, will shortly be due.

Friends Africa Mission.

27. Assistance was given to this Mission in order to enable it to bring out again, from furlough, the Chief Technical Instructor at Kaimosi. The technical training at the station (not subsidised by Government) had fallen off during his absence. There is a splendid equipment, which it should now be possible again to use efficiently.

Roman Catholic Missions.

28. In the teacher-training institutions at Kabaa and Yala (temporarily at Eregi) facilities and staff are being provided in order to train a number of technical apprentices. It is hoped that pupils will be working at these stations shortly under the Government syllabus.

H. O. WELLER,

Supervisor of Technical Education.

IIIa.—SCHOOL MEDICAL WORK IN NAIROBI.

During 1927 medical inspection of 924 Asiatic children was carried out in Nairobi. All the boys and a large proportion of the girls attending Indian Schools were examined.

The following more important conditions were observed :—

CLEANLINESS.

The standard of cleanliness generally was not high though the girls in this respect were much superior to the boys; 8.5 per cent. of children had vermin in their hair or on their clothes.

NUTRITION AND DEVELOPMENT.

148 children were below reasonable standards of nutrition and growth. This was particularly noticeable among the junior classes—the older children seemed to have improved immensely while at school. The growth curve from the average heights and weights shows a definite acceleration about the age of thirteen. Puberty, the extra fresh air and exercise

allowed the older Indian child, as contrasted with the confinement in which the younger child is kept, and the early leaving school for economic reasons of the poorer and underfed children, all probably play a part in this acceleration.

VACCINATIONS.

125 boys and 89 girls were unvaccinated. During the year all the boys attending the Government Indian School were vaccinated by the Health Office.

TEETH.

Generally the teeth of Indian children of all ages were satisfactory. A certain amount of caries of the milk teeth was noticed, but the permanent dentition was excellent. Six cases of pyorrhœa were seen and one of alveolar abscess.

TONSILS AND ADENOIDS.

The tonsils were enlarged and unhealthy in 16 per cent. of the boys and 12 per cent. of girls. The girls of the Khoja community seem to be peculiarly liable to this trouble, 25 per cent. of them showing definite and, in some cases, very marked enlargement.

Adenoids were present in 5 per cent. of boys and 1 per cent. of girls.

Both these conditions give rise to quite a high proportion of chest trouble, especially bronchitis and general catarrh. Pigeon chests and otorrhœa were the common sequelæ of nasopharyngeal obstruction. Diseased tonsils and adenoids equally in the tropics as in temperate zones play a very definite part in retarding nutrition and development, and chest and ear troubles are the equally natural sequence here of any unhealthy condition of the throat and naso-pharynx.

EYE DISEASES.

Eighteen children had organic eye disease, principally conjunctivitis and keratitis—conditions very amenable to proper treatment.

VISION.

All children of eight years or more were tested with Snellen's types. 87 out of 516 examined were found defective to a degree requiring treatment by suitable lenses. Only three of these children wore glasses. Expert treatment of visual defects is urgently required.

HEART AND CIRCULATION.

Twenty children had cardiac or circulatory defects. Five organic lesions with definite histories of rheumatic trouble were observed. No case of chorea was seen—a common condition in children in temperate zones. The fact strongly suggests itself that acute rheumatic conditions in children are uncommon in Kenya, though tonsillar enlargement seems to be even more prevalent than at home.

LUNGS.

Ninety children had chest trouble; of these by far the greater number were suffering from simple bronchitis and catarrh.

RICKETS.

Signs of old or latent rickets were observed in fifteen children. This is largely a preventable condition.

SKIN TROUBLES.

Twenty-five children were suffering from skin trouble of a definite and extensive nature, but a very much larger proportion showed skin irritation caused by scratching. A higher standard of cleanliness would obviate this trouble.

ENLARGED SPLEENS.

4.3 per cent. of children had palpable spleens. A thick blood film was taken from every child for examination by the Laboratory for malarial parasites; 3.7 were positive. These are surprisingly low and satisfactory figures when one considers that they were found at the height of the malarial season in Nairobi.

CONCLUSION.

The general standard of health among Indian children is quite fair. There exist, however, many conditions amenable to simple treatment and largely preventable; some, as for example, visual defects, urgently call for expert attention. Most useful work could be done among these children by preventive and curative measures in raising the general condition of their health. To this end it will be necessary to have the assistance of the School Committees and the willing co-operation of Indian parents. Much trouble was experienced during these examinations through some parents objecting to their children being examined by a male doctor. Every care was taken to ensure that any such objection should be minimised as far as possible. The Health Office Sister and a female

teacher of the school were always present when Indian girls were examined. In spite of these precautions it was found impossible to examine quite a considerable number of older Indian girls. Routine inspection of these children and the treatment and prevention among them of physical defects are equally important as in younger children. One hopes that the Indian communities will give all the assistance they can to any future school medical work in Nairobi.

P. P. D. CONNOLLY.

IIIb.—SCHOOL MEDICAL WORK IN MOMBASA.

Re SCHOOL MEDICAL INSPECTION.

The schools visited at Mombasa during the year 1927 were as follows :—

1. Allidina Visram High School.
2. Ismailia Boys' School.
3. Government Indian Girls' School.
4. Arab School.
5. C.M.S. School for Boys.

1.—ALLIDINA VISRAM HIGH SCHOOL.

255 boys were medically examined at this school. Judged by home standards, the health of the scholars as a whole was poor, 45 showing definitely diseased conditions requiring treatment, *i.e.*, 18.6 per cent., which, however, is a lower figure than that found in the other schools.

The most commonly encountered diseases were :—

Defective Eyesight	10 cases.
Enlarged Spleen	9 „
Cardio-vascular Disease	5 „
Skin Diseases	5 „
Teeth markedly carious	4 „

A report on the school buildings and surroundings, drawing attention to the necessity for various alterations and repairs, is forwarded under separate cover .

2.—ISMAILIA BOYS' SCHOOL.

136 pupils were medically examined at this school, of which 57, or 42 per cent., exhibited defects.

The school building is a shed, the walls being built of stone, with a concrete floor and zinc-iron roof, measuring some 80 ft. by 30 ft. Here 140 Indian boys, of ages ranging between 8 and 16 mostly, are congregated for five or six hours daily. There is no open space to permit of exercise and games. When school is over they return to home conditions, which are very much worse.

The defects encountered were as follows :—

Seriously diseased tonsils	16 cases.
Marked dental caries and pyorrhœa alveolaris	8 ,,
Catarrh of the respiratory tract ...	5 ,,
Otorrhœa	5 ,,
Tuberculosis	5 ,,

The above-mentioned conditions are caused to a considerable extent by bad housing and feeding. Fourteen cases showed enlarged spleens.

3.—GOVERNMENT INDIAN GIRLS' SCHOOL.

Here 105 pupils were examined, and 45, or 42.4 per cent., of these showed defects of a similar nature to those noted at the Ismailia Boys' School.

Diseased tonsils	13 cases.
Dental caries and pyorrhœa ...	4 ,,
Catarrh of the respiratory tract ...	5 ,,
Otitis media	1 ,,
Tuberculosis	1 ,,
Malnutrition	7 ,,
Enlarged spleen	7 ,,

The school in this case is a stone-built house. The rooms are small and ill-ventilated and lighted. It is totally unsuitable for use as a school-house. There is no playground for the pupils.

It is understood that it is intended to provide suitable school buildings for these two last-named schools. This is a step which should be embarked upon without delay. The unhygienic conditions under which these children attempt to carry out their studies have to be experienced to be realised.

4.—ARAB SCHOOL.

287 pupils were examined at this school, 59, or 21 per cent., showing diseased conditions requiring treatment. The more commonly encountered defects were:—

Skin diseases	... ..	19 cases.
Valvular disease and flabby heart	... ..	11 ,,
Dental caries	... ..	8 ,,
Tuberculosis	... ..	6 ,,
Malnutrition	... ..	4 ,,
Enlarged tonsils	... ..	5 ,,

In some 18 pupils the faeces were examined for intestinal worms. The following conditions were found:—

- 8 showed hookworm infection;
- 14 harboured round worms;
- 15 were infected with trichuris;
- 1 showed the ova of the tape-worm.

It is intended to have the faeces of each child tested in this way and treated for the conditions found. The results of treatment are very satisfactory, particularly in the case of hook-worm infection, where treatment on one or two occasions as a rule effects a cure. Of these conditions, hookworm disease or ankylostomiasis is the most serious. It produces a marked degree of anæmia and of general ill-health. Its role in aggravating other diseases is an important one.

As regards the school premises, the following should receive attention:—

1. *Latrine Accommodation.*—A 2-unit latrine of the approved type should be erected for the use of the staff. The existing 5-unit latrine, part of which is at present used by them, would then be sufficient for the pupils.

2. *Class Rooms.*—The *makuti* roofs of two of the temporary sheds are leaking, and in need of repair. It would appear that a further temporary shed is required. Each of the two large class rooms, on either side of the entrance hall, is as a rule partially divided by wooden screen of giry to accommodate two classes. A proper partition with improvement on this arrangement, as it would cost less to separate the two classes, each of which is likely to be disturbed

by noises unavoidably created by members of the other class, under the existing system. I would recommend that the class rooms in the permanent buildings be distempered at least once a year.

3. *Soakage Pit*.—The soakage pit from the standpipe in the school yard requires to be provided with a cast-iron cover set in cement concrete.

4. *Changing Room*.—A changing room should be provided at the school sports ground. A similar one to that existing on the adjoining ground belonging to the Young Indian Association would be sufficient.

5.—CHURCH MISSIONARY SOCIETY SCHOOL FOR AFRICAN BOYS.

91 boys from this school were medically examined, of which 62 showed defects requiring treatment.

The commonest conditions noted were :—

Enlarged spleen	...	...	...	45 cases.
Pyorrhœa and dental caries	...	...	...	19 „
Naso-pharyngitis	...	...	...	18 „
Diseased tonsils	...	...	...	15 „
Scabies	...	...	...	8 „ —

The school is conducted in a bungalow belonging to the Church Missionary Society, and in adjoining wood and iron buildings. The class rooms are small and not well lighted. The building is poorly adapted for use as a school.

Little has been accomplished in the direction of treatment. An average of some twenty boys from the Arab School have been attending at the Native Civil Hospital, mostly on account of skin diseases, catarrh of the respiratory tract and chronic ulcers.

About fifteen children from the Indian Girls' School attend at the Health Office Clinic for women and children. During the earlier part of 1927, particularly at the Allidina Visram High School, pupils were advised to see a private practitioner to have the defects noted remedied. It would appear, however, that very few have done so.

The building at the Native Civil Hospital aims at providing treatment for the general native population. Facilities do not exist for remedying the majority of defects commonly met with among

school children with, for example, enlarged spleen and chronic malaria, dental caries and pyorrhœa, diseased tonsils, scabies and defective eyesight, where, in order to accomplish any real benefit, careful and prolonged attention must be given to each individual case. A scheme providing treatment for defects of this nature is essential before any considerable benefit can be derived from school medical inspection.

H. DE BOER,
Medical Officer of Health.

IV.—GOVERNMENT SCHOOLS IN THE MACHAKOS DISTRICT.

1.—SITUATION.

The Government District School at Machakos is situated about one mile from Machakos Boma and is connected with sixteen village schools which at present chiefly serve the northern and central parts of the district. The complete organisation of schools which it is proposed to provide for the district will be shown below.

2.—GRADE OF SCHOOLS.

According to the classification adopted by the Education Department, the Central School at Machakos is graded as an Elementary C School carrying literary education at present to the Seventh Standard. The practical work, however, in joinery and building is considerably in advance of this stage. The village schools at present carry education only to Standard II (Elementary A), the most promising pupils being selected by examination annually for promotion to the Central School.

3.—NATURE OF SCHOOLS.

The Central School is a boarding school for boys only; the village schools are day schools, although in a few cases the Africans have themselves made their own arrangements for boarding under the supervision of the native schoolmasters. The Akamba are strongly opposed to the education of girls, as they fear the emancipation of their women, but the African schoolmasters, who have been educated at Machakos, are now expressing a desire for the education of their daughters.

4.—CO-ORDINATION OF SCHOOLS.

The village schools are closely allied to, and dependent upon, the Central School. All village schoolmasters are Akamba, and have been educated and have received their training as teachers at the Central School, and repeat in the village schools the principles of education which they have learnt at Machakos.

5.—STAFF.

The staff of the Central School consists of the Principal, who is also the Chief Technical Instructor, a Schoolmaster, who is a graduate of Cambridge University; two Technical Instructors in joinery and masonry; five African Schoolmasters; three African Technical Instructors. The staff of the village schools consists of twenty-eight African Schoolmasters.

6.—BUILDINGS.

There are seventeen buildings (apart from offices, etc.) on the school site, of sundried and burnt brick, of wood, and of mud and wattle. All except four have been erected by the pupils of the school.

7.—CURRICULUM.

All pupils on entering the Central School are indentured for a period of five years. The first two years are spent entirely in the class room, the last three years mainly in the workshops (carpentry, tailoring, etc.), or on the brick fields. Literary education is provided in a decreasing ratio during the second period. Both literary and technical education are carried out according to the departmental curricula. On the technical side, boys are trained on the erection of buildings, the making of furniture for schools, and on practical work generally. No work is allowed which will not be of service to the school or the district.

8.—ATTENDANCE AND ORGANISATION.

There are at present 176 pupils resident in the school, divided into the following classes:—

Junior School—

Std. III, number of pupils	...	44
Std. IV, number of pupils	...	32

76

Senior School—

Carpenters under training	41
Bricklayers	35
Tailors	3
Teachers	21
	<hr/>
	100
	<hr/>

The attendance at village schools amounts to approximately one thousand.

The village schools, as stated above, carry education as far as the second standard only. With the provision of village schools, the standard of education has risen at the Central School, which now contains Standards 3, 4, 5, 6, 7. In Standards 3 and 4 are found the pupils promoted from the village schools. It is hoped that later it will be found possible to dispense with indentures for boys in these classes, and to indenture apprentices for a five years' vocational course after passing Standard IV. Standards 5 and 6 are reserved for the apprentices under technical training. Standard 7 contains pupils who have elected to become teachers in village schools. It is also hoped to start other vocational courses at a later date, such as seconding boys during their school career as learners at the Machakos Native Hospital.

9.—DISCIPLINE, ESPRIT DE CORPS, ETC.

The discipline of the school has throughout been semi-military, approximating as closely as possible to that of the Police Force. Such discipline is preferred by the Akamba, who are accustomed to it under their tribal organisation and realise that discipline only can lead to progress. The maintenance of order and the punishment of minor offences are left very largely in the hands of the Nzama, or Boys' Council, which corresponds to the body of prefects in an English public school. The only offence which is brought to the notice of the Principal is absence from 9 p.m. roll call without leave. Cases of insolence, insubordination or theft are almost unknown. One African teacher is on duty each day and visits the dormitories at night to call the roll. On Sundays the boys are free to do whatever they wish. A large number attend service at the neighbouring Mission; others visit their friends. Military and physical drill form a strong feature of the curriculum. In 1926 and 1927 the school won the Denham Shield

for physical drill at the Olympic games in Nairobi. This competition is judged by the Commissioner and officers of the Kenya Police. Football is extremely popular, and matches are played against Machakos Town, with village schools, and between classes, *e.g.*, Carpenters, Masons, Teachers, etc.

The village schools practice the same military and physical drill as the Central School, and have their own inter-school football league, competing for a cup presented by W. F. G. Campbell, Esq., late District Commissioner, Machakos. Each member of the winning team receives a medal presented by the Principal of the Central School.

The village schools also compete for the Efficiency Medal, presented by the Principal of Machakos School, who visits all village schools annually and awards marks for progress in class, cleanliness, discipline, drill, handicrafts, school gardens and tidiness of school buildings and compounds.

10.—SCHOOL WORK COMPLETED AND IN HAND.

(a) *Literary*.—In 1926, 24 pupils were presented for the first public examination of the Department (Standard IV or Elementary B), and 23 passed. This examination includes handwriting, dictation and composition in Swahili, arithmetic, geography, hygiene and drawing. For the next examination, Elementary C, 3 were presented and 3 passed. In July, 1927, 114 pupils were presented for the Elementary B or Standard IV examination, of whom 102 passed. In December, 1927, 29 pupils were presented for the Elementary C or Standard VII examination, of whom 19 passed.

(b) *Technical Works*.—(i) Buildings; (ii) Joinery, etc., on Workshops; (iii) Minor work for settlers; (iv) Exhibits for Nairobi Agricultural Show, 1927.

Attention is drawn to the contribution of £1,800 per annum by the Local Native Council for the replacement of temporary school buildings and dispensaries throughout the Reserve by permanent buildings. These buildings, which are of burnt brick, are being erected by a mobile column consisting of Machakos apprentices accompanied by a European artisan or instructor. The boys are thus learning how the training they receive in school can be of assistance to their own people in the Reserve. It is proposed that as boys pass out of their apprenticeship they shall be retained in the gang and placed on a scale of pay according to their proficiency.

11.—THE TRAINING OF TEACHERS.

In order to provide for the education of all boys and girls in the Machakos district, the number of trained teachers and of schools must be increased year by year. The educational system will follow the system of administration.

The spheres or locations of twelve headmen will contain twelve permanent school buildings. Under each headman there are approximately four sub-headmen, each of whom will have a school connected with the permanent school. Under each sub-headman there are several *asiti*, each controlling approximately 5,000 acres. Each of these may want a school. This means the provision of some 300 or 400 schools. The total population numbers 186,894, of whom 20 per cent., or 37,379 may be reckoned as children of school age. Such provision makes allowance for 90 to 120 children in each school.

There are at present only 16 village schools staffed by 28 teachers, and there are 21 teachers under training at Machakos. It is proposed to raise very considerably the standard of education among these teachers, who will probably be the best educated village teachers in Kenya. All have made rapid progress not only in the village schools but at the Central School, Machakos. During the present year, they appear upon a recent examination to be capable of passing not only the Elementary B (Std. IV) examination in July, but also the Elementary C (Std. VII) examination in December. The preparation for this examination, together with instruction in garden work, the use of carpentry tools, the making of sundried bricks, and the mixing of concrete will complete their course for the year.

The second stage, a three years' course, will commence in January, 1928. During this course they will be prepared for the Junior Secondary Examination and the Teachers' Third Class Certificate. The latter examination includes a simple form of the Theory and Practice of Teaching, Black-board Drawing, and Drill. To these subjects on the literary side will be added a knowledge of Akamba folk-lore, songs and games, and on the manual side, village carpentry, building in sundried brick, mud and wattle, and thatching.

12.—CONCLUSION.

The educational system adopted at Machakos with its strong discipline and practical application is very popular with the Akamba, who are at last showing a great desire for

education. The system is extremely efficient in inculcating respect and good manners, and the importance of education as a service to the community. An examination of Machakos school shows no small probability of this district becoming a model of African Education to other schools in Kenya.

V.—MASAI SCHOOL, KAJIADO.

INSPECTION BY SUPERVISOR OF TECHNICAL EDUCATION,
JUNE 14TH—15TH, 1927.

STAFF.

The Principal is Mr. L. E. Whitehouse, whose special qualification is that he has learned Masai, and speaks it fluently. He was taken over by the Department from the Local Native Council. He is keen on his work, and on evidently friendly terms with the Masai.

Pay: £480 per annum. Still on temporary appointment, which should be confirmed as early as possible by a thirty months' agreement.

Native Staff.—Four African teachers:—

(a) Zadikiah Kiai, a Kikuyu from the Church of Scotland Mission, Tumutumu; Sh. 80 per mensem, plus food.

(b) Gad Kago, a Kikuyu from the Church of Scotland Mission, Kikuyu; Sh. 60 per mensem, plus food.

(c) Kasino Ole Lebrek, a Masai, trained at the Narok School; Sh. 30 per mensem, plus food.

(d) Lenuthuk Sidai, a Masai, trained at the Narok School; Sh. 30 per mensem, plus food.

LANGUAGE.

The language of the school is Masai, but the boys incidentally learn some Swahili, in reading, writing and arithmetic lessons. Swahili is not yet a subject.

TIME TABLE.

An analysis of the time table shows in a week of 1,650 minutes:—100 minutes devoted to drawing; 240 minutes to arithmetic; 200 to reading; 145 to writing; 600 to handicrafts and building; 225 to physical exercises; 90 reserved for "free lessons," *i.e.*, to make up arrears in any subjects, and 50 to recreation.

The school hours are 6.30 a.m. to 3.45 p.m. (no afternoon school on Saturday).

The term "Handicrafts" includes only actual building and the soldering of ghee tins at present. There are no benches and few tools. I saw the boys cutting and carrying thatching grass as work under this head.

Drawing is taught by the tracing of cut cardboard shapes on slates, with freehand lines to complete simple patterns.

Arithmetic is up to the first simple rules only.

Reading is of syllables and short words.

PUPILS.

The boys are all of one draft, divided for convenience into classes 1a, 1b, and 1c. Their ages are 8 to 14 years. All are boarders. They sleep 7 or 8 together in dormitories, which are also used at present as dining rooms, each 10 ft. 6in. x 15 ft.

(The Principal says that the boys do not like to sleep fewer than 7 or 8 together.)

Their diet is :—Daily : 1 lb. posho, 4 ozs. rice, 2 ozs. sugar. Weekly : 4 ozs. ghee, 1 lb. meat. Each boy is also expected to bring in a few cows for milk. A boy can easily drink half a gallon of milk at a sitting. It will be noticed that this diet differs widely from that traditional with the Masai—blood, milk and meat only.

There are six dormitories for 60 boys, but all the boys are not resident; some are away at the out-dairies.

INSPECTION.

I inspected the morning school on June 15th. The timetable subject was arithmetic in all classes, but, at my request, the pupils were also displayed in reading and drawing.

The boys appear well taught and many are intelligent; the Principal is adjusting his methods well to the mental stage of the pupils. The tribal inabilities of the Masai are almost incredible; for example, they have no method of reckoning lapse of time; to get the boys back at school after a holiday, the Principal serves out slips of wood, on which a boy cuts a notch each day, returning to school at notch No. 30.

This is an advance on Court practice at Narok, where it is the custom to tie knots in string for a witness who is wanted again; he has to untie one each day and return when the string is clear. The Kajiado boys have to do their own counting.

I found considerable undeveloped talent in drawing and probably good mental ability. One of the Masai teachers, son of an important chief, impressed me very favourably.

There was a Police school also in session. I understand that results here are very disappointing. There was only one Masai constable.

The school building (to be the Principal's house later) has three class rooms, a book store and a dispensary. The dispensary is well stocked, with a native dresser in attendance. It serves the Police also. The Principal has considerable rough medical and dental work forced on him by circumstances.

THE DAIRY.

The centres of school activities are the dairies; one at Kajiado, and twelve at out-stations. This work is supervised by the Principal; the Kajiado dairy is the largest and is the training centre for the others. The out-dairies are staffed by boys and old boys of the school; a 100-gallon dairy has two old boys and two boys; the boys getting Sh. 8 per mensem and the old boys Sh. 14 to Sh. 18. Food is found for them by the local stockowners.

GHEE-MAKING.

The chief dairy work is ghee-making. The circle of operations is:—

Masai women bring in their milk in gourds. It is rather smoky as the gourds are "washed" with a cow's tail and smoked. But it is too early yet to introduce the alternative use of milk tins; there is prejudice against them.

The milk is strained, the cream is separated (all machinery is Scandinavian), and the skim milk is returned to the women.

After twenty-four hours, the cream, which is of richness equal to that from Jersey cows, is churned to butter and washed. The buttermilk is used by the boys.

The butter is then melted and boiled until all water is gone, when it is of a clear amber colour. A pinch of soda is added to neutralise the smoky flavour; curd and milk fragments are allowed to settle, a thin scum is cleared, and, at the right temperature, the clear ghee is poured into tins. The tins are soldered up by the boys.

It is worth noting that although Machakos ghee is reckoned the standard in Nairobi, yet Masai ghee fetches a higher price—Sh. 54 a frasila (36 lbs.) as against Sh. 38 at present quotations.

The economics of the manufacture are : An average price of 50 to 60 cents per gallon is paid for milk brought in and the skim milk is returned. 85 to 90 gallons of milk give 10 gallons of cream, and, finally, four gallons of ghee (40 lbs.). In the last one-and-a-half months the school has sold ghee in Nairobi to the value of £1,200. Profits are absorbed by wages and the milk vendors.

From next year the industry will no longer receive the direct support of the Local Native Council; it must stand by itself or be given up.

BUILDINGS.

The Principal is living at present in one of the houses in the Boma, next to the Court. The school building will be his house later.

The present dormitories were built by the boys under the Principal's instructions; they are of sundried flat brick, thatched with grass. The floors are of earth, but this does not matter, as there are no "jiggers".

There is a building scheme drawn up with a satisfactory layout. One question put up for my advice was "What construction is to be adopted for the new buildings?" After looking at the local sand and stones brought from the river-bed and the sundried bricks, I withdrew my paper suggestion to use *pise-de-terre* and recommended cement concrete (using cement and the local graded sand with lumps of stone as "plums"), or unsquared rubble masonry, for all walls, and corrugated iron or thatch for roofs. I also recommended that the Kenya marble quarries lime should be tried instead of cement with "puzzolanic" material, if available. Floors could be of rammed earth for the present, to be finished as stone slab paving, pointed with cement, when funds are available.

Water Supply.—The water supply is from the Magadi Soda Company's main.

GENERAL REMARKS.

There is no doubt that the Principal, Mr. L. E. Whitehouse, is well qualified for the work, and that he is doing it well. His relations with the Masai are most cordial; the Paramount Chief seems a personal friend.

The land on which the school stands is on a ten years lease from the Magadi Soda Company, who in turn lease from Government. All the houses used by the Administration, including the two occupied by the school, are leased from the Company. This situation, being known to the Administration, is probably quite safe, but it might be explored, as Government is now about to put a good deal of money there into buildings.

The Principal has not yet been confirmed in his appointment. His allowance for travelling seems absurdly small. He has twelve out-dairies which he can only supervise properly at a personal loss.

RECOMMENDATIONS.

1. That the school be allowed to develop on its present lines.

2. That a special grant for masons' and carpenters' tools and benches be made from this year's savings, if any.

3. That the special subject of tin-smithing be taught. At present the boys use old petrol tins for the ghee; but this handy source of containers cannot last for ever. Moreover, it might be advantageous to put up ghee in smaller and more attractive tins. These could be made by the boys with simple plant.

H. O. WELLER,

Supervisor of Technical Education.

22nd June, 1927.

VI.—THE MASAI SCHOOL, NAROK.

FROM MARCH TO JULY, 1927.

Owing to the absence of a headmaster, until the arrival of Mr. A. I. Roach on March 3rd, 1927, the re-opening of the school and to some extent of the outlying dairies was delayed until the end of March.

JULY 10TH, 1927.

I beg to hand you herewith a report in answer to your various questions.

1. The children are run on the boarding system; six children sleep in a hut 14 feet in diameter.

A spirit of leadership is encouraged as far as the continual going out to the dairies and the consequent influx of new boys will allow.

The smaller boys who will not have finished their training for some time are organised on a leader system.

2. The diet of the pupils is :—

2 or 1½ lbs. of maize meal, according to size, per day.

Skimmed milk.

2 ozs. sugar per head per week.

2 ozs. salt ,, ,,

2 ozs. ghee ,, ,,

2 ozs. rice ,, ,,

1 lb. meat ,, ,,

The greater proportion of children bring four or six head of cattle with them when they return to school, and they supplement their ration with milk.

I should consider the school ration a very complete one from a medical point of view.

They have taken to grain foods with no difficulty. I think there is a growing tendency through the whole Masai Reserve to consume more grain foods.

3. There is a medical inspection of pupils each term, and an inspection of the school every four weeks during term time. As far as I can judge, there is a decided improvement in physical appearance and probably in weight and height also during term.

Epidemics are not common.

The usual ailments are colds, which I treat myself, or send to the Narok Hospital if I consider them severe enough.

Minor injuries occur from time to time.

At the last term medical examination, the Medical Officer found a rather high percentage of children suffering from adenoids and tonsils. These cases will be treated at the

Hospital when accommodation can be found for them. Any further particulars you may require about the medical welfare of the school can be obtained from the Medical Officer at Narok.

4. Teaching in hygiene is given by the native teachers and myself. Considering the smallness of the children this is extremely simple. Personal cleanliness is emphasised.

5. A literary training is given in Swahili and Masai. The pupils attain to a standard of being able to read and write comparatively quickly. I enclose a dairy milk sheet which is a fair example of their writing capabilities. I enclose a time-table, which is for the smallest children. The periods devoted to each subject are short, as thereby interest is maintained.

6. There is no industrial training, as it has been tried with no success with the Masai.

A school shamba was tried last year, with no success. They learn simple carpentering and building.

Drawing is done in conjunction with their hand work. They can add shillings. A great point is made of teaching the children to realise the value of the various shilling notes, as the Masai have no appreciation of the values of notes whatsoever.

7. There are games, as will be seen by the time-table, and also physical training. The scheme of the games is to develop the team spirit. Games play a large part in the disciplining of a new batch of children, as they are at first rather apathetic to any discipline or supervision. Great keenness is shown where any physical superiority can occur as in running or jumping.

A. I. ROACH,
Acting Principal.

**TABLE I.—STATISTICAL.
NUMBER OF TEACHERS IN GOVERNMENT SCHOOLS.**

NAME OF SCHOOL.	Certificated Teachers.		Uncertificated Teachers.		Total.
	Graduates.	Non-Graduates.	Graduates.	Non-Graduates.	
(1)	(2)	(3)	(4)	(5)	(6)
A.—EUROPEAN EDUCATION :					
European School, Nairobi	4	9	5	5	23
Central School, Eldoret .. .. .	..	6	1	1	8
European School, Nakuru	1	2	..	2	5
.. .. . Kitale	1	1	..	..	2
.. .. . Nanyuki .. .. .	..	2	..	..	2
.. .. . Thika .. .. .	..	..	..	1	1
.. .. . Mombasa .. .. .	..	..	..	1	1
B.—INDIAN EDUCATION :					
Government Indian Boys' School, Nairobi ..	4	8	2	11	25
Allidina Visram High School, Mombasa ..	3	12	2	1	18
Government Indian Girls' School, Mombasa ..	1	5	1	1	8
.. .. . School, Kisumu .. .. .	..	2	1	3	6
.. .. . " " " Lamu .. .. .	..	1	..	1	2
.. .. . " " " Machakos .. .. .	..	4	..	..	4
.. .. . " " " Thika .. .. .	..	2	..	..	2
.. .. . " " " Fort Hall .. .. .	..	2	..	..	2
C.—ARAB AND AFRICAN EDUCATION :					
Arab School, Mombasa	1	11	..	6	18
Ali bin Salim School, Malindi .. .. .	..	..	..	7	7
Coast Technical School, Waa .. .. .	..	4	..	4	8
Ukamba Native School, Machakos	2	2	..	8	12
Jeanes School, Kabete .. .. .	..	..	2	1	3
Native Industrial Training Depot, Kabete ..	One Principal, 24 European Instructors and Leading Artizans, four Native Instructors.				
Masai School, Narok	1	2	..	2	5
Government African School, Kajiado .. .. .	..	1	..	3	4
.. .. . " " " Kapsabet .. .. .	..	2	..	..	2
.. .. . " " " Kericho .. .. .	..	..	..	3	3

TABLE II.

AVERAGE ROLL OF GOVERNMENT SCHOOLS FOR 1927.

	NAME OF SCHOOL.	Administrative District.	Date of Foundation.	Average Roll.
A.—EUROPEAN EDUCATION.	European School, Nairobi ..	Nairobi	1910	287
	Central School, Eldoret ..	Uasin Gishu	1915	103
	European School, Nakuru ..	Nakuru	1911	99
	" " Kitale ..	Trans Nzoia	1925	30
	" " Thika ..	Kiambu	1926	8
	" " Nanyuki ..	Nyeri	1927	36
	" " Mombasa ..	Mombasa	1927	13
	Farm 140	Uasin Gishu	..	31
	" 139	"	..	28
	Sergoit	"	..	14
	Farm 674	"	..	21
Concordia	"	1926	13	
B.—INDIAN EDUCATION.	Govt. Indian Boys' School, Nairobi ..	Nairobi	1911	640
	Allidina Visram High School, Mombasa ..	Mombasa	1923	326
	Govt. Indian Girls' School, Mombasa ..	"	1925	127
	Govt. Indian School, Kisumu ..	Kisumu	1922	95
	" " " Machakos ..	Machakos	1910	69
	" " " Thika ..	Fort Hall	1923	40
	" " " Fort Hall ..	"	1920	36
	" " " Lamu ..	Lamu	1926	38
C.—ARAB AND AFRICAN EDUCATION.	Arab School, Mombasa ..	Mombasa	1912	244
	Native Industrial Training Depot, Kabete ..	Kiambu	1924	260
	Coast Technical School, Waa, Mombasa ..	Digo	1921	103
	Ukamba Native School, Machakos ..	Machakos	1915	174
	Do.—14 Village Schools ..	"	..	554
	Jeanes School, Kabete ..	Kiambu	1925	31
	Ali bin Salim School, Malindi ..	Kilifi	1919	93
	Village School, Mambui ..	"	1920	45
	" " Ganda ..	"	1921	30
	" " Kwale ..	Digo	1924	49
	Govt. African School, Kericho ..	Kericho	1923	28
	" " " Kapsabet ..	Narok	1925	50
	" " " Narok ..	"	1919	53
	" " " Kajiado ..	Ngong	1926	62

TABLE III.

AVERAGE ROLL OF MISSION SCHOOLS FOR 1927.

NAME OF SCHOOL.	Adminis- trative District.	Date of Founda- tion.	Mission.	Average Roll for Year.
Alliance High School, Kikuyu..	Kyambu	1926	Protestant Alliance Church Missionary Society	30
C.M.S., Kabete	"	1900		340
Maseno Central School.. ..	Central Kavirondo	1906	"	176
142 Village Schools	"	"	"	9,390
Taita Vocational School, Wusi..	Teita	1922	"	50
C.M.S., Freretown	Mombasa	1875	"	73
Buxton School	"	1897	"	144
C.M.S., Dabida	Teita	1904	"	} 663
8 Village Schools	"	"	"	
Weithaga School	Fort Hall	1904	"	127
Kahuhia Central School, Fort Hall	"	1922	"	209
C.M.S., Mutira	"	1912	"	92
7 Village Schools	"	"	"	288
C.M.S., Kabare	South Nyeri	1913	"	285
" Nairobi	Nairobi	1911	"	95
" Butere	North Kavirondo	1927	"	49
" Kathukini	Fort. Hall	1913	"	40
" Kaloleni	Kilifi	1922	"	113
" Embu	Embu	1910	"	} 852
23 Village Schools	"	"	"	
C.S.M., Kikuyu	Kyambu	1898	Church of Scotland Mission	698
17 Village Schools	"	"	"	756
C.S.M., Tumutumu	South Nyeri	1909	"	813
34 Village Schools	"	"	"	1,468
C.S.M., Chogoria	Embu	1922	"	134
6 Village Schools	"	"	"	234
St. Austin's Catholic Native School	Kyambu	1900	Holy Ghost Fathers	38
St. Peter Claver's Mission ..	"	1922		315
Mbitui School	Machakos	1926	"	16
Nzau School	"	1926	"	16
Catholic Mission, Mombasa ..	Mombasa	1920	"	68
All Saints Catholic Mission ..	Kyambu	1902	"	43
2 Village Schools	"	"	"	20
Catholic Mission, Lioki	"	1913	"	33
" " Kilungu	Machakos	1920	"	54
Village Schools	"	"	"	28
Catholic Mission, Bura	Teita	1892	"	22
9 Village Schools	"	"	"	237
Italian Catholic Mission	Nyeri	1903	Italian Catholic Mission	169
Village Schools	"	"	"	2,022
Salvation Army School, Nairobi	Kyambu	1923	"	128

TABLE III—(Contd.)

AVERAGE ROLL OF MISSION SCHOOLS FOR 1927.

NAME OF SCHOOL.	Adminis- trative District.	Date of Founda- tion.	Mission.	Average Roll for Year.
Kenia Mission School ..	South Kavirondo	1909	7th Day Adventist Mission	54
Village Schools	"	"	"	2,193
Magambo Mission School ..	"	1911	"	135
Village Schools	"	"	"	1,705
Kisii Mission School	"	"	"	90
3 Village Schools	"	"	"	2,061
Mazeras Central School ..	Digo	1894	United Methodist Church Mission	45
United Methodist Church Mission, Ribe	Kilifi	1862	"	} 276
Village Schools	"	"	"	
United Methodist Church Mission, Meru	Meru	1913	"	} 441
10 Village Schools	"	"	"	
Africa Inland Mission, Mukaa..	Machakos	1903	Africa " Inland Mission	72
" " " " Mulango	Kitui	1916	"	47
" " " " " "	"	"	"	146
Africa Inland Mission, Nyakach	Central Kavirondo	1911	"	46
4 Village Schools	Ravine	"	"	900
Africa Inland Mission, Eldama Ravine	"	1919	"	33
Village Schools	"	"	"	150
Kangundo Mission	Machakos	1896	"	125
Village Schools	"	"	"	144
Africa Inland Mission, Kijabe..	Kyambu	1903	"	} 354
3 Village Schools	"	"	"	
Ngenda Mission School, Ruiru..	"	1906	Gospel Missionary Society	90
9 Village Schools	"	"	"	440
Kambui Mission School	"	1901	"	85
9 Village Schools	"	"	"	150
Nyangori Mission	Kisumu	1924	Pentecostal Assem- blies of Canada	161
Lumbwa Industrial Mission ..	Kericho	1905	"	61
Kisumu Central	Kisumu- Londiani	1904	Mill Hill Catholic Mission	} 8,72
524 Village Schools	"	"	"	
Mumias Central	North Kavirondo	1905	"	56
238 Village Schools	"	"	"	6,925
Kakamega Central	"	1906	"	216
Village Schools	"	"	"	1,270
Kisii Central	South Kavirondo	1912	"	240
54 Village Schools	"	"	"	1,196

TABLE III—(Contd.)

AVERAGE ROLL OF MISSION SCHOOLS FOR 1927.

NAME OF SCHOOL.	Adminis- trative District.	Date of Founda- tion.	Mission.	Average Roll for Year.
Asumbi Central	South Kavirondo	1913	"	328
82 Village Schools	"	"	"	2,624
Rangala Central	"	1920	"	94
Village Schools	"	1920	"	103
Aluor Central	Central Kavirondo	1912	"	112
Village Schools	"	"	"	1,277
St. Mary's Teachers Training College	North Kavirondo	1927	"	29
Catholic Mission, Kibuye	Kisumu	1922	"	76
Nilotic Independent Mission	Central Kavirondo	1926	Nilotic Independent Mission	223
Village Schools	"	"	"	456
Kaimosi Mission.. .. .	North Kavirondo	1922	Friends Africa Mission	2,500
29 Village Schools	"	"	"	106
Maragoli Mission	"	"	"	5,345
50 Village Schools	"	"	"	1,720
Lirhanda Mission	"	1905	"	4,886
31 Village Schools	"	"	"	1,321
Kitosh Mission	"	1914	"	33
53 Village Schools	"	"	"	65
Malava Mission	"	1918	"	180
29 Village Schools	"	"	"	426
Catholic Mission, Mangu	Kyambu	1906	Catholic	43
5 Village Schools	"	"	"	715
Catholic Mission, Limuru	"	1904	"	101
7 Village Schools	"	"	"	118
Catholic Mission, Meru	Meru	1912	"	30
24 Village Schools	"	"	"	22
St. Michael's School	Kilifi	1904	"	
Catholic Training College, Kabaa Convent of the Holy Family, Chania Bridge	Machakos	1925	"	
Catholic Mission, Mbogo, Thika	Kyambu Fort Hall	1918 1927	"	

TABLE IV.—STATISTICAL.

ARAB AND AFRICAN EDUCATION.
TEACHER TRAINING INSTITUTIONS.

NAME OF SCHOOL.	Organization by which run.	Staff.		Average Roll.
		A. European	B. Native	
(1)	(2)	(3)	(4)	(5)
Jeanes School, Kabete	Government ..	3	..	31
Alliance High School, Kikuyu ..	Protestant Alliance	2	..	13
St. Mary's Teacher Training College, Yala	Mill Hill Mission.	2	2	28
Catholic Central Training College, Kabaa	Catholic Mission..	1	6	118
Church Missionary Society, Kaloleni	Church Missionary Society ..	1	..	11
Elementary Teachers' Training School, Ribe	United Methodist Church Mission	1	..	15
Church Missionary Society, Butere	Church Missionary Society	1	2	50

TABLE V.—FINANCIAL.

YEAR.	European Education.			Indian Education.			Arab and African Education.			Total.		GRAND TOTAL.
	Recurrent.	Extra-ordinary.	Total.	Recurrent.	Extra-ordinary.	Total.	Recurrent.	Extra-ordinary.	Total.	Recurrent.	Extra-ordinary.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	£	£	£	£	£	£	£	£	£	£	£	£
1923 ..	17,606	..	17,606	9,275	..	9,275	20,376	..	20,376	47,257	..	47,257
1924 ..	20,616	..	20,616	10,351	..	10,351	24,369	..	24,369	55,336	..	55,336
1925 ..	22,053	1,622	23,675	10,969	..	10,969	34,743	..	34,743	67,765	1,622	69,387
1926 ..	28,815	..	28,815	14,471	..	14,471	47,503	5,962	53,465	90,789	5,962	96,751
1927 ..	36,033	1,045	37,078	17,319	..	17,319	52,431	8,461	60,892	105,783	9,506	115,289

NOTE.—These figures do not include the cost of administration which is concerned with all three branches of education. The cost of administration in 1927 was £15,384.

APPENDIX TO SPECIAL REPORT No. VI.

TIME TABLE, THE MASAI SCHOOL, NAROK.

Class III—The youngest and newest pupils.

	8-00 to 8-30	8-30 to 9-00	9-00 to 9-15	9-15 to 10-00	10-00 to 10-15	10-15 to 11-00	11-00 to 12-00	12-00 to 1-00	1-00 to 1-15	1-15 to 2-00
			Break		Break		Break		Break	
Monday	Drill	Dictation ..	..	Arithmetic	..	Reading ..	..	Arithmetic	..	Writing.
Tuesday .. ..	..	Mental Arithmetic	..	Reading ..	..	Composition	..	Drawing ..	..	Arithmetic.
Wednesday .. ..	..	Hygiene ..	..	Writing ..	..	Geography .	..	Reading ..	..	Dictation.
Thursday .. ..	..	Writing ..	..	Arithmetic .	..	Drawing ..	..	Mental ..	..	Story.
Friday .. ..	..	Object Lesson ..	..	..	..	History ..	..	Drawing ..	..	Reading.
		8-00 to 9-00								
Saturday	Drill and Games ..	..	..	Tidy Lines and School. Bathing and Washing of Clothes.						

The afternoon periods are dispensed with as hand work may require.

(3)

Kenya

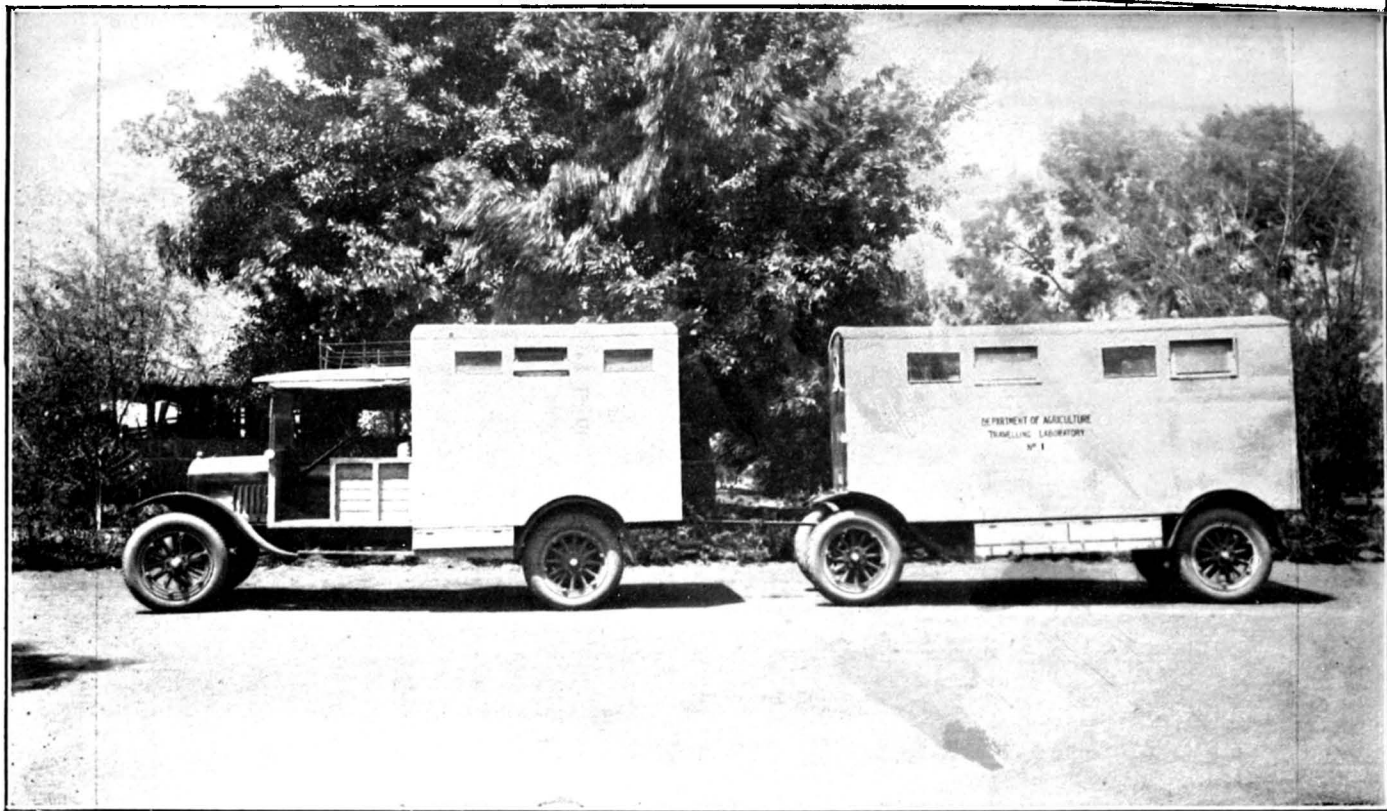
DEPARTMENT OF AGRICULTURE.
ANNUAL REPORT, 1927.

J. 687r

F8



View of Scott Agricultural Laboratories.



Mobile Field Laboratory.

Annual Report of the Department of Agriculture.

FOR THE YEAR ENDED 31st DECEMBER, 1927.

REPORT OF DIRECTOR.

STAFF, ETC.

During the year developments in two directions have resulted in provision for and an attempt made to strengthen the Plant Breeding Services and the Entomological Section of the Department. It is becoming increasingly important that men of good calibre be appointed, who have the will to envisage the work over a country of such varying conditions, and to realise that their work is not that of the ordinary set task, but that it calls for the exercise of more than ordinary consideration and apprehension.

The principal staff changes are reflected in Appendix A.

FINANCIAL.

Statements of Revenue and Expenditure for the Fiscal Year under review are given hereunder:—

EXPENDITURE.	Amount Sanctioned.	Amount Spent.
	£	£
Administrative and General	20,212	17,094
Native Agriculture	11,591	9,702
Scott Agricultural Laboratories	7,301	7,763
Plant Breeding Services	800	2,665
Grading and Conditioning Export Produce..	4,705	5,929
Contributions to Imperial Bureaux of Entomology and Mycology	450	450
Contribution to Amani Institute	1,200	1,200
Grant to Kenya Agricultural Society	500	500
Contribution to Imperial Scheme for Agricultural Scholarships	600	600
VETERINARY:—		
(a) Administrative and Executive Division	24,170	22,066
(b) Native Reserves	11,690	11,998
(c) Training Depot	2,396	1,310
(d) Rinderpest Service	5,876	6,516
(e) Research Division	30,645	29,888
TOTAL AGRICULTURAL DEPARTMENT ..	£122,136	£117,681

REVENUE.	Original Estimates.	Actual Receipts.
	£	£
Agricultural Produce Grading and Inspection Fees	5,800	6,576
Farm Produce and Stock	100	377
Veterinary Inoculation Fees	27,000	22,400
Sera, Vaccines and Laboratory Products	4,000	4,974
Sale of Government Stores	200	200
TOTAL AGRICULTURAL DEPARTMENT ..	£37,100	£34,527

The following statement shows the position in respect of Expenditure and Revenue during the last three years, and for explanatory purposes it is divided under these heads:—

- (1) Agriculture (including Headquarters Administration), Native Agriculture, Scott Agricultural Laboratories and Plant Breeding Services, Grading and Conditioning Services, Grants to outside bodies, etc.
- (2) Veterinary Administrative and Executive Division.
- (3) Veterinary Research.

	1925	1926	1927
	£	£	£
Agriculture (<i>including</i> Headquarters Administration)	17,080	17,140	17,094
Native Agriculture	11,016	9,209	9,702
Scott Agricultural Laboratories .. .. .	..	..	7,763
Plant Breeding Services	6,065	8,344	2,665
Grading and Conditioning Services	1,880	3,965	5,929
Grants to outside bodies, etc.	400	1,235	2,750
Gross Expenditure	36,441	39,893	45,903
Revenue	2,537	5,349	6,953
NET EXPENDITURE ..	£33,904	34,544	38,950
Veterinary (Executive Division)	37,026	38,627	41,890
Veterinary Research	27,743	29,686	29,888
Gross Expenditure	64,769	68,313	71,778
Revenue	31,062	30,032	27,574
NET EXPENDITURE ..	£33,707	38,281	44,204
TOTAL NET EXPENDITURE AGRICULTURAL DEPARTMENT ..	£67,611	72,825	83,154

The savings shown are due mainly to lateness of making appointments to fill vacancies.

The decrease in Revenue reflected in the earnings of the Veterinary Field Staff is due to the prevalence of drought in native areas restricting the number of inoculations it is possible to do on account of the condition of the stock.

GENERAL.

During the year 1927 the rainfall was on the whole under average and it was patchy, crops suffering from lack of rain at important times. Of the main crops the yield of coffee, which showed every promise of being over the average per acre, revealed a substantial short-fall and expectations were not quite realised, although the total quantity produced was in excess of that of any previous year. The yields of maize which were harvested from the 1926 plantings were slightly above average despite the too heavy rainfall experienced in most districts; the 1927 crop now being harvested will be below average, the rainfall being too light and the incidence of stalk-borer, particularly in the Nakuru Administrative District, having caused some loss.

Wheat planted in 1927 was up to average over the country, the extensive plantings in the middle of 1927 will show great variation in yield and estimates of final production vary from each other by as much as 30 per cent.

Owing to the drought which was felt generally over the whole country, Native Reserves have produced a smaller surplus, and food shortage is expected in parts, even livestock has been short of grazing and the country has suffered generally.

There was a strong movement directed towards the cheapening of fuel oils for agricultural purposes.

Mechanical ploughing appears to be a method of cultivation of some permanency, whilst other operations in connection with cultivation and planting have long been recognised as tractor operations on account of the speed attained to. Normally where work such as harrowing, discing, planting and after-cultivation can be done on time, larger yields are derived.

It is becoming more and more evident to progressive farmers and farmers' associations that the system of agriculture of the Colony requires, nay, demands, serious consideration, and that methods and systems require overhauling. There is too great a tendency for farmers to remain planters, far too great a concentration on that bugbear, the single crop. In good mixed farming country it is disappointing to find farmers stating that they are purely wheat farmers or maize farmers, without very much thought as to what additional purposes they will devote their energy and their farms. Such an

attitude may in part be excused the planter of a perennial crop such as coffee, but even then not entirely. Thinking farmers are experimenting with a rotation and now that the possibility of more fully controlling disease in cattle through fencing, dipping and inoculation is coming nearer, we may in good time find a change in farming systems, which will save much of our land from impoverishment. However, in the "dirty" areas, in which cattle farming will come only after a long time, and which comprise some of our best agricultural areas, farmers, particularly maize and wheat farmers, are urged to introduce green manures. These need not necessarily be leguminous, but green manure crops which besides adding humus to the soil, will also smother weeds. A very heavy sowing of sunflower or of lupins as a smothering and humus-adding crop should be tried.

Farmers should never forget that under our climatic conditions humus vanishes very quickly and with it the qualities which we so much extol in our soils. Local deposits of manure and lime should be investigated, there is a large market awaiting the introduction of local organic and other manures at reasonable prices. Artificial manures are being tried more extensively and attention is drawn to the value of composts made either with or without ground limestone, burnt lime or Adco. In view of the possibility of a large trade in fertilisers and ultimately in feeding stuffs, the matter of applying legislative control as to quality is being examined. The Department has instituted a series of crop and cultivation trials on the black plains soil near Nairobi.

Efforts should continue to be made to cheapen the cost of local farming products to local consumers in order that subsidiary farming industries may arise.

THEFT.

The Department more frequently nowadays is receiving reports of the theft of agricultural produce. It is a simple matter for a proportion of a standing crop to be appropriated in various petty ways, which in the aggregate reduce the earnings of the grower. The effect of this very simple way of earning a living on those who practise it can best be imagined.

The cattle industry can be said to be practically at a standstill, although much interest was aroused at the Stock-owners' Conference held at the beginning of the year, in Nairobi, when it was made abundantly clear that cattle farming could not progress without wholesale protection, mainly from disease. The resolutions accepted by the Select Committee of Legislative Council on the Estimates for 1928, bring appreciably nearer the time when fencing and dipping

will be seriously and actually undertaken on some scale in the Colony, particularly also as steps are being taken to establish a Land Bank.

The work on the dietary of farm stock, conducted under the direction of Dr. Orr, of the Rowett Research Institute, has been continued and prosecuted with vigour and some success.

The Department would record its pleasure at the visits of Messrs. Kephardt and Piemeisel, of the United States Agricultural Department. They have helped us considerably in determining a number of natural forage plants, some of which may be useful in modern agriculture.

The amount of research and experimental work accomplished by the staff of the Scott Laboratory and the Veterinary Research Laboratory is creditable; it would, however, be wiser were scientific officers required to make experimental and research work at their laboratories their main function, using the travelling laboratories where an occurrence has to be worked out *in situ*. It is unwise wholly to use scientific officers for the giving of advice to farmers in the field; the District Agricultural or Veterinary Officer in most cases should be the general peripatetic advisory officer.

The tendency there is of having a large number of specialists, particularly research workers, advising farmers generally and directly should be checked; it leads to loss of working time, lack of concentration on specific problems, and in some cases ultimately to a distaste for real research work on the part of the officer.

METEOROLOGICAL.

Again the financial provision allowed of nothing more than the upkeep of existing stations. The number of stations whose records are tabulated in the Meteorological Report, which is published annually, was 192. They are comprised as follows:—

	<i>No. of stations</i>
(a) Agricultural, Forestal and Public Works	16
(b) District and Military	33
(c) Railway	18
(d) Private	125
	<hr/> 192 <hr/>

A summary of the meteorological records for 1927 is appended (Appendix N).

It is hoped that more frequent inspection of recording stations by qualified persons will be possible in the future, particularly as the importance of correct recording is becoming more widely recognised. This may become possible through the newly organised Statistical Department.

AGRICULTURAL STATISTICS.

The Eighth Agricultural Census for the period 1926-1927 was compiled and deals with :—

- (a) Land under occupation and cultivation.
- (b) Main crops.
- (c) Animal husbandry.
- (d) Tractors and engines.
- (e) Labour.
- (f) Agricultural exports.
- (g) Wheat and wheat-milling statistics.
- (h) Cotton buying and ginning statistics.

Arrangements were made for the introduction of a system of Crop Reports for European areas, whereby forecasts of production in the succeeding season can be made. That information should prove useful to the Railway Department and shipping companies, also to Government in reference to the economic position generally.

It is hoped to overcome certain difficulties which have arisen at the outset.

IMPORTS.

The following table showing the quantities of foodstuffs imported in 1914 and also the past eight years, is of interest. They are for Kenya and Uganda. Separate figures are not available for Kenya.

IMPORTS—KENYA AND UGANDA.

	QUANTITY									VALUR.								
	1927	1926	1925	1924	1923	1922	1921	1920	1914	1927	1926	1925	1924	1923	1922	1921	1920	1914
Wheat .. cwts.	2,904	2,821	2,635	1,993	1,983	900	1,352	337	5,585	£ 2,694	£ 2,612	£ 2,524	£ 1,623	£ 1,590	£ 879	£ 1,900	£ 515	£ 3,001
Wheat Meal and Flour .. "	63,843	58,257	53,657	48,474	47,699	59,817	78,069	76,823	81,898	58,739	57,929	56,364	40,792	40,362	63,775	102,025	112,795	52,890
Ham and Bacon .. "	124	121	58	23	5	9	20	118	701	1,253	1,304	641	217	73	117	285	1,368	4,256
Butter .. lbs.	6,832	2,576	2,688	1,120	560	4,032	11,081	3,890	34,997	675	275	283	122	74	412	1,383	515	1,972
Cheese .. "	18,032	13,216	3,854	3,248	1,456	1,792	2,561	12,636	38,836	1,780	1,397	401	292	180	201	354	922	1,820
Ghee .. cwts.	10,475	7,099	7,309	8,592	5,233	4,209	1,878	600	2,347	46,832	49,838	42,685	28,740	13,717	14,631	13,900	3,510	8,702
Condensed milk .. "	8,531	8,009	6,258	5,352	3,105	1,305	4,560	5,210	9,468	27,321	29,132	22,990	20,851	11,912	5,247	25,076	22,554	20,498
Sugar .. "	9,623	19,567	27,161	27,446	31,632	69,212	65,958	47,921	74,485	10,661	20,265	31,475	42,049	54,041	89,405	129,869	167,554	54,829
TOTAL ...	..	..	..	..	..	..	..	..	..	149,910	162,752	157,363	134,686	121,949	174,667	274,792	309,733	147,968

The total value of these imports, representing articles of food which might be produced locally, amounts to £149,910, a decrease of £12,842 over last year, increases being shown in such items as flour, bacon, butter, cheese, ghee and condensed milk, with, however, a noteworthy reduction in the quantity of sugar imported.

EXPORTS—*Vide* APPENDIX "O."

The total value of agricultural exports, the produce of Kenya, in 1927 was £2,731,794, an increase of £482,073, compared with the previous year. The tonnage was 138,412 tons in 1927 against 85,444 tons in 1926.

Cotton exports show a decrease.

Figures quoted hereinafter show the progress of agricultural development. In the absence of an unfavourable season and serious fall in market prices, the quantities and values of agricultural exports will again show a substantial increase.

ACREAGE AND OCCUPATION.

The total area allotted for occupation by Europeans is approximately 5,000,000 acres, and in addition to this an area of about 2,000,000 acres is available for alienation. Of the area allotted 4,737,920 acres are under occupation, showing an increase of 150,103 acres over the previous year. The number of occupiers totals 1,901, or an increase of 92 over the previous year. The total area cultivated is 512,543 acres, giving an average of 269 acres per occupier, against 256 and 232 acres for the years 1926 and 1922 respectively. Including the development through livestock, on a basis of six acres per head for cattle and three acres per head for small stock, the average development by each European occupier is 1,338 acres, which shows the extensive character of farming operations in this Colony.

The figures for individual crops show that the areas under coffee, sisal, wheat, sugar cane and barley are increasing. Further particulars of crop production and livestock will be found under appropriate headings in this report.

MAIN CROPS.

On 31st July, 1927, the total area under crops, European, was 438,035 acres, and the total area under cultivation was 512,543 acres. For comparative purposes figures for the

previous year are given and the percentages of increase and decrease are shown :—

CROP.	1927	1926	Increase	Decrease
	Acres.	Acres.	%	%
Maize	192,592	193,187	..	0.3
Wheat	65,036	43,765	48.4	
Barley	4,093	2,644	54.8	
Coffee	74,662	68,950	8.14	
Sisal	71,213	60,197	18.30	
Tea	3,156	1,689	86.09	
Coconuts	8,113	8,766	..	7.4
Sugar Cane	6,811	6,747	1.00	
Miscellaneous	17,194	18,525	..	7.2
Total acreage of crops grown	442,770	404,470	9.5	
Less Catch crops	4,735	3,427	38.1	
Net area under crops ..	438,035	401,043	9.2	

MAIZE.

The season's figures reveal a decrease of 595 acres in the area planted as at 31st July, 1927 (192,592 acres). The average yield of maize over the whole country was 7.39 bags per acre.

The following table showing acreages and yields of maize in past years is of interest :—

YEAR.	Acreage Harvested.	Actual Production.	Bags per acre.
	Acres.	Bags.	
1922-1923	74,747	517,877	6.23
1923-1924	108,556	833,640	7.68
1924-1925	129,647	893,108	6.89
1925-1926	155,751	826,614	5.95
1926-1927	177,987	1,314,643	7.39

During the year steps were taken to establish a Plant Breeding Station at and from which maize breeding and selection work could be more largely and expeditiously carried out. Selection work with Mr. Simpson's Ol'Bonaita White Maize has been continued at the Scott Agricultural Laboratories, but the type cannot yet be said to be fixed, although on the average as a cropper it is on the high side.

It is seen that the claims of crops other than maize are being given practical consideration by farmers. It would assist were variety plots of numerous different arable crops laid down at a large number of centres, in order that more specific

advice could be given on the subject of alternate crops and green manures for the different districts. The fact that the Department has no District Agricultural Officers in the European areas has largely prevented the prosecution of such fundamental trial work. Farmers themselves have from time to time tested large numbers of different crops, but not in such a way that comparisons are possible and their experiences are not collated.

No Maize Conference was held during the year, matters did not arise which would warrant a full meeting. The Consulting Committee continues to function and satisfactorily discharges its duties.

During 1927, 970,133 bags were submitted for grading, being 427,281 more than the number in 1926. Not more than 54,000 emanated from native sources.

Standard samples were prepared and distributed as in former years.

It is of interest to record the fact that the Kenya Farmers' Association, through which organisation a number of maize growers market their crop, voluntarily offered to levy a cess on every bag of maize exported. The money so derived is handed over to Government to be applied towards the development of maize growing.

WHEAT.

The area planted as at 31st July, 1927, was 65,036 acres, a very significant increase as compared with the previous year. The acreage harvested in each year and the production during the past five years are as follows :—

YEAR.	Acreage Harvested.	Actual Production.
	<i>Acres.</i>	<i>Bags.</i>
1922-1923	15,158	35,793
1923-1924	19,599	55,920
1924-1925	23,996	61,067
1925-1926	30,627	80,069
1926-1927	46,601	120,569

As already observed there was a great increase in the acreage sown. Ordinary June sowings suffered badly from drought and some had to be ploughed in. Wheat is often grown by maize farmers as an afterthought when maize plantings would not mature in time, low yields result. Also wheat is often grown on land which is unsuitable unless properly manured. The application of a phosphatic manure is likely to improve the yield of wheat in almost all cases, also

any slight acidity in the soil is much more detrimental to wheat than it is to maize. The application of one ton of ground limestone to acid soils or soils deficient in lime has a beneficial effect which lasts over a period of years. Where farmers are uncertain, it is cheap and easy for them to experiment with phosphates and lime on a small area, when they may find results which subsequently may turn to advantage on a much larger scale.

Where suitable varieties are grown on properly prepared and suitable land yields 5 to 10 bags per 1 acre over large acreages have been reported and, given sufficient rainfall, are the rule. Even at export prices such crops pay. In unproved districts farmers are advised to go carefully with wheat and preferably under advice from the Department. There is a much greater feeling of security with the wheat crop to-day than ever before. Mau Summit, Molo and Kipabus have greatly extended the areas planted to Equator, whilst at the lower altitudes large areas are planted to Kenya Governor which makes an excellent milling blend with Equator.

It is confidently expected that wheat growing will increase in popularity when the causes for low yields are better understood. Drought and the unsound choice of soil and varieties have been the chief contributory factors in causing low yields this year. It is further hoped that the new wheats evolved by the plant breeder, which are resistant to both yellow and black rusts, will overcome the difficulties with which Equator wheat seems unable to cope.

The establishment of the Wheat and Maize Breeding Station at Njoro has proceeded slowly. The houses were begun in November and the laboratories were not even commenced by the end of the year. This has caused difficulties in doing laboratory work and endangered some of our strains. It is trusted that 1928 will see the station equipped and in full working order.

The disposal of the crop produced in 1927 is already presenting difficulties. It is important that sufficient grain be retained for milling and as storage on farms is attended by inordinate loss some central storage at mills should be provided and export of surplus take place as early as possible. Consideration was given to the possibility of grading wheat, but it is premature to lay down grades until more is known of average Kenya wheat. Inspection of export wheat will not prevent the shipment of poor samples as inspection refers mainly to cleanliness and freedom from weevil. Immediately grading is possible it should be adopted, when buyers elsewhere will know what is being shipped to them.

WHEAT MILLS.

A census of wheat mills and wheat milling was again taken during 1927 and furnished the following information :—

There were nine wheat mills operating during the year. The nine mills are capable of milling a total of 40.5 bags (200 lbs.) wheat hourly. 67,602 bags wheat were milled during the year, producing 19,083 bags (200 lbs.) fine flour and 31,511 bags (200 lbs.) atta flour.

The wastage in milling (pollards, bran, etc.) was 17,008 bags of 200 lbs. or 25.1 per centum of the total quantity milled.

BARLEY.

Interest is increasing in this crop and farmers are advised to try a small acreage each year until they understand its culture. It is expected that in the future barley will become one of the main crops grown and particularly as mixed farming advances. In 1927, 4,093 acres of barley were planted as against 2,644 acres in 1926.

COFFEE.

The season has been droughty but the quantity of coffee exported is up by 70,000 cwts. The export value shows a corresponding increase from £727,453 in 1926 to £1,140,549 in 1927. The total area under coffee is 74,562 acres or 8 per cent. more than for 1926, and the acreage in bearing is up practically 8,000 acres at 53,800. The estimate of production in July, 1927, was 213,000 cwts. whereas 209,843 cwts. was exported equivalent in value to 42 per cent. of the Colony's total agricultural exports. There are 749 coffee planters in the Colony. The Coffee Officer states that the production of coffee per acre planted is only about two-thirds of what it should be and in his report gives some of the reasons why the acreage output is below a reasonable average.

During the year a Coffee Conference, that is, a meeting of delegates from various farmers' associations and other bodies interested in coffee, was organised by the Department and held in Nairobi in June, 1927; a full report of the proceedings was issued. Farmers showed great keenness and especially emphasised the need for more regular inspection of plantations and the establishment of coffee trial stations. Also the ever-present menace of insect pests was carefully considered with a view to more research and investigational work being undertaken. It would be ultimately of the greatest benefit to the industry were an experiment station established at which the details of plantation treatment and management, together with factory methods, could be exhaustively studied. At the same time the breeding of coffee for yield could be regularly undertaken there. When it is considered that the industry has not

yet evolved a definite system of management and will not do so until specific and accurate data and information are secured from trials it would be wise to have this aspect fully studied so that at a much earlier date the country would be proceeding with its coffee work on systematic lines.

The experiments on coffee varieties at the coast are promising; Robusta appears to be suited to the conditions.

Inspection work was again interrupted by the absence on leave of the Coffee Officer. Two appointments of Agricultural Officers were provided on the 1928 Estimates to admit of more frequent and regular inspection of coffee and other plantations. These officers will be stationed in up-country areas.

SISAL.

The outturn of sisal was much increased but, owing to the fall in prices, the value of fibre exported in 1927 is only £468,974 as against £579,499 in 1926. The total area planted as at 31st July, 1927, was 71,213 acres of which 40,751 acres was over three years old and therefore ready for cutting. The increase in area for 1927 is 11,016 acres or 18.30 per cent. over the previous year.

The people interested in this industry are as heretofore energetically pursuing investigations into methods and systems with a view to lowering working costs and increasing acre outturn.

COCONUTS.

There was a decrease in the export of copra from 22,085 cwts. valued at £25,765 in 1926 to 14,725 cwts. valued at £14,070 in 1927. The time is not far distant when most if not all of the Colony's production will be absorbed locally.

SUGAR CANE.

Practically no increase is recorded in the area planted under cane which stands at 6,811 acres. The production of sugar is, however, increasing and export of 25,320 cwts. took place during the year. In view of the success which has attended the working of sugar estates and mills during the past few years it is a little surprising that further ventures are not started.

The occurrence of mosaic disease still engages the attention of the Department and whilst eradication is being pressed energetically, inspection reveals that the occurrence is over an area somewhat larger than originally thought.

MISCELLANEOUS CROPS.

One of the most important ways in which the agriculture of the Colony can be made more diversified is by the culture of those crops which to-day we class as miscellaneous.

Amongst them are the very important ones known as lucerne, tobacco, pineapples, English apples, plums, nuts, limes, potatoes, buckwheat, groundnuts, and many feeding and hay crops. At various points in the Colony one finds enthusiasts who do try these crops and whilst the immediate reward may be meagre, it is on their experience and their efforts that probably important and valuable lines of agricultural work will arise, to be followed no doubt by the establishment of local agricultural industries. It is unfortunate that the sort of record which should be kept of the efforts made oftentimes is not kept, and in this connection the Department could help.

NATIVE AGRICULTURE.

As in previous years the main functions of the agricultural officers of the Department have been advisory to administrative officers and instruction in the agricultural schools at the Scott Agricultural Laboratories and at Bukura. It has been possible, owing to larger staff being available, to impart more direct instruction in the reserves, both by means of native instructors, demonstration plots and barazas addressed by officers.

Mass issues of seed and of pure bred poultry were made and instruction was given in the preparation of hides, ghee and bees-wax.

Veterinary services in the reserves are referred to under that head.

The distribution of the staff engaged in Native agriculture was as follows:—

Nyanza.—Two agricultural officers regularly and one part time with 8 native instructors. One stock inspector with instructors has been occupied in the improvement of hides.

Kikuyu.—Two agricultural officers regularly and one part time with 15 native instructors.

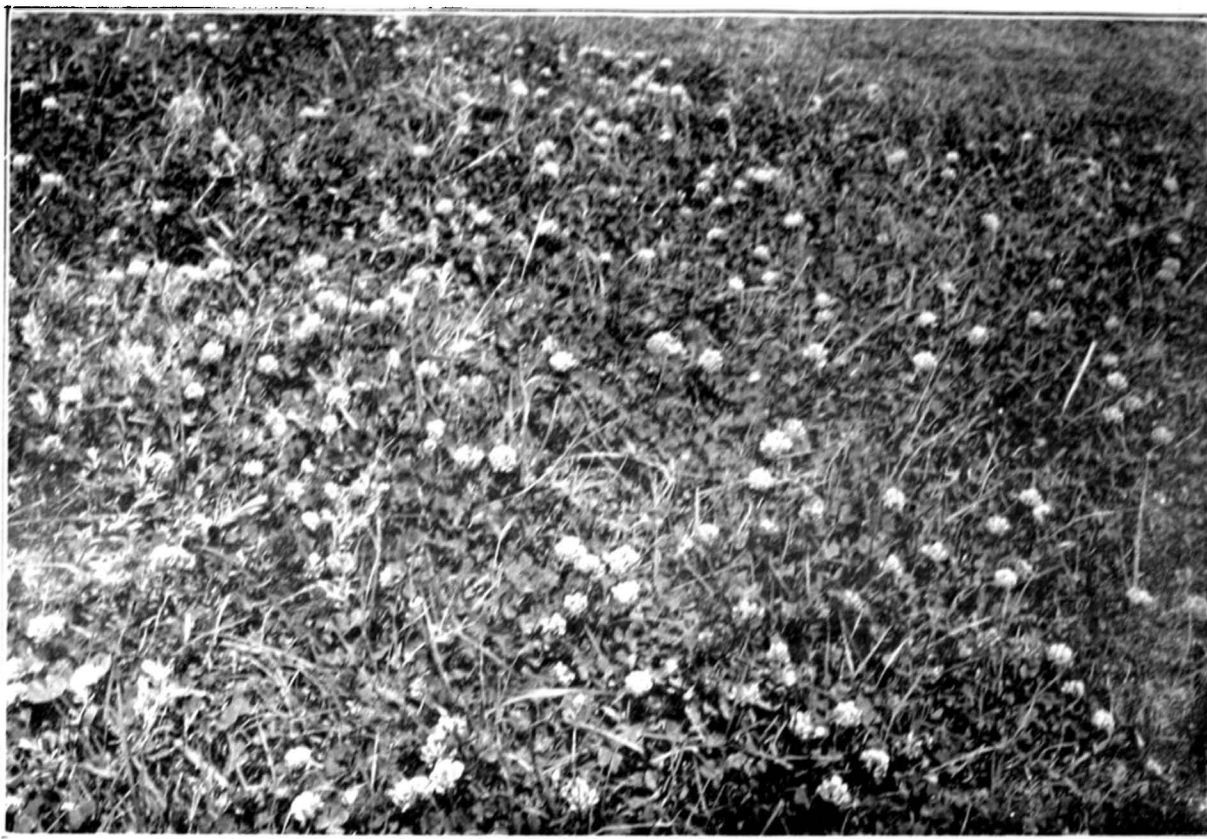
Coast.—One agricultural officer, 3 instructors and 10 apprentices.

Ukamba.—One agricultural officer part time on hide work. One officer was on leave for the greater part of the year and one post vacant for some months. One agricultural officer was transferred to the Plant Breeding Section and three new appointments made towards the end of the year.

At the Native Agricultural Schools the average number under training was, at the Scott Laboratories 38, and at Bukura 45. No pupils completed the course at the Scott



Wheat Breeding Plots at Scott Agricultural Laboratories.



Indigenous Clover ("Uplands Red") at Scott Agricultural Laboratories.



Indigenous Clover ("Uplands Red") at Scott Agricultural Laboratories.

Laboratories owing to the course having been lengthened from two to three years. Nine boys finished the training at Bukura and are to be engaged as instructors and four of the most promising have been kept on for a further year's more advanced course.

Veterinary staff in the reserves are referred to under that head.

WEATHER CONDITIONS.

Nyanza.—Rainfall has been below the average during the past year. During the early months rainfall was normal but the short rains failed and the crops were poor. Considerable damage was done by hail particularly to the cotton crop. A shortage of food occurred in North Kavirondo in the early part of the year and the Native Foodstuffs Ordinance was applied to that district. Buckwheat was distributed for seed and to some extent alleviated the distress.

South Kikuyu.—The long rains were normal but the later July and August rains failed at the higher elevations. The short rains were late and below the average and considerable apprehension was felt in South Kikuyu for the short-rain crops. Conditions improved in December and a small crop is assured.

North Kikuyu (Embu, South Nyeri and Fort Hall).—The long rains commenced early and some shambas were not planted in time. Good crops were obtained on the whole. The short rains were favourable and good crops assured.

Coast.—Rains were on the whole satisfactory though somewhat local; fair yields were obtained from the long-rain crops. Short-rain crops promise well in some districts but in others the yield will be poor. On the whole the rainfall has not been satisfactory and no increase in the production of native crops is anticipated, with the exception of cotton of which a considerably larger area was planted.

ISSUE OF SEED.

The distribution of seed to native reserves is shown in the following table:—

DISTRIBUTION OF SEEDS TO NATIVE RESERVES—1927.

	Maize	Beans	Wheat	Ground-nuts	Simsim	Rice	Buck Wheat	Fruit Trees	Mtama	Wimbi	Tobacco	Oats	Potatoes
KERIO PROVINCE :													
Tambach	1,200	2,400	..	..	..	..	1,800	..	2,000	..	..	..	720
West Suk	800	..	..	..	..	..	..	..	..	..	..	..	300
Turkana	180	..	..	..	..	..	..	..	2	2	4 oz.	..	..
Baringo .. .. .	..	200	1,200	..	..	..	..	..	1,200	..	..	600	180
KIKUYU PROVINCE :													
Embu	32,000	8,000	4,200	600	1,000	..	..	..	..	..	..	..	600
South Nyeri	63,000	1,000	1,260	..	..	..	..	..	..	..	..	..	300
Kyambu	39,100	357	79	..	..	..	..	..	..	..	..	..	4,051
Fort Hall	30,000	900	1,200	..	..	..	..	..	..	..	..	..	..
NYAMZA PROVINCE :													
North Kavironco ..	50,000	..	..	..	..	..	..	..	..	..	..	..	600
Central Kavironco	40,000	..	..	..	..	..	3,000	..	..	..	..	..	600
South Kavironco ..	..	..	..	..	..	..	3,000	..	..	..	..	..	600
Nandi	16,000	400	..	..	..	..	..	..	..	..	..	..	300
Kericho	10,000	..	..	..	..	..	..	..	..	..	..	..	600
UKAMBA PROVINCE :													
Machakos	800	2,000	2,400	482	1,126	..	..	..	..	..	..	..	300
Kitui .. .. .	..	..	..	..	..	..	25	..	..	..	..	..	..
Voi .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	900
COAST PROVINCE :													
Malindi	4,260	450	..	60	45	..	..	..	..	..	..	..	..
Kilifi	5,000	..	..	..	3,000	..	..	..	..	..	..	..	..
Digo	4,000	..	..	..	2,000	..	..	..	..	..	..	..	..
Kwale .. .. .	..	..	..	..	2,000	..	..	..	..	..	..	..	..
NORTHERN FRONTIER PROVINCE :													
Meru	1,200	80	1,950	..	..	12,400	..	22	..	..	..	..	..

Considerable suspicion is shown by the Wakikuyu of any kind of seed issue and they are disinclined to accept such issues except under persuasion. In Nyanza the value of improved seed is being more and more realised and Local Native Councils have voted increased sums for the purchase of seeds. The majority of natives do not yet realise the value of good seed and without persuasion from the Administration and Agricultural Department much poor seed would be planted.

The main issues of flat white maize were made in the North Kavirondo and South Nyeri districts.

Such issues in this and past years are showing their value in the increased quantity of good quality maize exported from the reserves. Surplus seed from the Scott Laboratories, Bukura, and from demonstration shambas was issued free as in previous years and in areas in which communications are difficult such seed or demonstration shambas are being enlarged and the amount of seed issued is increasing.

IMPLEMENTS, ETC.

The increased use of labour-saving appliances is becoming more general in native reserves. Nyanza still leads the way in this respect but in South Kikuyu more interest is being evinced in wheeled transport and also a number of ploughs, mills and cultivators have been purchased by natives. In North Kikuyu small water-power mills are popular and their use is increasing.

As the use of such appliances becomes more general the interest taken in them expands as the benefits from their use are more apparent, and considerable increases may be looked for in the future. The waste of energy in women transporting heavy loads over very considerable distances is enormous and any substitution of ox gharries or other form of transport will release a large amount of labour for more useful purposes.

MAIZE.

The main issues of seed were made in the Karatina and Sagana districts and in the Maragoli area of Kavirondo. The valuable effects of such issues and of mass issues in previous years have been very evident both in the export trade from such areas and in the growing crops. An entirely satisfactory short-rain maize has not yet been found. White Congo appears more nearly to meet the requirements but this has not yet displaced the mixed native variety in most areas. In the Coastal area quick-growing varieties of yellow maize have been fairly successful. The quantity of maize of native origin exported during the year is given as 54,000 bags. Damage by stalk-borer was reported from all areas though the amount

of damage done was generally small. Efforts have been made with some success to impress on the native the importance of attention to measures for combating this pest. The trade in maize in the reserves is susceptible of considerable improvement and more particularly in outlying districts sharp practices are frequently indulged in by traders.

COTTON.

An intensive campaign for the encouragement of the planting of cotton in North and Central Kavirondo was undertaken, an agricultural officer and an administrative officer being detailed for the purpose. The low prices paid in the previous year did not encourage further planting but as a result of the special efforts made some 20,000 acres were planted by the end of July, about four times the area planted the previous year. The cotton was fairly well cultivated though it was found necessary to employ a staff to see that cultivation was carried out. Owing to the failure of the short rains and to damage by hail in the Malakisi area the yield per acre is not likely to equal that of the previous season. Nevertheless in view of the increased acreage a quantity substantially in excess of that of last year will be harvested. In the Coastal area, in spite of the dissatisfaction felt by growers at the prices paid last season, the efforts of the administrative and agricultural officers have resulted in an increased acreage under this crop. Germination has been better than in the previous year and some 115,000 lbs. seed cotton had been purchased before Christmas.

The 1926-1927 crop owing chiefly to adverse weather conditions was late and small. Some 1,045,000 lbs. seed cotton were purchased in Kavirondo compared with 2,484,000 lbs. in the previous season. The low prices received for the 1926-1927 crop did not tend to encourage planting during 1927 and the officers concerned are to be congratulated on the result of their efforts.

For the 1926-1927 crop the average price for "A" quality was approximately 12 cents per lb. seed cotton. A substantial increase over this price is anticipated for the 1927 planted crop. The buying season opened at 20 cents per pound for seed cotton.

The total production of lint for the whole Colony during 1927 was 1,232 bales of 400 lbs. each.

SIMSIM.

Good crops of simsim have been secured on the Coast and as a long-rain crop in Nyanza. The short-rain crops there have suffered and yields will be small. The crop is a popular

one in areas suited to it and prices ranged from Sh. 20 to Sh. 30 per 100 lbs. Seed was issued in the Coast area by the Department and was eagerly sought after. The crop is well suited to native needs and well adapted to certain areas. Total exports during the year amounted to 66,580 cwts.

GROUNDNUTS.

Although a suitable crop in many areas the cultivation of groundnuts does not appeal to the native. Good yields have been obtained at many of the demonstration shambas in the country and issues of seed made in Central Kavirondo and the Coast. Harvesting and shelling is often carelessly done and the resulting seed poor. 24,960 cwts. valued at £22,564 were exported during the year.

BUCKWHEAT.

Owing to the natives having become accustomed to the crop in certain centres from its issue in times of food shortage, this crop is becoming more popular particularly in the drier areas and the considerable demand for seed could not be met. The requirements for seed by coffee planters and other farmers as a green manure are large and the price is considerably in excess of its real value. Issues of seed were again made in areas where a food shortage occurred and in spite of hasty preparation of the ground a useful crop was secured.

WHEAT.

With the further assurance, provided by the successful growth of Kenya Governor by Europeans, that the crop is not likely to succumb to rust attacks the growth of wheat has been encouraged in suitable areas, more particularly in the Kikuyu Province. Signs are not wanting that as the crop becomes better known it may replace to a considerable extent maize and mtama in the short rain season in certain districts. Such replacement cannot fail to have a good effect on the fertility of the land, the diet, nutrition and general health of the native and eventually the export trade of the country. Excellent crops grown by natives have been observed.

NATIVE AGRICULTURAL SHOWS.

Exhibits of native agricultural produce were staged at the Agricultural Show at Nairobi from Kavirondo, Kikuyu, Embu and the Coast.

A Native Agricultural Show was held in the Malindi district with encouraging results, over 1,000 exhibits were staged and a considerable improvement in the quality of the exhibits over previous shows was evident.

NATIVE LIVESTOCK.

The following figures of the number of native-owned livestock are given from the best available estimates :—

Cattle	...	...	...	...	3,260,000
Sheep	...	...	...	...	2,600,000
Goats	...	...	...	...	3,600,000
Horses	...	...	...	...	200
Mules	...	...	...	...	300
Donkeys	...	...	...	...	35,000
Camels	...	...	...	...	60,000

The prices realised by native stock, though lower than in previous years are still higher than are warranted by the intrinsic value of the stock.

POULTRY.

Issues of pure bred Rhode Island Red cocks were made during the year as follows :—

Coast (Kilifi)	...	...	...	...	50
Embu	...	...	...	...	} 105
South Nyeri	...	...	...	...
Kavirondo	...	...	...	...	50

A mass issue was made in a location after the elimination of all scrub cocks there. The birds are doing well and are much prized by the owners. Results are anticipated comparable to those obtained in former years by the same method.

HIDES AND SKINS.

Instruction in the preparation of hides and skins has been more actively pursued. In addition to the stock inspector working in the Kavirondo Reserve one of the newly appointed agricultural officers has been at work in the Machakos-Kitui area and all agricultural officers in native reserves have given demonstrations of shade drying. To arrive at any considerable improvement in the quality of hides exported some control of the traders appears to be necessary. In far too many cases no more is paid to the native for a well-prepared hide than for a third-grade one and until this state of affairs is remedied no general improvement can be looked for.

The quantity of hides exported fell from 51,631 cwts. in 1926 to 47,834 cwts. in 1927 and the value from £180,423 to £163,096. In the case of sheep and goat skins the quantity increased from 990,185 valued at £55,480 to 1,164,520 valued at £61,625.

The estimated values of agricultural exports of native origin for the last five years are shown hereunder :—

	1923	1924	1925	1926	1927
	£	£	£	£	£
Animals	10,000	20,000	16,000	11,000	12,000
Copra and Coconuts	10,280	35,000	28,000	20,600	12,000
Cotton .. ..	..	11,860	41,000	32,750	15,030
Groundnuts	24,000	26,000	19,000	31,000	22,500
Maize	12,000	130,000	100,000	70,000	75,000
Millets	4,000	300	865	2,750	3,350
Pulse	12,000	15,000	16,000	20,400	19,900
Simsim	22,000	84,000	65,000	76,500	67,350
Hides	60,000	121,000	210,000	140,000	160,000
Skins	3,000	30,000	50,000	51,000	67,000
Oil-Simsim	2,400	2,200	3,000	5,500	3,550
Potatoes	3,000	4,000	4,000	7,250	7,500
Miscellaneous ..	1,000	1,000	1,000	2,000	2,600
TOTAL .. £	271,680	480,360	564,665	470,750	497,780

An explanation should be given as to the completeness of these estimates as an indication of the extent of native production in this Colony by one illustration, namely maize. The Department graded 54,000 bags of native maize for export and in addition 214,300 bags of native maize were shipped to East Coast ports ungraded.

From certain stations on the new line of rail from Thika to Nyeri, at which the collections of produce are practically wholly of native origin, no fewer than 209,000 bags of maize have been railed. In addition, from Nyanza over 100,000 bags of maize were sent out either as meal or as grain.

The native maize crop comes in, in part, during the time when there is a large demand for maize meal in these territories, so that by far the larger proportion of the total crop is consumed locally. Quantities of maize are, of course, grown in other native areas and sold outside the reserves, but sufficient has been said to indicate that the export figures of native maize are not comparable with the total sales.

In increasing measure also, is the above true of simsim, groundnuts and copra—a very much greater local use is being made of these commodities.

LIVESTOCK INDUSTRY.

Reference has been made to native-owned livestock under the head "Native Agriculture."

The following table shows the numbers of livestock owned by Europeans during the last five years :—

	1923	1924	1925	1926	1927
Cattle : Total ..	190,140	211,381	216,599	213,423	215,650
(a) Breeding Stock	104,631	110,855	110,547	105,556	107,434
(b) Oxen	85,509	100,526	106,042	107,867	108,213
Horses	1,454	1,642	1,846	1,844	2,137
Mules	1,093	985	922	780	719
Donkeys	1,260	1,213	1,336	931	1,046
Sheep (wool-bearing)	112,046	133,916	140,725	162,848	209,299
Sheep (native) ..	35,014	32,132	38,071	43,057	32,972
Goats	6,258	4,618	5,372	4,454	3,697
Pigs	12,120	10,608	8,564	9,125	12,954
Poultry	38,685	38,910	31,150	35,728	43,988

There was an increase of 1.04 per cent. in the total number of cattle for 1927. The almost stationary position of the industry in a country so well suited to stock and dairy farming has been previously commented upon. It is clear that without some drastic alteration of conditions the development of stock-raising by Europeans is not likely to be large. It is hoped that the introduction of fencing and dipping on a large scale such as is probable under legislation shortly to be introduced will give the necessary fillip to the industry.

The large increase in wool-bearing sheep amounting to 28.52 per cent. is noteworthy. The value of wool exported in 1926 was £62,450 and in 1927 was £64,561.

It is observed that the business of pig breeding and feeding is on the increase. Fears are always entertained that the Colony will over-produce and farmers will be unable to dispose of their stock. This happened about six years ago, and a

repetition would be unfortunate. Those who are interested in the disposal of pigs and pig products in this Colony have had time enough to investigate the uses to which pig products could be put and the markets which are available. If the Colony is ever going to develop the business it is all important that farmers be informed as to the minimum prices which are possible when the overseas market is the main market. Naturally the farmer will be interested in the actual expense incurred between the receipt of supplies of pigs and the marketing of the products therefrom.

POULTRY.

This small side line is becoming more popular and is dependent on the quality and cheapness of the supplies of feeding stuffs. In dry and warm districts under careful management poultry thrive. The Department has increased the number and size of its poultry runs, but is not undertaking any special work in connection with poultry, save as regards improvement in native flocks.

The following table gives the quantities of certain animal products sold by Europeans during the last five years:—

YEAR.	Milk.	Cream.	Butter.	Cheese.	Ghee..	Wool.
	<i>Galls.</i>	<i>Galls.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
1926-27 ..	617,747	92,640	216,863	148,305	124,057	632,088
1925-26 ..	395,031	72,693	291,894	144,070	115,815	670,752
1924-25 ..	371,692	85,557	303,085	92,994	108,153	461,588
1923-24 ..	372,103	107,669	252,990	93,248	112,815	427,266
1922-23 ..	351,920	43,352	246,544	145,452	97,439	445,024

It will be noted that there is a very large increase in the amount of fresh milk sold, with, however, a considerable reduction in the quantity of butter produced.

It is calculated that the production of the primary product—milk—has increased from 1,729,470 gallons in 1925-26 to 2,257,974 gallons in 1926-27 or 30.5 per cent. This very large increase is more noteworthy since the number of dairy cattle increased by less than 2 per cent.; it must be attributed partly to the over-average rainfall in 1926 affording plentiful grazing in the later part of that year, and the corresponding maintenance of the milk supply through the dry season, but more particularly to improved methods of production and greater attention on the part of the stockowner to the care and management of the herds. If one-fifth only of the number of cattle shown as breeding stock are cows in milk the average milk production per head would be only 105 gallons per annum.

IMPORTATIONS.

The importations of pure bred cattle for the last three years are as follows :—

	1925	1926	1927
Shorthorn Bulls	24	26	18
„ Cows and Heifers	13	..	..
Freisland Bulls	49	4	77
„ Cows and Heifers	36	..	..
Ayrshire Bulls	16	9	10
„ Cows and Heifers .. .. .	..	1	3
Hereford Bulls	6	..	..
Aberdeen Angus Bulls	2	1	..
Africander Bulls	2	..	..
Jersey Bulls	8	2	..
„ Cows and Heifers .. .. .	..	6	..
Kerry Bulls	1	..	..
„ Cows and Heifers	3	..	..
Red Poll Bulls	3	3	..
„ Cows and Heifers	1	..	..
Polled Hereford Bulls .. .. .	..	..	1
Black Welsh Bulls .. .. .	..	..	4
Black Polled Angus Bulls .. .. .	..	..	4
Guernsey Bulls .. .. .	..	..	..
Welsh Bulls .. .. .	..	..	12
TOTAL ..	164	52	130
TOTAL BULLS..	111	45	127
TOTAL COWS AND HEIFERS ..	53	7	3

VETERINARY DEPARTMENT.

ADMINISTRATIVE AND EXECUTIVE DIVISION.

The total expenditure for the year under review was £41,890, an increase of £3,263 over the previous year. The revenue collected during the year 1927 amounted to £22,400, a decrease of £3,920 from the previous year.

The decrease in the amount of revenue collected is due to the fact that several veterinary stations had to be closed down during the year owing to drought.

RINDERPEST.

The following table shows the number of rinderpest inoculations carried out during the year :—

RINDERPEST INOCULATIONS DURING 1927.

	Double Inoculations	Virulent Blood Tests	Serum Alone Inoculations	Mortality All areas.
SETTLED AREAS :				
By District Staff ..	25,790	..	1,084	..
By Rinderpest Service	27,217	500		..
NATIVE RESERVES :				
Veterinary Stations ..	102,853	3,176	10,655	..
TOTALS ..	156,560	3,676	11,739	3,734

The field conditions under which the work is carried out continue to compare favourably with those in other countries and the percentage of mortality remains approximately the same as that of previous years.

PLEURO-PNEUMONIA.

The number of outbreaks of this disease are in excess of those reported during the year 1926 owing to the increase of infection of native-owned stock. Owing to the incidence of this disease the Veterinary Stations at Kibigori, Sondu and Isiolo were closed for varying periods.

The free issue of vaccine to stockowners was continued throughout the year.

EAST COAST FEVER.

No material progress in the eradication of this disease can be reported, but serious consideration has been given to this subject and Government has decided to adopt measures whereby compulsory dipping and fencing will be enforced in areas infected with East Coast Fever and in certain "clean" areas.

OTHER DISEASES.

Valuable advice to stockowners in connection with bovine infectious abortion and sterility in cattle is to be found in the report of the Acting Chief Veterinary Officer.

The measures to be adopted to combat trypanosomiasis, anthrax and blackquarter are also fully explained by the Acting Chief Veterinary Officer in his report.

Cases of ulcerative and epizootic lymphangitis and horse sickness reported during the year 1927 are in excess of those reported during the previous year. Specific preventative measures remain unknown.

VETERINARY SERVICES IN NATIVE RESERVES.

The inoculation services for the immunization of native-owned stock against disease continue satisfactorily.

At the Veterinary Training Depot, Ngong, a dairy herd has been collected and the tuition of pupils in veterinary subjects has commenced.

THE PREPARATION OF HIDES AND SKINS.

The educational work of instructing natives in the better preparation of hides and skins for export was continued throughout the year. As a result of the adoption of improved methods of preparation demonstrated to the natives at various centres in the Central Kavirondo Reserve the price of prepared hides has been increased by approximately Sh. 10 per frasila.

Pupils from other native reserves have received tuition in the improved methods of preparation at Maragoli.

THE BRANDING OF STOCK ORDINANCE.

During the year under review 242 brands were registered, an increase of 12 over the previous year. Four registered brands were transferred to other owners. 152 branding irons for the branding of squatter stock were disposed of, an increase of 21 over those sold during the year 1926.

DIVISION OF VETERINARY RESEARCH.

TECHNICAL ROUTINE.

(a) Preparation of Laboratory Products.

The amount of serum, vaccines, etc., prepared and issued during 1927, is shown on the tabulated forms.

It will be noted that research work was carried out in connection with the preparation of a blackquarter liquid vaccine, and that the liquid vaccine was substituted for the muscle vaccine which had previously been prepared at, and issued from, the laboratory.

(b) Routine Diagnosis.

This included the examination of smears and specimens, etc., forwarded for examination, the total number for the year being 9,036, details of which are shown on the tabulated sheets.

TECHNICAL RESEARCH.

(A).—DISEASES OF CATTLE.

RINDERPEST.

(1) The elimination of redwater and gallsickness infections from the virus.

The increasing risk of losses from redwater and gallsickness in cattle undergoing rinderpest immunisation (simultaneous method) consequent on the use of rinderpest blood containing both infections, particularly in cattle born and reared on estates where dipping at short intervals combined with thorough hand-dressing is regularly carried out from, or shortly after, birth necessitated urgent attention being given to the introduction of a method of obtaining rinderpest virus free of redwater and gallsickness.

Various methods were investigated, viz :—

- (a) The substitution of peritoneal washings for virulent bovine blood.*
- (b) The substitution of nasal secretion for virulent bovine blood.*
- (c) The substitution of blood of a goat reacting to rinderpest, for virulent bovine blood.*
- (d) The use of virus-makers (cattle) born and reared on estates where dipping is regularly carried out.*

Peritoneal washings, nasal secretion, and goat virus, were found to be unsuitable for field use. Nasal secretion may be utilised for—

- (1) infecting cattle destined for virus-makers, and
- (2) for the immunisation of imported cattle against rinderpest prior to redwater-gallsickness immunisation.

The possibility of obtaining virus-makers susceptible to redwater nad gallsickness from estates in this Colony, received attention.

As the result of observations hereon, it was found that a percentage of young cattle, born and reared on some estates where three days dipping combined with hand-dressing, and on other estates where three days dipping not combined with hand-dressing, is regularly carried out from or shortly after birth, are susceptible to both infections, whereas a large percentage of the young stock born and reared on estates where seven days dipping not combined with hand-dressing is regularly carried out, do not escape redwater and gallsickness.

(2) *Rinderpest prophylactic vaccination.*

The value of vaccination with extracts of organs collected from cattle reacting to rinderpest as a prophylactic measure was investigated with the following results:—

A more or less virulent and a non-virulent extract may be prepared.

The former will transmit rinderpest in a percentage of susceptible cattle, at least; animals which react acquire an immunity.

A temporary immunity is conferred in a percentage of cattle inoculated with non-virulent extract.

Standardisation of extracts to a degree of virulency which will produce a rinderpest reaction, and confer immunity in 100 per cent. of cases, and a negligible mortality will be difficult, if at all possible, owing to the difficulty of conserving *in vitro* rinderpest virus at a degree of virulency, and to differences in the susceptibility of cattle.

The data at present available, is insufficient to draw conclusions as to the nature of the immunity conferred by inoculation of more or less virulent extracts.

Inoculation of non-virulent extracts does not confer a resistance to simultaneous, or six days later, inoculation of virus, but apparently some resistance to contact infection.

(3) *The effect of tartar emetic in vitro on the viruses of rinderpest and trypanosoma vivax.*

Virulent rinderpest blood containing trypanosoma vivax infection was treated for five minutes with tartar emetic in the proportion of 1 of tartar emetic to 20,000 parts of citrated blood. The vivax infection was destroyed, but the blood remainder virulent for rinderpest.

The method should be of practical assistance in rinderpest immunisation operations in vivax infected areas, for obtaining supplies of rinderpest blood free of vivax infection. Further experiments should be carried out to determine the effect of tartar emetic *in vitro* on other species of trypanosomes.

EAST COAST FEVER.

Experimental East Coast Fever immunisation carried out and recorded by investigators, shows that a percentage of inoculated cattle give no apparent reaction and that a larger percentage of cattle which definitely react, survive exposure to natural infection in comparison with those which give an "indefinite" or no apparent reaction to inoculation.

During the period under review, a number of susceptible cattle were inoculated to (a) determine which method or combination of methods of inoculation produces the greatest percentage of reaction, (b) compare the mortality which occurs from East Coast Fever by the different methods of inoculation, (c) ascertain whether an original inoculation confers a resistance to re-inoculation, and (d) whether a higher resistance to natural infection is conferred by re-inoculation.

The transmissibility of East Coast Fever by inoculation of emulsion of infected ticks, species *Rhip. appendiculatus*, and the immunity conferred in cattle which react to inoculation of emulsions of infected ticks was also investigated.

This experimental work was undertaken chiefly with a view to elaborating a method of inoculation which would produce the greatest percentage of reactions to East Coast Fever, and the lowest death-rate from inoculation and subsequent exposure to natural infection.

Other experimental East Coast Fever work included the following, viz :—

The immunisation of unweaned calves.

Prophylactic inoculation with spleen extract.

The following is a summary of the results :—

East Coast Fever is transmissible by various methods or combination of methods of inoculation of blood, spleen pulp and gland pulp of an East Coast Fever infected beast.

None of the methods or combinations employed invariably transmit East Coast Fever; inoculation of spleen pulp or blood mixed with spleen pulp produced a varying percentage of reactions in different lots of cattle, nil to 87 per cent., approximately; with the exception of gland juice, dose 1 c.c., inoculation of blood alone produces the smallest percentage, average 28 per cent.

Intravenous inoculation of spleen pulp and simultaneously subcutaneous and intradermal inoculation of spleen pulp mixed with blood gave the largest percentage of reactions, viz, 87 per cent. approximately.

Blood alone produced the lowest percentage of death rate from East Coast Fever, viz. 1.6 per cent., spleen pulp or blood mixed with spleen pulp gave varying percentages of mortality in different lots of cattle, nil to 16 per cent., average 7.5 per cent.

An original inoculation did not necessarily confer a complete resistance against re-inoculation.

Re-inoculation does not confer a higher resistance to natural infection.

An intravenous inoculation with spleen pulp and simultaneously subcutaneous and intradermal inoculation of blood mixed with spleen pulp, produced a larger and more marked percentage of reactions in comparison with an original and subsequent inoculation by the other methods.

A percentage of susceptible cattle which give no apparent reaction to an original and subsequent inoculation are not protected against a reaction and death when exposed to natural infection.

On estates where losses are occurring from East Coast Fever and no facilities exist for controlling the disease, an original inoculation by the method which produces the largest percentage of reactions and most resistance to natural infection, viz., one intravenous inoculation of spleen pulp and simultaneously, subcutaneously and intradermally, blood mixed with spleen pulp, is indicated.

TRANSMISSION OF EAST COAST FEVER BY (1) EMULSIONS OF
TICKS, (2) EMULSIONS OF TICKS AND SIMULTANEOUSLY,
INOCULATION OF BLOOD OF AN EAST
COAST FEVER BEAST.

A number of cattle were put in experiment to determine the transmissibility of East Coast Fever by emulsions of ticks alone, or emulsions of ticks and simultaneously blood of an East Coast Fever beast.



View at Green Manuring Trials in Foreground and Selected Kenya "Flat White"



Green Manuring Trials (Njahi) in Coffee at Scott Agricultural Laboratories.

- (1) Engorged larval and nymphal ticks collected from an East Coast Fever reacting beast and emulsified and inoculated immediately after collection did not produce East Coast Fever, and immunity was not conferred.
- (2) East Coast Fever was *variably* produced by subcutaneous and intravenous inoculation, respectively, of an emulsion of nymphal ticks which engorged as larvae on an East Coast Fever beast and fed for 96 hours prior to emulsifying.
- ~~(3) Intracutaneous inoculation of the same emulsion did not transmit.~~
- (4) The immunity conferred in animals which react to inoculation of emulsion of infected ticks is not necessarily complete against natural infection.
- (5) Subcutaneous inoculation of emulsions of nymphs which engorged as larvae on an East Coast Fever beast and fed for 96 hours prior to emulsifying and simultaneously intracutaneous and subcutaneous inoculation of blood of an East Coast Fever beast *variably* produces East Coast Fever.
- (6) Inoculation of nymphal ticks which engorged as larvae on an East Coast Fever beast and which were fed for 96 hours, does not offer better prospects of producing a reaction and conferring immunity to natural infection than inoculation of spleen pulp of an East Coast Fever beast.

IMMUNISATION OF UNWEANED CALVES.

A number of unweaned calves varying in age from 2 to 7 months were infested with nymphae (species *Rhip. appendiculatus*) which engorged as larvae on cattle reacting to East Coast Fever.

Of the total, viz., 15, 5 reacted to East Coast Fever (of these 5, 4 = 80 per cent. died, and 1 = 20 per cent. recovered), the remaining 10 did not react.

The survivors, viz., 1 reactor and 10 non-reactors, were tested on their immunity.

Result.—The reactor to the original infestation again contracted East Coast Fever when exposed to natural infection.

Of the 10 non-reactors, 5 died from East Coast Fever = 50 per cent.; 3 reacted = 30 per cent., and 2 did not react = 20 per cent.

Thus of the 15 calves put in experiment, 6 = 40 per cent. survived, and 60 per cent. died of East Coast Fever.

An observation of importance in connection with the immunity conferred by recovery from an attack of East Coast Fever is recorded, viz., 66 per cent. of the calves which reacted to infestation by hand, recovered and again reacted to East Coast Fever when exposed to natural infection; the immunity conferred by recovery from natural infection is thus not always absolute and complete against natural reinfection.

PROPHYLACTIC INOCULATION WITH EXTRACT OF SPLEEN OF AN EAST COAST FEVER BEAST.

The inoculation of spleen extract was found to have no prophylactic value.

During the period 10/6/27 to 9/2/28, a total of 217 laboratory cattle consisting of discontinued rinderpest experimental cattle, surviving rinderpest virus-makers, and heifers purchased for the N'gong Training Depot, were inoculated for East Coast Fever and pleuro-pneumonia, at the laboratory; and transferred to the Veterinary Training Depot, N'gong, where they were exposed to East Coast Fever natural infection.

The results, so far obtained, show that provided good field conditions exist, viz., abundance of grazing and watering facilities, the mortality from exposure to natural infection in inoculated cattle is considerably less in comparison with inoculated cattle exposed under adverse field conditions.

It is not generally recognised that a percentage of inoculated cattle, when exposed, react to natural infection and that cattle reacting to natural infection require good grazing and sufficient water within easy distance.

DISEASES OF EQUINES.

The preparation of horse-sickness anti-serum was commenced.

EAST AFRICAN SWINE FEVER.

The value of extracts of spleen for the prophylactic vaccination of East African Swine Fever was investigated with the following results:—

Spleen treated with commercial formalin, 1 of spleen to 1,000 formalin and stored for 7 days at 0° C. transmitted swine fever, and produced mortality from swine fever.

Spleen treated with toluol, 1 of spleen to 9 of toluol, produced swine fever, and death.

Spleen treated with 1 in 100 toluol and incubated for 4 days, and normal saline in the proportion of 1 of spleen to 9 of saline to which toluol was added to make 1 per cent. of the total bulk, and the extract stored at 0° C., produced swine fever, and death.

Spleen treated with normal saline in the proportion of 1 of spleen to 9 of saline, to which toluol to make 3 per cent. of the total bulk was added, then incubated for 48 hours, and stored at 0° C. produced resistance against a virus stored at 0° C. for approximately 2 years but conferred no protection against virus of the same strain of 26/11/27.

Animals which survived inoculation with an attenuated virus and a non-virulent or attenuated extract were not protected against a non-attenuated virus.

ANTHRAX.

The double vaccine was issued throughout the year with apparent benefit as no complaints were received of breakdowns of immunity or of fatalities consequent on its use. It was hoped to issue a single spore vaccine as manufactured in South Africa, Australia and America, but some technical difficulties were encountered in the preparation of this vaccine. These have been overcome and it is expected the new vaccine will be ready for issue by May of this current year (1928).

Vaccination with the spore vaccine will consist of one inoculation, but different strains will be issued for cattle, for sheep, for goats, for pigs and horses.

BLACKQUARTER.

The preparation of muscle vaccine was discontinued and a liquid vaccine substituted.

The existence or otherwise, in Kenya Colony, of infections which may be confused with blackquarter is receiving attention.

CONTAGIOUS ABORTION.

A pamphlet on the control and prevention of contagious abortion was written up and published for circulation amongst stockowners.

Results of agglutination tests made on samples submitted for examination show that contagious abortion is prevalent in Kenya Colony.

Investigations into abortion in swine is receiving attention.

LAIKIPIA LUNG DISEASE.

(INF. PLEURO-PNEUMONIA OF SHEEP).

(a) This disease was extensively investigated in view of the continued heavy lamb mortality in the N'gobit and Laikipia districts, but there is no doubt that this disease occurs throughout this Colony.

It has been established that the disease chiefly affects new-born lambs amongst which, in certain years, the mortality may be as high as 75 per cent. Many animals that survive and grow into adults are typical "lungers" and in all probability maintain infection in the herd. The disease has been recognised in adult goats, but experimentally these animals are very resistant to the disease.

It is thought that adult sheep possess a fairly strong immunity, but they can be experimentally infected by cultures of the organism and by organ or tissue material.

The preparation of a vaccine for issue was continued, and owners have reported satisfactory results following its use.

GOAT DISEASES.

(b) Diseases of the goat are not well-known in this Colony and recently an attempt was made to get order out of chaos and ascertain the epidemiology of the prevalent respiratory diseases of this animal. It has been well known for several years that infectious pleuro-pneumonia was rampant in native goats in both Uganda and Tanganyika while its presence had also been confirmed in this Colony. At the present time, it exists throughout the Colony, and is said to be particularly bad in the Eldoret district. No new observations have been made on this disease as no cases have been sent down to the laboratory. One goat received from the N'gobit was found to be suffering from Laikipia lung disease of sheep.

The second goat disease investigated was a common, but mild complaint, chronic in its nature and course, which was rampant in the laboratory herd and native goats towards the end of the year. It was at first considered that the disease was infectious pleuro-pneumonia, but that opinion was soon dispelled by the pathology of the disease, which, in many respects resembles the disease known as takosis, described by Mohler and Washburn in the United States. In order to avoid confusion and assist in further identification or otherwise of this Kikuyu disease with takosis, the name "Kikuyu disease of goats" is tentatively put forward as a name for this new condition.

The disease attacks animals of all ages and both sexes. It has been seen in kids of not more than 12 weeks old.

PLANT POISONING.

Investigations into the presence, in this Colony, of plants poisonous for stock were commenced, and are being continued.

It was found that Acokantheresis which is produced by two species, viz., *A. schimperi* and *A. longiflora* was responsible for a mortality.

The cause of a serious mortality was investigated, the cause of which was found to be due to *A. schimperi* and *A. longiflora*.

AGRICULTURAL CHEMISTRY.

For the greater part of the year the staff was under strength.

About 1,200 letters were dealt with and 763 reports issued, both showing a marked increase in numbers over 1926.

The amount of analytical work done in the laboratory again shows an increase over the previous year.

The number of dips reported on was 646. The number of samples dangerously incorrect again shows a slight decrease (34.9 per cent. as against 33.45 per cent.) but one-third of the total 646 samples represent dipping fluids which are ineffective or injuriously affect the animals dipped in them. This is a most important matter and should be brought to the notice of all stockowners who contemplate making dipping tanks.

Routine soil analysis restricted to determinations of organic matter, reaction, lime requirement and total phosphate and costing Sh. 60 per sample can now be carried out for farmers. Several such analyses have already been undertaken.

With the object of locating fresh limestone deposits an advertisement was put into *The East African Standard* in August as the result of which 22 samples were received. Examination of these, so far, has shown very few new sources of limestone with the exception of material coming from Mombasa and district.

No reliable yield results are available this year from the Kasarini manurial experiments. The manurial plots at the Scott Laboratories gave no significant results, again the season having been entirely unpropitious.

Analyses of coffee cherry and coffee pulp from eleven representative coffee districts in the Colony have been commenced in order to determine the amount of fertilising material removed by a crop of coffee.

Investigations into the germination of coffee cherry were continued with the assistance of the Laboratory of the Imperial Institute, where Mr. Beckley was accorded every facility and assistance.

ENTOMOLOGY.

Possibly the outstanding feature of the Entomologist's Report is a resumé of what has been done, and is being done, in connection with the control of the maize stalk-borer. With the present system of notification and inspection, the limiting of time of planting and the compulsory destruction of crop remnants, it is hoped that next season the damage done will be slight. Earnest co-operation among the farmers themselves and between the farming community and the Department of Agriculture is an essential.

The work on the control of the coffee mealy-bug has been continued and a bulletin by T. W. Kirkpatrick, Assistant Entomologist, has been published, entitled: "The Common Coffee Mealy-bug (*Pseudococcus lilacinus*, Ckll.) in Kenya Colony."

Further pests of coffee have been investigated and where possible details of the life cycle are worked out.

The braconid parasite of the pink boll-worm of cotton, mentioned in last year's report, page 143, has been named *Microbracon kirkpatricki* in honour of its discoverer. Consignments of that parasite have been sent to Egypt and other countries are interested in its introduction to their territory.

The Entomologist has spent several months of the year in tsetse fly investigations in different parts of the Colony.

Towards the end of the year two travelling laboratories were supplied which were utilised in preliminary research work in the field.

The usual routine work, which is yearly on the increase, has been continued.

MYCOLOGY.

The Mycologist returned from leave on July 21st and took over from Mr. H. Wilkinson who had been acting in his absence.

Over 2,000 miles were covered in the course of visits to districts for purposes of plant disease investigation. The chief diseases concerned were coffee berry disease and mosaic disease of sugar cane. During the year the presence of the former was confirmed in Kaimosi, Buret and Sotik. Sugar mosaic was reported in Central and South Kavirondo native reserves and at Lumbwa. Immediate action was taken to eradicate these sources of infection. Good progress has been made in the elimination of susceptible varieties on European and Indian farms in Nyanza Province.

Investigations carried out during 1927 included work on black tip of coffee, heat injury of sisal, a rot in export consignments of potatoes and preliminary steps towards the determination of the number and distribution of biologic forms of black stem rust of wheat in Kenya.

No outstanding new disease was reported during the year. Powdery scab of potatoes (*Spongospora subterranea*) was identified for the first time and pink disease (*Corticium salmonicolor*) which hitherto had only been known to attack coffee in this country, was found on loquat and *Cupressus macrocarpa*.

PLANT BREEDING.

The new organisation of the Plant Breeding Services recommended by Professor Sir Rowland Biffen has been inaugurated this year.

A farm of 200 acres has been acquired out of Njoro Township land and is now the main centre for plant breeding in the Colony. The work previously done on Ngata Farm, Njoro, will be transferred to the new Plant Breeding Station where maize breeding and selection will also be undertaken and any other experimental work as necessity and opportunity arise. The necessary buildings, cage, etc., are in course of erection.

In addition to the Njoro Plant Breeding Station there are two subsidiary stations, one at the Scott Agricultural Laboratories where wheat will be bred for resistance only to black stem rust and one at Mau Summit, on land kindly loaned by Major J. J. Drought, where wheats will be bred for resistance only to yellow rust. It is considered easier to breed a high yielding wheat resistant only to one rust rather than to two, but this latter work is being carried out at Njoro. It is hoped that at the Njoro Plant Breeding Station wheats will be bred which will be suitable for all parts of the country.

Mr. R. J. Lathbury, M.A. (Cantab.) was appointed Assistant Plant Breeder on June 26th, but the Assistant Agricultural Officer provided for in the Supplementary Estimates for 1927 for plant breeding services has not yet been appointed. An African clerk was appointed to these services in August of this year.

Informal addresses on wheat were given by the Plant Breeder at Molo and Londiani and the whole country has been covered in tours of inspection of wheat crops. Much valuable information is obtained from these tours which enable authoritative advice to be given to farmers on all subjects relating to wheat.

Both black stem and yellow rust have proved more severe in their attacks this year than ever before and, on account of the unusually warm weather experienced, black stem rust has infected wheats more severely at higher altitude than usual. Kenya Governor has stood up remarkably well to black stem rust and there is now sufficient seed of it available for all requirements. It is still considered that Kenya Governor and Equator are by far the best bread wheats to grow in their respective spheres, though the millers are able to absorb small quantities of other wheats.

The work of raising rust-resistant varieties of wheat continues in a promising manner at the three plant breeding stations. A full statement on the activities of these stations and on the work of the Plant Breeder will be found in Appendix I of this Report. Two new varieties resistant to black stem rust have already been issued to farmers.

It is interesting to note that, with the advent of Kenya Governor wheat and of the railway, West and North Kenya show great promise of becoming wheat growing districts.

MAIZE.

Field selection was again carried out and material gathered for more extensive selection work with ear to row tests.

GRADING AND INSPECTION.

PLANT IMPORT INSPECTION.

The Diseases of Plants Prevention Ordinance was revised and published on September 6th, and now includes the inspection of all fruit. 7,768 packages of fruit, seeds and plants, and 500 tons seed sugar cane were passed to the declared value of Sh. 421,835/60. 48 packages, value Sh. 791, were passed in transit to Uganda.

MAIZE GRADING AND CONDITIONING.

970,133 bags were inspected during the year: an increase of 40% on 1924, the previous highest record. Approximately 54,000 bags or 5.5% were native grown. 695,852 bags were graded K.2. 86,382 bags were rejected as wet.

BULK SHIPMENT.

365,337 bags of K.2 and 47,885 of K.2SW were shipped in bulk, most of this being railed to the coast in second-hand bags.

RULE 25.

114,300 bags were shipped to the ports permitted without certificate.

The Kenya and Uganda Railway rebagged 4,151 bags and renewed 3,927 bags of maize at the shippers' expense.

MAIZE CONDITIONING PLANT.

101,631 bags of maize, consisting of 98,964 wet, and 2,872 weevily, were conditioned, 8,535 bags of which were consigned direct.

CLOVE DRYING EXPERIMENT.

An experiment carried out with the co-operation of the Department of Agriculture, Zanzibar, for the drying of cloves was unsuccessful.

POTATOES.

Compulsory grading commenced on July 1st. On October 21st an amendment was published providing for an additional grade, and modifications in packing. Certificates for 21,740 cwt. were issued.

BEANS.

9,140 bags were inspected by request, and 51 certificates issued.

WHEAT.

Samples were taken and discussions regarding inspection and subsequent grading were held towards the end of the year.

COOL STORES.

The cool stores were taken over in January, and the following commodities deposited during the year :—

Butter	...	...	1,544 cases.
Cheese	...	...	3,541 lbs.
Beef	...	...	211 qrs.
Mutton and pork	...	...	80 carcasses.
Fruit	...	...	102,229 lbs.
Vegetables	...	...	3,979 lbs.
Fresh fish	...	...	8,583 lbs.
Smoked and dried fish	...	...	15,178 lbs.
Poultry	...	...	135
Small meats	...	...	472 pieces.

PLANTATION INSPECTION.

The need for more frequent and extensive inspection under the Ordinance was duly emphasised at the Coffee Conference. As a result two Agricultural Officers in addition to the Coffee Officer have been provided for 1928.

56 coffee plantations were inspected during the year.

An entire district—namely the Nakuru Administrative District—and Ravine, was under the closest inspection for the presence of stalk-borer and an elaborate set of precautions

were operated by the Inspector, through a large number of Honorary Inspectors. Towards the end of the year the destruction of infested maize stalks was proceeding rapidly. As over 300 farms were involved the work of the Inspector was not light and the Department is grateful for the assistance rendered by the Honorary Inspectors and the Kenya Farmers' Association.

Inspection of the area in which sugar mosaic occurred was conducted during the year and several inspections in connection with the destruction of the weed *Striga lutos* were carried out by Agricultural Officers detailed for the purpose. The administration co-operated most effectively in this work which embraces both European and Native areas.

ECONOMIC SURVEYS.

Only two small surveys were undertaken, one for a suggested line from Kitale to Mount Elgon, the other dealt with the suggested extension of the line from Narro Moru to Nanyuki.

Examination of returns for economic surveys in connection with the feeder road proposals was also undertaken.

LABOUR.

The following tables shows the average number of units of labour employed monthly on European holdings for 13 months to July 31st 1927. Casual daily labour employed is shown in this year's figures for the first time.

YEAR.	Casual daily labour.	Men.	Women.	Children.	Total.
1919-20..	45,005	3,917	4,787	53,709
1920-21..	55,939	4,911	6,539	67,388
1921-22..	61,753	4,261	5,935	61,649
1922-23..	54,406	6,609	9,942	70,957
1923-24..	66,993	8,316	11,784	87,093
1924-25..	61,755	8,477	11,315	78,527
1925-26..	64,875	6,021	13,717	84,611
1926-27 to 31-7-1927..	5,006	76,838	4,802	15,428	102,074

A considerable increase in the numbers of men and children at work is disclosed; the falling off in the number of women is probably accounted for by the fact that this class of labour is mainly employed casually by the day and some of the women shown in 1925-26 appear as casual daily labour in 1926-27. The percentage increase, 14.7% excluding casual daily labour, is the highest recorded for some years and the actual numbers employed greater than ever before. In spite

of the very considerable agricultural development that has taken place during the year the labour position has probably never been easier. Furthermore the value of the individual labourer appears to be on the increase in that the number of labourers required to work an equivalent acreage decreases slightly year by year.

AGRICULTURAL SHOWS.

In addition to the Native Agricultural Show previously referred to, the East African Agricultural Show was held at Nairobi in August. Exhibits from Southern Rhodesia, Tanganyika and Uganda were staged and representative exhibits by all sections of this Department. With the exception of the maize classes, due to time of year at which the Show was held and the stock classes, due to risk of infection, the exhibits were of high quality. The district exhibits were particularly worthy of note and formed a most instructive index of the possibilities of various settled areas.

LAND SETTLEMENT.

There has been an increase in the number of occupiers during the year of 92. The Department has interested itself in the matter of further and closer settlement, and has undertaken to report on areas available and suggest possible subdivision in order to meet the requirements of the Settlement Schemes in preparation.

LIBRARY AND PUBLICATIONS.

The following reports, bulletins, etc., prepared by the officers of the Department have been published during the year :—

- Annual Report of the Department of Agriculture for the year 1926.
- Meteorological Records for the year 1926.
- Report of the Proceedings of the Coffee Conference, 1927.
- Report of the Proceedings of the Stockowners' Conference, 1927.
- Report on Wheat Products in Kenya, by Professor Sir R. H. Biffen, F.R.S.
- The Coffee Industry of Kenya Colony (Revised Edition) by A. D. le Poer Trench, O.A.C. (Dip. Ag.), Senior Coffee Officer.
- Coffee : Principles of Pruning and Observations on Trials, by A. D. le Poer Trench, O.A.C. (Dip. Ag.), Senior Coffee Officer.
- The Common Coffee Mealy-bug in Kenya Colony, by T. W. Kirkpatrick, M.A. (Dip. Ag.), (Cantab.), F.E.S.

The Diseases of Plants Prevention Ordinance Rules, 1927.

Control of Streak Disease in Uba Cane (*East African Farm and Home Journal* reprint).

Striga Weed : A most serious menace to farmers, by H. Wilkinson, A.R.C.Sc., F.E.S., F.L.S., Acting Mycologist.

DEPARTMENTAL REPORTS.

Submitted with this report are included the following appendices :—

- (a) Staff Changes and New Appointments in 1926.
- (b) Staff at December 31st, 1926.
- (c) Annual Report of the Chief Veterinary Officer.
- (d) Annual Report of the Chief Veterinary Research Officer.
- (e) Annual Report of the Agricultural Chemist.
- (f) Annual Report of the Entomologist.
- (g) Annual Report of the Inspector of Plantations.
- (h) Annual Report of the Mycologist.
- (i) Annual Report of the Plant Breeder.
- (j) Annual Report of the Senior Coffee Officer.
- (k) Annual Report of the Chief Grader and Inspector.
- (l) Annual Report of the Agricultural Officer, Scott Agricultural Laboratories.
- (m) Annual Report of the Agricultural Officer, Nyanza.
- (n) Annual Report of the Agricultural Officer, Coast.
- (o) Annual Report of the Assistant Agricultural Officer, Embu.
- (p) Summary of Meteorological Records for 1926.
- (q) Schedule showing Agricultural Exports for 1926, and previous years.

In conclusion, I should like to pay tribute generally to the members of the staff of the Department for the loyal way in which they have discharged their duties during the year. I would also tender the thanks of the Department to administrative and other members of the public service as well as to many members of the public for the advice and assistance they have rendered the Department.

E. HARRISON,
Acting Director of Agriculture.

APPENDIX A.

The principal changes and new appointments during the year under review were :—

Mr. Alex. Holm, C.B.E., F.H.A.S., S.E.A.C. (Dip. Hons.), proceeded on leave on 26th May.

Mr. E. Harrison, M.S.A., B.Sc., N.D.A. (Hons.), appointed Acting Director, 26th May.

Mr. H. Wilkinson, A.R.C.Sc., F.L.S., Inspector of Plantations, appointed Assistant Entomologist, 1st October.

Mr. R. J. Lathbury, M.A., Agricultural Officer, appointed Assistant Plant Breeder, 28th June.

Mr. M. H. Fox, B.Sc., A.I.C., Chemical Officer, appointed Government Analyst, and transferred to Medical Department, with effect from 1st February.

Mr. A. C. Hunter, Office Superintendent, appointed Statistical Officer, 17th December, 1926.

Mr. E. J. Kelly, Clerk, appointed Office Superintendent, 17th December, 1926.

Mr. D. S. Gracie, Assistant Agricultural Chemist, arrived on first appointment, 21st July.

Mr. C. G. Bishop, Assistant Agricultural Officer, arrived on transfer from Tanganyika Territory on 16th September.

Mr. R. G. Bentall, Assistant Agricultural Officer, arrived on first appointment on 25th November.

Mr. C. O. Oates, N.D.A., Assistant Agricultural Officer, arrived on first appointment on 9th November.

Mr. R. F. D. Armstrong, Clerk, seconded to Public Works Department, 21st November.

Mr. R. J. Dukes, Clerk, appointed locally, 21st June.

Mr. E. C. Parish, Clerk, appointed locally, 1st July.

Miss M. M. Burge, Clerk, transferred Education Department, 8th February.

Mr. L. Walker, Clerk, appointed locally 5th February, and transferred to Public Works Department, 22nd June.

Mr. S. G. Sharp, Clerk, transferred Administration, 1st June.

Miss M. V. Ashe, Clerk, appointed locally, 1st October.

Mr. F. J. Blake, Junior Clerk, appointed locally 17th January, and resigned 30th September.

Mr. J. B. Gould, Junior Clerk, appointed locally 1st October.

Mr. K. R. Maitland, Clerical Learner, left the service, 5th March.

Miss E. M. Geater, Clerical Learner, appointed locally 1st May.

Mr. A. E. Taylor, Mechanic, arrived on first appointment, 23rd August.

Mr. R. N. Noble, Clerical Learner, appointed Laboratory Assistant, Junior Grade, 1st March.

2.—VETERINARY ADMINISTRATIVE AND EXECUTIVE DIVISION.

Mr. E. Beaumont, M.R.C.V.S., arrived on first appointment as Veterinary Officer on 3rd February.

Mr. W. Fotheringham, M.R.C.V.S., arrived on first appointment as Veterinary Officer on 11th December.

Mr. W. B. C. Danks, M.R.C.V.S., B.Sc., arrived on first appointment as Veterinary Officer on 11th December.

The following Stock Inspectors were appointed locally during the year :—

Messrs. H. Alton, 5th January; B. Stabin, 1st May; J. J. Scally, 11th May; R. H. Cameron, 27th August; E. A. Egan, 1st September.

The appointments of the following officers were terminated during the year :—

Messrs. A. W. Carter, Veterinary Officer, 31st March; G. Scade, Temporary Veterinary Officer, 31st October, F. G. Chapman, transferred to Nigeria, 9th November; J. E. McDonogh, 31st March; H. Alton and E. A. Egan, 31st December.

The death of Mr. H. J. Vernon, Stock Inspector, at Nairobi on 30th June, is reported with regret.

The following officers of the Field Staff were attached to the Veterinary Research Laboratory, Kabete, at various periods during 1927 :—

Veterinary Officers Messrs. J. R. Hudson, W. G. Emerson, and E. J. Mulligan.

3.—DIVISION OF VETERINARY RESEARCH.

Mr. R. W. Mettam, M.Sc., M.R.C.V.S., transferred from South Africa, arrived on first appointment, 8th April.

Mr. S. R. Pelling, Laboratory Assistant, arrived on first appointment, 10th June.

Mr. J. Forsyth, Yard Foreman, appointed Laboratory Assistant, 1st August.

Mr. A. McDougall, appointed locally, Temporary Yard Foreman, 19th November.

Mr. W. Sherman, Clerk, appointed locally, 18th July.

APPENDIX B.

STAFF LIST OF DEPARTMENT OF AGRICULTURE

(As at December 31st, 1927).

Director : Alex. Holm, C.B.E., F.H.A.S., M.R.A.S.E., S.E.A.C. (Dip. Hons.), on leave.

Deputy Director : E. Harrison, M.S.A., B.Sc., N.D.A. (Hons.), Acting Director.

ADMINISTRATIVE AND GENERAL.

Statistical Officer : A. C. Hunter.

Accountant : H. S. Land.

Office Superintendent : E. J. Kelly.

Clerks : R. Abram, R. F. Dalziel-Armstrong (seconded to Public Works Department), J. E. Harrison, R. F. Palmer, F. Parker, L. Myers, J. Riddell, Mrs. M. A. Carr Hole, Miss M. V. Ashe, R. J. Dukes, E. C. Parish, W. White.

Junior Clerks : D. P. Herne, J. B. Gould.

Clerical Learners : J. F. Dent, Miss M. E. Hall, Miss E. M. Geater.

Entomologist : T. J. Anderson, M.A., B.Sc. (Hons., Edin.), F.Z.S., F.E.S.

Assistant Entomologists : T. W. Kirkpatrick, M.A., F.E.S.; H. Wilkinson, A.R.C.Sc., F.E.S.

Mycologist : J. McDonald, D.F.C., B.Sc. (Hons.), F.L.S.

Agricultural Chemist : V. A. Beckley, M.A.

Assistant Agricultural Chemist : D. S. Gracie, B.Sc.

Plant Breeder : G. J. L. Burton, M.C., B.A.

Assistant Plant Breeder : R. J. Lathbury, M.A.

Laboratory Assistant (Junior) : B. A. Pickering.

Laboratory Assistant (Junior) : R. N. Noble.

Laboratory Assistant (Junior) : F. W. Evans.

Chief Grader and Inspector and Manager of Cool Stores : C. C. T. Sharp.

Grader and Inspector : F. B. L. Butler, F.L.S., F.R.H.S.

Assistant Grader and Inspector : B. F. Ratcliffe.

Foreman, Mechanic and Assistant Manager, Cool Stores :
D. F. Sargent.

Mechanic : A. E. Taylor.

Senior Agricultural Officer : D. L. Blunt, M.A.

Agricultural Officers : P. Booth, N.D.A., U.D.A. ; A. G. Bailey, B.A.

Assistant Agricultural Officers : A. S. Hartley, W. Lyne Watt, N. D. Spranger, W. G. Leckie, B.S.c. ; H. J. Taylor, S.E.A.C. (Dip. Hons.) ; H. G. Bentall, C. O. Oates, N.D.A. ; C. G. Bishop.

VETERINARY.

1.—ADMINISTRATIVE AND EXECUTIVE DIVISION.

Chief Veterinary Officer : A. G. Doherty, M.C., M.R.C.V.S., on leave.

Deputy Chief Veterinary Officer : H. H. Brassey Edwards, M.R.C.V.S., Acting Chief Veterinary Officer.

Senior Veterinary Officers : O. Dixon, M.C., M.R.C.V.S. ; R. C. Wheeler, M.B.E., M.R.C.V.S. ; J. T. C. Bradshaw, M.R.C.V.S.

Veterinary Officers : R. Scott Little, M.R.C.V.S., D.V.S.M. ; R. L. Creery, M.R.C.V.S. ; E. J. Mulligan, M.R.C.V.S. ; W. G. Emerson, M.R.C.V.S. ; F. R. Hale, M.R.C.V.S. ; J. R. Hudson, B.Sc., M.R.C.V.S. ; E. Beaumont, M.R.C.V.S. ; W. Fotheringham, M.R.C.V.S. ; W. B. C. Danks, B.Sc., M.R.C.V.S.

Stock Inspectors : D. Wyartt, R. A. C. Campbell, W. L. Lewis, G. White, H. E. Evans, J. Mackay, L. E. Smith, H. Thorne, T. Harris, F. T. O'Meagher, J. F. Greig, C. B. Jolley, P. H. Poolman, C. P. Glover, J. Denwett, A. Lambie, J. H. Ward.

Temporary Stock Inspectors : G. B. P. Curry, A. H. Moeran, A. E. Wardill, H. C. W. Guy, B. Stabin, J. J. Scally, R. H. Cameron.

2.—DIVISION OF VETERINARY RESEARCH.

Chief Veterinary Research Officer : J. Walker, M.R.C.V.S.

Assistant Chief Veterinary Research Officer : R. Daubney, M.R.C.V.S., M.Sc.

Veterinary Research Officers : S. H. Whitworth, M.R.C.V.S., B.V.S. (Melb.), D.V.M. (Zurich) ; R. W. M. Mettam, M.Sc., M.R.C.V.S.

Laboratory Superintendent : A. Walker.

Laboratory Assistants : J. T. Schultz, H. J. Gray, J. R. McQueen, E. J. Hall, W. P. Bruce, F. Lyons, J. Forsyth, S. R. Pelling.

Overseer : J. Burton.

Yard Foreman : A. MacDougall.

Clerks : A. E. Johnstone, A. J. Kemp, W. Sherman.

Clerical Learner : Miss R. M. Dennis.

Mechanic : O. Stenmark.

Storekeeper : J. Scott.

Assistant Storekeeper : G. W. Clochley.

APPENDIX C.

REPORT OF THE ACTING CHIEF VETERINARY OFFICER.

STAFF CHANGES.

The Chief Veterinary Officer was on duty from 1st January until 25th July, 1927.

Major H. H. Brassey Edwards, Deputy Chief Veterinary Officer, was appointed Acting Chief Veterinary Officer on 22nd July, 1927.

Captain O. Dixon, Senior Veterinary Officer, carried out the duties of Acting Deputy Chief Veterinary Officer during the periods 1st January to 8th April, 1927, and 22nd July to 31st December, 1927.

The following officers returned from leave during the year 1927 : Major H. H. Brassey Edwards, Deputy Chief Veterinary Officer, on 9/4/27 ; Mr. W. G. Emerson, Veterinary Officer, on 1/10/27 ; Mr. R. L. Creery, Veterinary Officer, on 30/10/27 ; Mr. R. Scott-Little, Veterinary Officer, on 25/11/27 ; Mr. H. G. Vernon, Stock Inspector, on 23/5/27 ; Mr. F. T. O'Meagher, Stock Inspector, on 25/5/27 ; Mr. F. H. Poolman, Stock Inspector, on 6/8/27 ; Mr. J. F. Greig, Stock Inspector, on 25/11/27 ; Mr. H. Thorne, Stock Inspector, on 29/11/27.

The following officers proceeded on leave during the year 1927 : Colonel A. G. Doherty, Chief Veterinary Officer, on 25/7/27 ; Mr. R. L. Creery, Veterinary Officer, on 4/3/27 ; Mr. W. G. Emerson, Veterinary Officer, on 16/4/27 ; Mr. R. Scott-Little, Veterinary Officer, on 4/3/27 ; Mr. E. A. Wilshaw, Veterinary Officer, on 7/10/27 ; Mr. P. H. Poolman, Stock Inspector, on 20/3/27 ; Mr. J. F. Greig, Stock Inspector, on 2/4/27 ; Mr. H. Thorne, Stock Inspector, on 17/4/27 ; Mr. F. G. Chapman, Stock Inspector, on 1/5/27 ; Mr. C. P. Glover, Stock Inspector, on 9/9/27 ; Mr. A. Lambie, Stock Inspector, on 3/9/27 ; Mr. C. B. Jolley, Stock Inspector, on 26/10/27 ; Mr. G. White, Stock Inspector, on 10/12/27.

The following Veterinary Officers arrived from England on first appointment during 1927 : Mr. E. Beaumont, on 3/2/27 ; Mr. W. Fotheringham, on 11/12/27 ; Mr. W. B. C. Danks, on 11/12/27.

The following temporary Stock Inspectors were appointed locally during the year 1927 : Mr. H. Alton, on 5/1/27 ; Mr. B. Stabin, on 1/5/27 ; Mr. J. J. Scally, on 11/5/27 ; Mr. R. H. Cameron, on 27/8/27 ; Mr. E. A. Egan, on 1/9/27.

The appointments of the following officers terminated during the year 1927: Mr. G. Scade, Temporary Veterinary Officer, on 31/10/27; Mr. A. W. Carter, Veterinary Officer, on 31/3/27; Mr. G. Chapman, Stock Inspector, who was transferred to Nigeria on 9/11/27; Mr. J. E. McDonogh, Stock Inspector, on 31/3/27; Messrs. H. Alton and E. A. Egan, Stock Inspectors, on 31/12/27.

The death of Mr. H. J. Vernon, Stock Inspector, at Nairobi, on the 20th June, 1927, is reported with regret.

The following officers of the Field Staff were attached to the Laboratory, Kabete, for various periods during the year 1927: Mr. J. R. Hudson, Veterinary Officer; Mr. W. G. Emerson, Veterinary Officer; Mr. E. J. Mulligan, Veterinary Officer; Mr. W. Fotheringham, Veterinary Officer; Mr. W. B. C. Danks, Veterinary Officer.

DISTRIBUTION OF VETERINARY FIELD STAFF AS AT
31ST DECEMBER, 1927.

Headquarters, Nairobi:

Acting Chief Veterinary Officer.

Senior Veterinary Officer Bradshaw.

District Veterinary Officer Beaumont, Nairobi District and Southern Kikuyu Reserve.

Veterinary Training Depôt, Ngong:

Acting Deputy Chief Veterinary Officer Dixon.

Stock Inspector Greig.

Rinderpest Service—Mobile—Alienated Areas:

Veterinary Officer Hudson.

Stock Inspector Wyartt.

Stock Inspector Denwett.

Stock Inspector Curry.

Stock Inspector Brauen.

Stock Inspector Moeran.

Machakos Area:

Veterinary Officer Hale (in Native Reserve).

Stock Inspector Cameron (Waterfalls Quarantine Station).

Nanyuki and Nyeri, Laikipia District:

Veterinary Officer Mulligan (District Veterinary Officer, alienated areas and neighbouring Native Reserves).

Stock Inspector Poolman (in alienated areas).

Stock Inspector Campbell (Samburu Native Reserve).

Stock Inspector Scally (Isiolo Quarantine Station).

Naiyasha and Nakuru Districts, Alienated Areas :

Veterinary Officer Creery, Gilgil.
Stock Inspector Thorne, Nakuru.

Kisumu-Londiani and Molo Districts :

Veterinary Officer Emerson (District Veterinary Officer,
Lumbwa and neighbouring Native Reserves).
Stock Inspector O'Meagher, Lumbwa (in Native Reserves).
Stock Inspector Mackay, Kibigori (in Native Reserves).
Stock Inspector Evans, Soudu (in Native Reserves).

Uasin Gishu and Trans Nzoia Districts :

Senior Veterinary Officer Wheeler (District Veterinary Officer and neighbouring Native Reserves).
Veterinary Officer Scott-Little (Kitale and neighbouring Native Reserves—West Suk and Turkana).
Stock Inspector Smith, Eldoret.
Stock Inspector Ward, Kingwal (Nandi Native Reserve).
Stock Inspector Harris (Bungoma and Kitai Quarantine Stations, North Kavirondo Native Reserve).
Stock Inspector Guy (Bungoma and Kitai Quarantine Stations, North Kavirondo Native Reserve).
Stock Inspector Stabin (Chebororwa Quarantine Station, Elgeyo and Marakwet Native Reserves).
Stock Inspector Lewis (Maragoli, North Kavirondo Native Reserve—hides and skins preparation).

Kasmasia, Njemps and Uasin Gishu Masai Native Reserves :

Veterinary Inspector Hassan, Rongai (Native Reserves).
Veterinary Assistant Abdul Ghani, Rongai (Native Reserves).

Mombasa :

Veterinary Assistant Rahman (Port duties).

Kabete Laboratory—Training :

Veterinary Officer Fotheringham.
Veterinary Officer Danks.

On Leave :

Chief Veterinary Officer.
Veterinary Officer Wilshaw (appointment terminates on expiration of leave).
Stock Inspector Glover.
Stock Inspector Lambie.
Stock Inspector Jolley.
Stock Inspector White.

Vacancies :

- One Veterinary Officer has been asked for *vice* Mr. Wilshaw.
- Seven new Veterinary Officers have been asked for for distribution as follows during 1928 :—
- 2 Veterinary Officers for Samburu Native Reserve.
 - 2 Veterinary Officers for Central Kavirondo Native Reserve.
 - 2 Veterinary Officers for field duties, North Kavirondo Native Reserve and Isiolo Quarantine Station.
 - 1 Veterinary Officer for East Coast Fever Service.
 - 1 Veterinary Officer for Rinderpest Service.

EXPENDITURE, VETERINARY DIVISION, 1927.

Summary of Expenditure, 1927 :—

	Original Estimate Sanctioned.	Amount Spent.	Savings.
	£	£	£
Administrative and Executive Division ...	24,170	22,066	2,304
Sub-Division Native Reserves	11,690	11,998	942
Veterinary Training Depot	2,396	1,310	1,086
Rinderpest Service ...	6,676	6,516	790
Grand Total ...	44,932	41,890	3,042

VETERINARY ADMINISTRATIVE AND EXECUTIVE DIVISION.

	1923	1924	1925	1926	1927
	£	£	£	£	£
Expenditure (actual) ..	30,716	29,546	36,356	38,318	41,890
Revenue (actual).. ..	6,119	11,536	24,520	25,320	22,400
Expenditure (after deduct- ing Revenue) ..	24,597	18,010	11,836	12,998	19,490

VETERINARY RESEARCH DIVISION.

	1923	1924	1925	1926	1927
	£	£	£	£	£
Expenditure (actual) ..	20,973	20,600	27,743	29,686	29,888
Revenue (actual).. ..	4,684	7,328	6,543	4,792	5,014
Expenditure (after deduct- ing Revenue) ..	16,289	13,272	21,200	24,714	24,874

TOTAL EXPENDITURE VETERINARY SERVICES FOR
YEARS 1923-1927.

				£
1923	...	...	...	40,856
1924	...	...	...	31,282
1925	...	...	...	33,036
1926	...	...	...	37,712
1927	...	...	...	44,364
				£187,250

As a comparison, it might be stated that the Union of South Africa Government in 1926-27 spent £426,411, a decrease of £4,201 from the previous year, on the veterinary services of the four territories. In eradicating 204 outbreaks of foot and mouth disease by compulsory slaughter of stock the British Government in 1926 paid in compensation the sum of £188,604.

COMPARATIVE STATEMENT OF REVENUE FOR THE YEARS
1925, 1926 AND 1927.

STATION.	1925	1926	1927	Total three years.
	<i>Shs.</i>	<i>Shs.</i>	<i>Shs.</i>	<i>Shs.</i>
ALIENATED AREAS :				
Nakuru	21,033/89	6,575/06	3,253/70	30,862/65
Naivasha	1,191/08	420/36	..	1,611/44
Mombasa	14,979/48	16,046/96	23,254/60	54,281/04
Nyeri	8,315/94	34,206/10	62,466/18	104,988/22
Lumbwa	12,935/50	1,916/50	2,274/00	34,826/00
Eldoret	36,281/43	1,034/50	806/80	38,122/73
Nairobi (Head Office)..	19,484/68	15,335/90	17,527/00	52,347/58
Kitale	22,999/00	328'00	530/00	23,857/00
Rumuruti	17,620/30	1,970/48	..	19,590/78
Rinderpest Service ..	26,558/50	60,264/50	60,478/50	147,301/50
Gilgil .. .. .	..	..	1,193/45	1,193/45
TOTAL ..	181,399/80	155,798/36	171,784/23	508,982/39

COMPARATIVE STATEMENT OF REVENUE FOR THE YEARS
1925, 1926 AND 1927.—(Continued).

STATION.	1925	1926	1927	Total three years.
	<i>Shs.</i>	<i>Shs.</i>	<i>Shs.</i>	<i>Shs.</i>
NATIVE RESERVES :				
Eldama Ravine ..	568/80	164/40	..	733/20
Isiolo Veterinary St. ..	11,164/57	9,083/31	980/50	21,288/38
Kibigori Veterinary St. ..	5,965/50	27,910/50	9,629/00	42,785/00
Machakos Veterinary St. ..	21,556/00	30,451/96	12,952/50	64,960/46
Waterfalls Veterinary St. ..	79,160/00	39,288/00	11,166/50	129,614/50
Bungoma Veterinary St. ..	154,485/00	94,266/00	59,169/50	307,920/50
Kingwal (Nandi) ..	7,154/50	60,594/50	16,631/50	84,380/50
Timboroa Veterinary St., (Kerio)	30,816/50	51,620/50	..	82,437/00
Machakos (Rinderpest Service) .. ..	..	37,558/54	..	37,558/54
Ngong (Masai) .. ..	..	216/00	..	216/00
Kilungu (Machakos) .. ..	..	..	22,673/00	22,673/00
Soudu (Lumbwa) .. ..	..	..	6,781/00	6,781/00
Kaptumo (Nandi) .. ..	..	..	2,101/50	2,101/50
Mbooni (Machakos) .. ..	..	..	9,788/50	9,788/50
Sultan Hamud (Machakos) .. ..	..	..	14,045/00	14,045/00
Kitai (North Kavirondo) .. ..	..	..	83,631/00	83,631/00
Kamasia .. ..	..	..	15,391/00	15,391/00
Kakunga (North Kavirondo) .. ..	..	..	5,117/00	5,117/00
Chebororwa (Marakwet) .. ..	..	..	6,177/00	6,117/00
TOTAL ..	310,870/87	350,433/71	276,234/50	937,539/08
GRAND TOTAL.. <i>Shs.</i>	492,270/67	506,232/07	448,018/73	1446521/47

REVENUE.

There is a decrease in revenue this year of Sh. 58,214. The total revenue of Sh. 448,018 cts. 75, was collected for inoculation fees; Sh. 171,784, cts. 23, from non-native areas, an increase of Sh. 15,985, cts. 87, over the previous year; and Sh. 276,224, cts. 50, for native areas, a decrease of Sh. 74,199 over the previous year.

The revenue credited to the Veterinary Administrative and Field Department is the result of inoculation and laboratory products prepared by the Veterinary Research Department.

The reason for the decrease of revenue is due to lesser demands for inoculations in native reserves as the result of the condition of the stock brought about by drought.

REPORT OF CONTAGIOUS ANIMAL DISEASES FOR THE
PAST THREE YEARS.

DISEASES.	No. of outbreaks in 1927.	No. of outbreaks in 1926.	No. of outbreaks in 1925.
Rinderpest	73	71	149
East Coast Fever	31	58	10
Pleuro-Pneumonia	20	11	13
Black Quarter	22	11	22
Trypanosomiasis	11	6	8
Foot and Mouth Disease	22	9	5
Sheep Pox	2	1	2
Horse Sickness	8	13	7
Ulcerative Lymphangitis	42	38	104
Epizootic Lymphangitis	7	17	24
Swine Fever	2	3	3
Contagious Bovine Abortion	1	2	5
Anthrax	27	7	38

SETTLED AREAS.

Nairobi Veterinary District includes the Limuru, Kyambu, Ruiru, Thika and Makuyu districts.

The following outbreaks of contagious disease were : East Coast Fever, 4 ; Rinderpest, 7 ; Ulcerative Lymphangitis, 8 ; Anthrax, 7 ; and Swine Fever, 1.

East Coast Fever.—Four outbreaks were confirmed in the Limuru area ; although the source of infection could not be actually determined, it is very probable that the disease was due to extension from infected areas by illicit movement of native-owned stock.

Anthrax.—Seven outbreaks occurred in or near the Nairobi township and 1,071 cattle were inoculated with the double vaccine with successful results.

Rinderpest.—Seven outbreaks occurred in the Thika district in August, September and November ; three among European-owned stock, one in both European and native squatter stock, and three among squatter stock. The dipped cattle in two of the outbreaks were dealt with by the serum alone method, and are to be double-inoculated when suitable virus-makers are available for use. In other outbreaks 537 cattle were double-inoculated, and in order to collect all native squatter stock for inoculation a central crush was established on neighbouring Crown land. This work is commented on elsewhere in this report.

The District Veterinary Officer attended and treated the following animals at the Veterinary Dispensary, Nairobi : Equines, 152 ; bovines, 40 ; canines, 618 ; felines, 37 ; total, 847 animals.

Cases of sickness and accidents among Government and Municipal owned animals were attended to, and twenty-nine animals were certified unfit for the E.A.S.P.C.A.

Nairobi Veterinary Quarantine Station.—During the year, 35 bovines, 8 equines, 18 canines and 1 feline were admitted to the Quarantine, as compared with 39 bovines, 5 equines, 34 canines and 2 felines in 1926. The following observations are made on the protective inoculations against redwater and anaplasmosis. Each bovine receives two inoculations of redwater and anaplasmosis vaccine. The first vaccine is the weaker South African strain transmitting *anaplasma centrale*, and the second vaccine the stronger local strain giving a marked resistance to *anaplasma marginale*.

It is to be noted now that tick-infested stock cannot be admitted at the station, which is primarily used for immunisation of animals against tick-borne diseases. In some instances the second inoculation was followed by a severe redwater reaction, but this was always controlled by the use of trypanblau. The minimum period during which animals are detained at the station for immunisation against redwater and anaplasmosis is four months.

Nanyuki Veterinary District includes the North Nyeri, Laikipia and Nyeri Districts.

The following outbreaks of diseases were reported during the year: Rinderpest; 28; East Coast Fever, 21; Black-Quarter, 11; Contagious Bovine Pleuro-Pneumonia, 3; Anthrax, 4; Foot and Mouth Disease, 5; Sheep Pox, 1; Horse Sickness, 6; Ulcerative Lymphangitis, 4; Epizootic Lymphangitis, 2; Canine Piroplasmiasis, 12. In the previous three years no rinderpest was reported from this district, and the spread of the disease in the year under review is attributed to infected game. Although outbreaks of East Coast Fever are fewer than the previous year, the incidence of this tick-borne disease must be considered a menace to the stock industry in these districts. But with the introduction of legislature for dipping and fencing it is reasonable to suppose the disease should be eradicated in a short period. The outbreaks of pleuro-pneumonia were isolated, affecting trek oxen.

During the year the following inoculations were undertaken in the district:—

	Rinderpest.	Pleuro-pneumonia.	Anthrax.	Black Quarter.	Ulcerative Lymphangitis.
Nanyuki ..	24,513	3,182	1,200	4,230	4
Laikipia ..	7,809	480	400	..	..

Gilgil Veterinary District includes Kijabe, Naivasha, Gilgil, Thomson's Falls, Elmenteita, and Nakuru districts. The following outbreaks of disease were reported during the year: Rinderpest, 18; Bovine Pleuro-pneumonia, 7; East Coast Fever, 16; Trypanosomiasis, 3; Black Quarter, 7; Anthrax, 11; Foot and Mouth Disease, 12; Horse Sickness, 2; Ulcerative Lymphangitis, 3; Epizootic Lymphangitis, 2; Contagious Bovine Abortion, Sheep Pox and Swine Fever, one each. Redwater and anaplasmosis are prevalent in the district.

The Gilgil area is a difficult one to control, owing to the varying interests concerned—dairying and agriculture—and the incidence of disease arises chiefly from the presence of native squatter cattle and cattle owned in townships by Indians and Somalis.

Rinderpest in this district was reported at the time when game was dying of the disease. The Rinderpest Service was available to deal with the outbreaks and to undertake a general district inoculation. The district staff handled one outbreak affecting 200 head.

Tick-borne diseases are increasing in this district, and it is hoped that the introduction of fencing and dipping acts will be a means of destroying tick life and thereby reducing the present menace.

Bovine Pleuro-pneumonia.—Severe outbreaks of this disease occurred in Solai, Subukia, and Gilgil, and the outbreaks were attributed to diseased cattle bought at a public sale. The number of recorded deaths was 66 in 1,517 cattle implicated in the outbreaks. The severity of the epidemic was enhanced by the fact that in-contact animals were not under the protective influence of pleuro-pneumonia vaccine.

Uasin Gishu and Trans Nzoia Veterinary Districts.—As regards the herds in these settled areas, the grade stock have suffered considerably from tick-borne diseases. In the absence of fencing and the presence of enormous herds of squatter cattle, disease control is a difficult problem.

The following outbreaks of disease were reported during the year: Rinderpest, 20; Contagious Bovine Pleuro-pneumonia, 10; Trypanosomiasis, 3; Anthrax, 5; Black Quarter, 2; Tuberculosis and Bovine Lymphangitis, one each; Ulcerative Lymphangitis, 25; Epizootic Lymphangitis, 3; and Contagious Pleuro-pneumonia affecting sheep and goats.

The outbreaks of rinderpest mostly affected native squatter stock, and as the Rinderpest Service was not available at the time the outbreaks were dealt with by the serum alone method. The Rinderpest Service operated in the Trans Nzoia and Southern Uasin Gishu Districts.

Contagious bovine pleuro-pneumonia outbreaks affected approximately 4,500 cattle, with a mortality of 130 head. All the stock were vaccinated.

A number of lymphangitis cases were destroyed. A vaccine is issued free to owners on application.

Lumbwa Veterinary District includes Kisumu-Londiani District, Molo, Kericho and Sotik Districts.

During the year only one outbreak of rinderpest has been reported from this district and 540 cattle were double-inoculated. Three outbreaks of bovine pleuro-pneumonia were confirmed, and 2,491 cattle were vaccinated against the disease.

In addition the following outbreaks were recorded: East Coast Fever, 3; Black Quarter, 2; Ulcerative Lymphangitis, 2; Trypanosomiasis, 5, and Foot and Mouth Disease, 5.

RINDERPEST.

With quarantine measures effectively stopping movement of all stock, together with the collection of infected cattle into cordons and the destruction or sterilisation of infected viscera or carcasses, it is possible to eradicate rinderpest.

This system is useful in countries, like Kenya, where native peoples in the past were doubtful, or suspicious, of all things pertaining to their stock and resent, at first, any idea of protective or preventative inoculations.

Large infected areas have been cleaned up by this method of control, but the time required is long and constant requests are made for the relief of the restriction on movement of stock, to permit sales and provide cash for the payment of taxes, etc. A large staff is required to control these restrictions, as any success depends upon holding up the movement of stock and infective materials. On every occasion, when this system has been practised in this Colony, the disease was eradicated, but as soon as quarantine measures were slackened, rinderpest reappeared and spread rapidly by the necessary movement of stock which had to provide help and income by sale or barter.

The word "quarantine" is a dreadful word to Administrative officers, and a word well known to the local native peoples, as all native reserves are in quarantine for rinderpest, and must remain so until a system of control is established having a permanent effect on the spread of this disease.

Quarantine measures in themselves are therefore unsatisfactory, but they bring the first contact of active methods to the crude native peoples' minds, and give them the first degree of confidence.

In a country like Kenya, where rinderpest is enzootic in most parts, and travelling game are susceptible to the disease, any method adopted which does not confer a permanent immunity to the disease by the simultaneous inoculation of virulent blood and anti-rinderpest serum is generally considered worthless.

Most countries have adopted the simultaneous method of control of rinderpest, having first of all tried and exhausted other methods.

There are countries where the use of blood cannot be utilised on account of the religious principles of the peoples, and in others, owing to the prevalence of other diseases transmitted by blood inoculations.

The simultaneous method of inoculation of virulent blood and anti-rinderpest serum has been accepted in this Colony as being the only means of control to combat the outbreak and spread of rinderpest with any permanent success.

This method of control is accepted by the European and native owners.

Double inoculations were commenced in this Colony by Montgomery in 1912. Field double inoculations have had varying successes and failures, but thanks to improvements brought about by research officers, principally Walker, a system of double inoculation is practised now which is almost reaching the perfect stage.

It may be of interest to refer back a few years and glean from records and show how the control of rinderpest in this Colony has gradually improved and increased through the years:—

1920.—Rinderpest was widespread throughout the native reserves of the Colony and there were eighty outbreaks on European-owned farms. The result of double inoculations carried out were, on the whole, satisfactory, but in individual cases the losses were abnormally high.

A probable explanation of some of these cases is that the blood used in some of the double inoculations had lost its virulency. The number of cattle double inoculated against rinderpest during the year was 38,323, with a mortality of 6.5 per cent.

1921.—There were fifty-four outbreaks on European-owned farms and rinderpest was widespread throughout the year. Owing to the difficulty of supplying virulent blood at short notice, the serum alone method was largely employed

on European-owned farms. The first large native-owned cattle double inoculations were carried out, and 19,619 cattle were inoculated with a mortality of 0.9 per cent; a large number of the cattle being immune. Inoculations on European-owned farms totalled 44,363 cattle, including a large percentage of pure-breds and high grades. Deaths following inoculations were 0.43 per cent.

Instructions were introduced by the Chief Veterinary Research Officer (Mr. J. Walker) :—

- (1) That rinderpest virus must be used within 24 hours to permit of the blood being used in a virulent form.
- (2) Infecting rinderpest virus makers by the in-contact method instead of injecting the controls with virus, to eliminate the risk of inoculating the virus makers or controls with redwater and anaplasmosis.
- (3) Administration of larger doses of anti-rinderpest serum, as it was proved that the inoculation of excessive doses of anti-rinderpest serum did not interfere with the rinderpest reactions, provided virulent blood was used for the inoculation.

51,819 cattle were double inoculated against rinderpest during the year, including 7,726 cattle on European-owned farms, 22,540 native-owned cattle and 21,553 trade stock.

1922.—All native reserves were classed as enzootic rinderpest areas. Fourteen outbreaks of rinderpest occurred on European-owned farms, traceable to extension of disease from native reserves. Natives in certain reserves expressed their willingness to have their stock double inoculated against rinderpest.

18,894 cattle were actively immunised in a native reserve, with a mortality of 3 per cent. from all causes. Double inoculations on some European-owned farms recorded a mortality amounting to 10—15 per cent., due to redwater and anaplasmosis, following the rinderpest reactions. Experiments by Research Officers were undertaken to determine whether the blood of sheep could convey rinderpest alone to bovines and whether it was suitable for use in double inoculations of cattle susceptible to redwater and anaplasmosis. The results were irregular, but the experiments are being continued.

A total of 32,114 cattle were double inoculated during the year, including 6,283 trade stock.

1923.—The Government policy of payment for inoculations caused a set-back, as the natives had not sufficient money and objected to pay in kind. Rinderpest was prevalent throughout the native reserves and thirty-eight outbreaks occurred on European-owned farms. Research work was curtailed owing to a shortage of officers; experiments with sheep and goat's blood for double inoculation purposes already reported on were curtailed owing to the prevalence of other contagious diseases demanding priority.

15,523 cattle were double inoculated on European-owned farms; the total for the year numbered 28,524 head.

1924.—Rinderpest was prevalent throughout the year in all native reserves and two hundred and eleven outbreaks were dealt with in alienated areas. In one native reserve 1,328 outbreaks were reported, involving 26,305 head of cattle of which only 6,707 were infected, chiefly young stock, and the mortality was 4,405 head. A commencement was made to establish combined inoculation and educational centres within the native reserves where the native peoples could be taught immunisation work. Further research on the utilisation of sheep for the production of rinderpest virus for rinderpest immunisation was carried out, but in view of the irregular reactions the substitution is not recommended. During the year 59,149 cattle were double inoculated, with a mortality of approximately 2 per cent.

1925.—This year makes a noticeable step forward as the active immunisation by the simultaneous method of control is generally accepted as the best suited to Kenya conditions.

A special Rinderpest Service commenced to double inoculate cattle on the European-owned farms and to train Africans in the system of controls. Immunisation centres in native reserves proved successful and demands for double inoculations for rinderpest from native stockowners increased as the method of control gained their confidence. Rinderpest was reported to be very prevalent in game. One hundred and nineteen outbreaks were reported on European-owned farms and rinderpest was prevalent in all native reserves. Immunity testing by a second inoculation of virulent blood was introduced, and virulent blood not older than six hours must be used for double inoculations. During the year 185,888 cattle were double inoculated against rinderpest with a mortality of 2.2 per cent. The percentage of immune native-owned stock is difficult to estimate, but assuming that 25 per cent. of treated animals were immune, the mortality rate would then

be 2.6 per cent. of the susceptible cattle. Later in the year instructions were given that virulent blood not more than four hours old must be used for double inoculations.

1926.—Progress was maintained as the large increase in the rate of immunisation against rinderpest in 1925 was still further increased in 1926 and the system of control by double inoculation stands endorsed. During the year 194,306 cattle were actively immunised against rinderpest, and in addition 19,391 head were tested for immunity by the injection of rinderpest virus alone. The concentration of staff on special rinderpest work affected considerable restriction in mortality which numbered only 4,187 head. A large proportion of the mortality was due to stock arriving at the native inoculating centre suffering from the disease. Mortality following double inoculations in stock dipped from birth was due to redwater and anaplasmosis.

The incidence of rinderpest was not so marked as in former years, and the number of outbreaks on European-owned farms was 39.

1927.—The following rinderpest inoculations were carried out during the year :—

AREA.	Double Inoculations.	Virulent Blood Tests.	Serum alone Inoculations.
SETTLED AREAS:			
<i>(a) By District Staffs :</i>			
Nanyuki	24,513	..	..
Gilgil	200	..	870
Nairobi	537	..	214
Lumbwa	540	..	..
	25,790	..	1,084
<i>(b) By Rinderpest Service :</i>			
Burnt Forest and Molo ..	2,734	20	..
Naivasha	1,884	..	..
Laikipia	9,178	399	..
Elmenteita, Gilgil and Thomson's Falls ..	9,318	79	..
Trans Nzoia	3,125	2	..
Lumbwa	1,678	..	..
	27,917	500	

AREA.	Double Inoculations	Virulent Blood Tests	Serum alone Inoculations
IN NATIVE RESERVES AND AT VETERINARY STATIONS.			
Kamasia	6,734	679	..
Kaptumo (Nandi)	1,196	69	..
Kingwal (Nandi)	4,211	2,032	44
Bungoma and Kitai (North Kavirondo)	45,517	389	10,375
Machakos (Ukamba)	3,330	..	9
Kilungu (Ukamba)	14,436	..	..
Mbooni (Ukamba)	4,123	..	..
Waterfalls (Ukamba)	1,856	7	227
Sultan Hamud (Ukamba)	7,733	..	..
Kibigori (Central Kavirondo)	3,722	..	..
Soudu (Lumbwa)	1,546	..	..
Kakungu (North Kavirondo)	3,070	..	..
Chebororwa (Marakwet)	3,701	..	..
Thika (Kikuyu)	1,597	..	..
Kyambu (Kikuyu)	81	..	..
	102,853	3,176	10,655
TOTALS.			
In Settled Areas by District Staffs	25,790	..	1,084
In Settled Areas by Rinderpest Service	27,917	500	..
In Native Reserves and at Veterinary Stations	102,853	3,176	10,655
GRAND TOTAL ..	156,560	3,676	11,739

TOTAL MORTALITY .. 3,734 approximately.

For comparison the total Figures for 1926 are appended.

RINDERPEST DOUBLE INOCULATIONS, 1926.

	Double Inoculations	Virulent Blood Tests	Serum alone Inoculations	Mortality
In Settled Areas ..	12,607	..	2,077	456
Rinderpest Service in Settled Areas ..	60,301	1,949	..	382
Veterinary Quarantine Stations	88,042	17,442	6,033	2,911
Rinderpest Service in Native Areas ..	33,356	..	..	438
TOTAL ..	194,306	19,391	8,110	4,187

The demand for rinderpest control by double inoculations has been far in excess of the scope of the available staff.

RINDERPEST SERVICE.

The total number of inoculations have decreased as compared with the previous year. This is due to the Rinderpest Service in the settled areas having to deal only with yearling stock in the districts in which inoculations had been done previously. There is a difficulty of meeting the demands of different district associations when requests are received from several for inoculations at the same time of the year. It is hoped that during the present year the professional staff of the Rinderpest Service may be increased with the view of duplicating at least its efficiency. The biggest factors in mortality were redwater and anaplasmosis following inoculations. The mortality over 27,917 head was 456 or 1.6 per cent., including 133 from redwater and 52 from anaplasmosis.

One alteration in the technique of the inoculation during the year can be recorded—this is the infection of the virus makers by a subcutaneous inoculation of nasal discharge from an infected animal, and thereby avoiding the unreliability and delay caused by infecting virus makers by contact. Field experiments have been attempted with inoculation of exalted goat virus and a special rinderpest vaccine with varying results.

In order to obtain information in regard to the immunity to Rinderpest existing in stock in a native reserve, 552 cattle were controlled by temperatures with the following results :—

	Cattle. Reacted.	
(a) Under 1 year and 6 months ...	331	311
(b) Over 1 year and 9 months and under 2 years and 3 months ...	120	100
(c) Over 2 years and 3 months and under 2 years and 9 months ...	47	31
(d) Over 2 years and 9 months and under 3 years and 3 months ...	21	10
(e) Over 3 years and 3 months ...	33	2
	<hr/> 552	<hr/> 454

The number of immune cattle was 18 per cent. and the proportion of susceptible cattle 82 per cent.

This remarkable situation in the control of rinderpest in this Colony is the result of competent methods brought about by diligent research and thorough application of them.

The numbers of cattle dealt with are a satisfactory indication of the permanency of the work and it is interesting to note the attitude of the native stockowners who have taken advantage of rinderpest immunisation in face of the mortality recorded.

The system used for double inoculation against rinderpest here is now controlled in such a way that high mortality is an exceptional result. In this Colony, where tick-borne disease is very prevalent, there must remain a difficulty in obtaining blood free from piroplasms.

Success in connection with double inoculations depends upon an active uncontaminated virulent blood and a potent anti-rinderpest serum.

In Egypt and India, the research laboratories control the issue of virus ready for use by the field staff, but neither of these countries has the worry of eliminating pathogenic piroplasms from the blood. The virulent blood is sent out either in preservative on ice, or in a very fresh state, still containing gases, under seal. Both methods have proved satisfactory, and the virulent blood by these means can be sent long distances in tropical climates and remain virulent up to a week so long as ice is available and the seals remain intact. The blood is guaranteed and tested virulent, and the field staff have no qualms as to the result of the inoculation because every susceptible animal inoculated with this virus must contract rinderpest during the double inoculation. In this Colony the difficulties of obtaining a suitable virus maker are very many indeed, and yet the field officer is expected to find, test and produce the material for his inoculations. So long as bovine blood must be used for double inoculations, and as long as certain forms of piroplasms exist in cattle, communicative by the injection of blood, will there be a grave risk of producing high mortality in cattle which have been dipped from birth or reared on pastures free from tick life.

Every precaution is taken to produce a clean virulent blood by placing controls to be used as virus makers which have been examined for piroplasms without result. The blood drawn at the height of the reactions and used fresh within four hours produces rinderpest when injected into susceptible cattle, which will in some cases break down to redwater. It is impossible to deal with every aspect of this question of providing the correct kind of rinderpest virus, but it is obvious that the present system in vogue in this Colony is the bad feature in a good system of rinderpest control.

The research laboratories should have the facilities to produce the virulent virus, and whether a bovine, sheep or goat blood, or any other infective material is used, this Colony should follow in the footsteps of Egypt and India and ask the research laboratories to be responsible for the control and issue of a suitable rinderpest virus. This issue cannot be avoided; as I have pointed out, the enormous demand for rinderpest control by double inoculation is increasing each year and must further increase as the method improves year by year. It is

clear, therefore, that field officers will not be able to find and test suitable virus makers from sources without elements of risk and uncertainty.

Anti-rinderpest serum of a potent kind is the other essential laboratory product, as the proper use, by a correct dose, means the control of the reaction to the disease in the immunising process. This Colony differs from India and Egypt in the amount of anti-rinderpest serum doses; whereas in the other countries massive doses of serum are used to block out reactions, in this country smaller doses are given to hold, but allow, noticeable reactions.

Doses of anti-rinderpest serum in Egypt are controlled by the age and not by the weight of the animal.

With a guaranteed virulent blood plus a massive dose of anti-rinderpest serum, the mortality is usually nil. The reactions are blocked out, and no temperatures are registered, and an immunity is conferred without any doubt.

Potency of anti-rinderpest serum must differ, although there is no reason to believe that the serum used in this country varies to any degree.

We have knowledge of anti-rinderpest serum from Tanganyika requiring a bigger dose than prescribed as the ordinary dose, although a protective dose for Tanganyika cattle did not protect Kenya cattle.

India recognises four kinds of serum according to the day on which the blood is drawn. The potency of the serum is estimated on a notation, based on the capacity of the serum to control completely, or otherwise, the intensity of the reaction. Class "A" serum of high potency (over 90 per cent.) is reserved entirely for the simultaneous inoculation of pure-bred and grade stock; at 90 c.c. per 600 lbs. live weight the serum must block out any reaction. A class "B" serum at 75—80 per cent. potency is used for the double inoculation of native stock at prescribed doses in accordance with the susceptibility of the cattle. The reactions are expected to be very mild at the higher doses, protect at the lower doses, and in any case there should be no mortality. In this Colony cattle are in greater variety with more varying degree of susceptibility than in India, and if a method of annotating the potency of anti-rinderpest serum could be undertaken by the research officers, the knowledge of the strength of the potency of the serum must be of considerable assistance, must establish more confidence in the staff double inoculating highly susceptible cattle, and may reduce the small mortality due to heavy reactions in high grade stock. Laboratory products must be of a guaranteed quality to practise the immunisation method which will bring about a permanent control of rinderpest.

There is reason for optimism in Rinderpest control as agreed upon in Kenya Colony, notwithstanding the difficulties of double inoculation which research has, and will, overcome.

EAST COAST FEVER.

There is no doubt that if East Coast Fever was eradicated the ranching value of the land must increase considerably. The position in this Colony is that East Coast Fever is spreading rapidly and taking an increased toll of cattle each year.

With the history of South Africa, particularly Natal and Rhodesia, before us, where large sums of money are spent annually, the stage has been reached when prevention and eradication measures must be concentrated upon. East Coast Fever is the most dangerous disease in the Colony and the losses from this disease are enormous.

The proceedings of the last Stockowners' Conference made the position clear that the stockowners in this country were alarmed at the spread of East Coast Fever and expressed doubts whether the present methods of dealing with the disease were effective. Resolutions were passed pressing Government to perfect means for eradicating this disease and give an immunisation service.

The ultimate success of the dairying industry of the Colony is largely dependent upon closer settlement and the encouragement of intensive dairy farming. The delegates wished to force the opinion of unfairness to encourage such settlement, owing to the decimation of herds by East Coast Fever in many parts of the country.

The results to date show that inoculation can be carried out with the prospect of conferring a variable immunity on approximately 80 per cent. of susceptible cattle.

Inoculation is of assistance to owners in reducing losses, until such time as the disease can be effectively controlled by short-interval dipping, combined with thorough hand-dressing and fencing. The experience generally is, that on farms where East Coast Fever has existed, eradication cannot be hoped for until dipping has been employed for some time; inoculation would be of assistance in reducing the losses until eradication of ticks has been effected by dipping, and, more particularly on large understocked estates.

For small holdings, if infected, immunisation would be of assistance until infection could be eradicated by dipping and hand-dressing and fencing.

Closer settlement would mean closer supervision and quicker eradication.

In any case immunisation cannot, in my opinion, be employed to eradicate the disease.

There are limitations to immunity in East Coast Fever in nature, and in exceptional cases one case probably in ten thousand may break down. The limitations of resistance generally to artificial infection are greater than to natural infection.

In view of this expression of opinion, the only means of eradicating East Coast Fever is the destruction of the transmitting agent, *viz.*, various species of ticks, by dipping combined with thorough hand-dressing, under supervision if necessary, and fencing.

It is not anticipated that even with fencing and dipping on heavily infected farms the tick life will be eradicated for some time. The size and the understocking of many farms is an obstacle to the destruction of ticks, because the ticks are not collected and brought to the dip. Maintenance of tick life is perpetuated by small game and vermin. In such cases of prolonged infection with sustained mortality it is advocated that immunisation measures be adopted, but provision must be made for fencing and dipping to prevent undue spread of infection.

The control of infection of East Coast Fever generally in the Colony would be impossible, particularly in native reserves, until the native stockowner understands the benefits of a dipping and fencing scheme for eradication purposes, and therefore they will not be included in a scheme. It is, however, hoped that when eradication measures are demonstrated with practical results in the alienated areas the confidence of the native stockowners may be established in time.

Infection in the alienated areas may be described in two groups: (1) Heavily infected areas with a general spread of disease on most farms, and (2) infected farms within a clean area. In these alienated areas with cattle cleansing measures, and the assistance of immunisation in extreme cases of infection, East Coast Fever eradication can be accomplished in varying periods.

Any control measures should be introduced gradually in order to concentrate on particular districts which, as in the instances of Naivasha, Laikipia and North Nyeri could be readily accomplished, and therefore the question of a district option is indicated giving preference to the above-mentioned stock districts.

Important developments have taken place during the year in connection with proposed measures to control and finally eradicate East Coast Fever from the clean areas of Laikipia, North Nyeri and Naivasha.

Government has decided to pass a law whereby compulsory dipping and fencing will be enforced on East Coast Fever infected farms in those areas.

To carry out the regulations a special staff will be appointed, but it must be realised, however, that progress will be impeded unless full co-operation exists between the veterinary authorities and stockowners themselves. It is realised that quarantine measures or other measures of compulsion are irksome to farmers, but if East Coast Fever is to be eventually eradicated from any given area restriction measures must be borne cheerfully by individuals for the benefit of the community as a whole.

Cases of sickness or deaths must be reported at once, and everyone should be able to take suitable smears, to be submitted for examination as soon as a beast shows signs of illness, so that if East Coast Fever is diagnosed, prompt control measures can be taken; undoubtedly the best way of controlling East Coast Fever is by means of the destruction of infected ticks through dipping and hand-dressing. Those measures have been applied in other countries with marked success.

Owing to some unknown factor, dipping on certain farms in this country does not meet with the usual success, and research work is indicated in that connection. Immunisation by spleen pulp inoculations entails increased infection of ticks, and can only be entertained in conjunction with dipping and fencing, or farms in infected areas where no other mode of control exists, and where losses from East Coast Fever are expected to be heavy.

Forty-four outbreaks were reported and confirmed during the year. The following statistics are given to show the number of fresh outbreaks in clean areas during the past three years :—

Districts.	1925.	1926.	1927.
Laikipia and North Nyeri ...	9	40	21
Molo	2	8	3
Limuru	—	2	4
Gilgil-Naivasha	6	7	16
Totals ...	17	57	44

East Coast Fever—Quarantines Revoked.

	1925.	1926.	1927.
Laikipia and North Nyeri ...	1	1	15
Molo	—	4	7
Limuru	1	—	1
Gilgil-Naivasha	10	2	3
Totals ...	12	7	26

RETURNS FROM GOVERNMENT DIPPING STATIONS FOR
1925, 1926 AND 1927.

STATION.	EQUINES.			CATTLE.			SHEEP AND GOATS.		
	1925	1926	1927	1925	1926	1927	1925	1926	1927
Nakuru ..	741	251	15	9,823	7,620	7,941	10,868	10,099	19,538
Naivasha ..	..	..	..	..	..	..	..	..	10,263
Gilgil ..	..	..	147	..	..	9,590	..	..	..
I-solo ..	1,614	260	..	..	..	..	73,282	37,314	21,700
Nyeri ..	24	..	..	1,073	..	280	150	..	..
Nanyuki ..	124	88	..	21,384	24,551	13,977	..	..	..
Fort Hall..	..	..	..	..	..	..	..	336	..
Eldoret ..	..	..	..	..	..	..	..	603	..
	2,503	599	162	32,280	31,171	32,727	94,563	47,413	41,238

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.

This disease has shown a considerable increase during the year, and 26 outbreaks have been reported and confirmed on farms in the settled areas, as compared with 11 in 1926 and 13 in both 1925 and 1924. Four outbreaks were reported from Nanyuki, Nyeri and Laikipia; 11, Gilgil and Nakuru; 8, Uasin Gishu and Trans Nzoia; 2, Ravine, and 1, Kisumu and Londiani Districts.

The reason for the additional number of outbreaks is to be found in the increase of infection of native stock. Bovine Pleuro-pneumonia has increased considerably among the native stock in certain native reserves due to the movement of trade stock. The Veterinary Stations which were used as outlets for these reserves were closed as the technique of diagnosis and inoculations broke down for unknown reasons. The experience in this Colony is that cattle which are inoculated yearly with Pleuro-pneumonia vaccine as a rule do not contract natural infection, and on yearly re-inoculation they do not react again. The potency of pleuro-pneumonia vaccine cannot be fixed, and fresh strains have to be used from time to time. In consequence variations are necessary in the vaccination technique, and at the present time two vaccinations of a mild strain of vaccine are used with a fortnight's interval between them, and three weeks afterwards a third vaccination is given subcutaneously behind the shoulder with a strong strain of vaccine. In view of the serious outbreaks of bovine Pleuro-pneumonia in certain districts public auction sales for a while were cancelled until the incidence of the disease subsided and was under control. The recommendations of a special committee of Legislative Council of 1922 are adopted by this Department as the present policy. They are as follows:—

1. That slaughter and payment for compensation should be discontinued except in exceptional cases and for purposes of diagnosis.

2. That laboratory vaccine be issued free to stockowners for the purposes of inoculation themselves, or by an officer of the Veterinary Department, if available.

3. That the production of vaccine be expedited.

4. That the inoculations be compulsory at the discretion of the Chief Veterinary Officer.

Instructions are given for procedure in case of an outbreak.

12,170 full vaccinations with pleuro-pneumonia vaccine were carried out.

During the year under review 419,104 doses of pleuro-pneumonia vaccine were issued by the Veterinary Laboratory, Kabete. Of that number 99,966 doses were despatched to European stockowners and 319,138 doses to District Veterinary Officers.

The use of pleuro-pneumonia vaccine was considerably increased during the year and stockowners are availing themselves of the free issue of this vaccine to protect their herds. Approximately 20,000 doses of pleuro-pneumonia vaccine were issued to European stockowners during the year 1926.

BOVINE INFECTIOUS ABORTION.

Bovine infectious abortion is spreading considerably through the herds of this Colony and although the incidence of this disease may be considered widespread, the infection on individual farms is small in comparison. In consequence, a few words of practical advice based on observations in this Colony would not be misplaced.

Failing immunisation against infectious abortion, the best methods of combating the disease in this Colony are by agglutination test and isolation, where it can be accomplished in lightly infected herds. When a cow aborts in a healthy herd the owner usually ascribes the event to ordinary causes, which do exist in this country, such as plant poisoning or accidents. If the expulsion of the foetus is accompanied by an odourless brownish discharge, infectious abortion is probably responsible and steps should be taken to have the blood of the cow tested. Clean herds must avoid any contact with infected pastures, not necessarily with the cattle themselves. The discharge from the womb of an infected animal spreads millions of germs over the pastures, paddocks and bomas and it is known that infection most commonly takes place through

ingestion of infected material. Pregnant cows should be carefully observed, and the approach of the well-known symptoms of abortion should allow time for the animal to be isolated and the foetal membranes and discharge should be burnt or buried. The genital organs should then be flushed regularly with antiseptic solutions until all discharge has stopped, and the animal isolated for at least three months, copulation being avoided during that period. By these means infectious abortion infection can be controlled.

The bull may very rarely transmit the disease by coition and therefore it is wise to disinfect the sheath of the bull before service. Blood samples should be sent from all cows that have aborted whether infectious abortion is suspected or not. In the event of a positive return the agglutination test should be applied to the whole herd to allow prompt measures of segregation of infected and healthy beasts.

It is to be noted that under ranching conditions in this country the disease does not receive such serious attention as it does in countries where stock are kept confined in buildings or graze over limited areas, as, through exposure to our climatic conditions such as sunlight, etc., infective material rapidly loses its virulency and the infection does not spread so rapidly in a herd. The economic importance of the disease must, however, receive serious consideration as apart from the loss of the calf itself, the loss in milk and in many cases the future uselessness of aborting cows for breeding purposes, constitute real loss in a breeding herd.

STERILITY IN CATTLE.

The selection of animals for breeding purposes is intimately connected with the production of milk and calves. The livestock in this Colony is increasing, and soon greater production must be obtainable by improving the quality and efficiency of this stock. Breeding for milk production is becoming more intensive each year, but progress is impeded by sterility.

When dairy stock is simply grazed on the land, it must be realised that a sterile condition is caused in many animals by a deficiency in the diet, such as minerals. Fertility in such cases may be restored by feeding on a well-balanced ration. The nutritional aspects of sterility are indirectly receiving attention and the results of the Rowett Institute feeding experiments should add to the information on this little-known subject. Several farmers in this Colony blame the decrease of breeding efficiency to the bull, and not to the barren cow. Accordingly several bulls are tried without result, and they conclude that all the bulls used are unfruitful.

The bull can be dismissed as being the important cause of sterility, because the main factor is uterine infection. The bull is, however, sometimes at fault when he is not properly managed, through too few or too many services, etc. Inflammation of the uterus is caused by the entrance of micro-organisms following an abortion, or even a normal parturition when the risks of infection from the exterior are greatly increased through the open entrance of that organ. If cases of sterility in cows are to be reduced the uterus must be safeguarded against infection by germs largely derived from dirt and dung, found in small paddocks and bomas, and as far as possible calving should take place under natural conditions and in open pastures, or under suitable artificial hygienic conditions.

TRYPANOSOMIASIS.

The number of outbreaks during the year under consideration show a marked increase over previous years. In 1925, 8 outbreaks were reported, 6 in 1926 and 11 in 1927. All reported outbreaks occurred on European farms, where tsetse flies were not known to exist. Subsequent entomological surveys carried out in certain cases were also negative. It must be understood that for the disease to appear on a farm some source of infection must exist, at least for the initial introduction of the disease in a herd.

The following are the most common means of spreading trypanosomiasis :—

- (a) Ox transport moving in or in the vicinity of a fly belt for certain specific purposes such as logging, charcoal carrying, transport of safaris on shooting expeditions etc.
- (b) Illicit movement of stock from or through an infected area on to farms.
- (c) Movement of large game such as elephant and buffalo who are frequently accompanied by a few tsetse for long distances.
- (d) Abnormal migration of herds of game seeking for water during drought.
- (e) Mechanical transport such as motor cars and lorries, railway trains, etc., which can be the means of carrying tsetse flies through miles of country.

Besides the above-mentioned sources of infection, there may be others less known but which nevertheless deserve attention. In this connection it must be remembered that large numbers of tsetse are not necessary to start an outbreak of trypanosomiasis—one or two infected flies are sufficient. The disease can then be kept alive and propagated by other

biting flies such as *stomoxys*, *tabanidae*, *haematopota*, *hippobosea*, etc. *Stomoxys* is abundant everywhere in this country, especially in the vicinity of cattle bomas; the other varieties are more rare but frequently occur in certain districts. Fly life is usually more active during the hot season especially at the beginning of the rains.

TRANSMISSION.

Trypanosomes do not multiply in the body of the more common biting flies as they do in the tsetse; the only means of propagation of the disease by the former is on the same principle as an ordinary inoculation—i.e., the fly transmitted must get access and bite a clean animal directly it leaves an infected one, before the infected blood on its proboscis has time to dry, thereby causing the destruction of any trypanosome present in the blood. So that the activity of flies, other than tsetse as transmitters, is usually restricted to a few hundred yards only and provided the infected animals are kept well away from clean ones, in the absence of tsetse flies, the risk of infection is negligible.

TREATMENT AND PREVENTION.

Up to the present day many medicinal agents have been tried to cure trypanosomiasis in cattle, and although certain preparations give a temporary relief, none of them can be said to effect a permanent cure or be of practical value in the field.

The best means at our disposal for non-infected herds is preventing initial infection by keeping stock away from tsetse flies or *vice versa*. If, however, infection has already been introduced, eradication is the main object and infected animals must be slaughtered. The degree of infection in a herd can only be determined by repeated blood examination of individuals, as although a beast is infected with trypanosomes, the parasites can be absent from the peripheral circulation for days and sometimes weeks. Further measures of control must be adopted to destroy as many biting flies as possible; the burning of manure and dirt dumps, regular dipping and ranching stock in the open will help in that process.

Mortality in infected herds is usually high, especially during the rains or under stress of hard work, and strict quarantine measures have to be enforced to prevent the spread of infection to clean farms or areas. In this connection co-operation of all stockowners is earnestly requested, as if trypanosomiasis obtain a good hold in the country, agriculture and stock-breeding developments would be seriously interfered with.

ANTHRAX.

Twenty-seven outbreaks came under notice during the year as compared with seven in 1926 and thirty-eight in the previous year.

The distribution was as follows :—

Nairobi	...	...	...	...	7
Gilgil and Nakuru	...	...	...	...	11
Uasin Gishu-Trans Nzoia	...	...	...	...	5
Nanyuki-Nyeri-Laikipia	...	...	...	...	4

The increase in outbreaks reported during the current year is most probably due to shortage of grazing through lack of rains. In dry seasons such as the past, cattle have to graze the coarser portions of the grass down to the roots; this frequently causes abrasion of the mucous membrane of the alimentary tract, through which anthrax spores, which are prevalent in the ground, get entrance to the system. Anthrax in this country is very much less virulent than in Great Britain. It frequently occurs that infected beasts show localised lesions, which usually take the form of large oedematous swellings on different parts of the body; some animals so affected die after a protracted period, others again recover spontaneously. Cases also occur where the disease takes the well-known virulent form causing the sudden death of one or more beasts, without visible swellings.

Any case of sudden death, or of animals showing large swellings must be regarded with suspicion, and smears must be taken from the blood or serum contained in the swelling and sent to the laboratory for examination. The best time to obtain preparation for the diagnosis of anthrax is immediately after death, as in the majority of cases the bacilli only enter the circulation just prior to death.

In this country, many cases of swelling are put down to snake bite, when the cause is actually anthrax, and a good deal of loss could be avoided by the prompt diagnosis of the real factor.

Post mortem must never be carried out and blood or exudates must not be spilled from suspected cases, as once the bacilli are exposed to the air, they become encapsuled and infection may remain in the ground or in infected premises for years.

TREATMENT.

The only efficacious treatment is prevention by vaccination—suitable vaccine can be obtained from the laboratory.

During the year, 14,078 doses were issued by the Veterinary Laboratory, Kabete, of which 8,448 doses were used by European stockowners and 5,630 doses by the district staffs. 2,671 cases were inoculated by the district staffs.

BLACK QUARTER.

Twenty-two outbreaks of Blackquarter were reported during the year with the following distribution :—

Gilgil-Nakuru	...	...	...	...	7
Nanyuki-Nyeri-Laikipia	...	...	...	...	11
Uasin Gishu-Trans Nzoia	...	...	...	...	2
Lumbwa	...	...	...	...	2

The majority of those occurred on well-known infected farms or areas.

Stockowners must remember that this disease can be eliminated from their herds by regular vaccination. A single liquid vaccine is now being produced at the Laboratory, eliminating the trouble experienced when using the previous powder vaccine, which was difficult to handle and had to be administered in two stages.

During the year 31,400 doses of the liquid and powder vaccines were issued by the laboratory; 26,150 doses to stockowners direct, and 5,250 doses to district staffs. 4,220 inoculations were undertaken by the staff.

SWINE FEVER.

Two outbreaks of this disease were reported during the year :—

Nariobi	...	...	...	...	1
Gilgil-Nakuru	...	...	...	...	1

Spontaneous outbreaks of swine fever frequently occur on farms, and the source of infection is usually obscure. In this connection, it must be noted that wart-hogs contract the infection, and although not suffering themselves they do transmit the disease and may act as carriers for indefinite periods.

EQUINE DISEASES.

ULCERATIVE LYMPHANGITIS.

A small increase is noted in connection with this disease during the year, 42 cases having been confirmed as compared with 38 during 1926. 25 cases occurred in horses, 15 in mules and 2 in donkeys. This condition still predominates as the worst scourge affecting the equine population in the Colony. Different treatments including vaccination are adopted with a varying degree of success.

Specific preventive measures cannot be adopted as the actual source of infection is still unknown, but there is little doubt that dust and dirt are auxiliary to contamination of individuals through lesions in the skin.

Animals can be kept free from ulcerative lymphangitis in highly infected areas by good stable management, especially in connection with keeping the skin clean by thorough grooming, weekly spraying with a weak disinfectant also helps to keep off the infection. It is considered that the uncontrolled native syce, with his natural disinclination for hard work, is the chief responsible factor in the majority of cases of lymphangitis. To this must also be combined the owner, European or Somali, who is content to see his horse or mule run loose and is not prepared to spend any time or labour on the most elementary demands of hygiene.

The Laboratory still issues vaccine free of charge for the experimental treatment of this condition; its efficacy cannot be reported upon as owners using the vaccine do not trouble to report progress in the vast majority of cases.

EPIZOOTIC LYMPHANGITIS.

Seven cases of this disease have been confirmed during the year. The same remarks apply to this as to ulcerative lymphangitis.

HORSE SICKNESS.

Eight cases of this disease have been reported; six from the Nanyuki district and two from the Gilgil area. The decrease in the number of cases is believed to be due to the shortage of rain in most districts.

CANINE PIROPLASMOSIS (TICK FEVER).

One hundred and forty cases have been treated by the subcutaneous injection of trypanblau according to the directions supplied by the laboratory. Relapses to the first inoculation were less than 4 per cent.

Approximately ten deaths were reported and it was found that nearly all of these occurred in cases which were not brought for treatment in the early stages of the disease.

It was found that stovarsol in conjunction with trypanblau assisted recovery, but when used by itself did not prove to be a specific cure.

Trypanblau undoubtedly gives the best results in the treatment of tick fever in dogs.

VETERINARY SERVICES—NATIVE RESERVES.

The inoculation service given by the veterinary staffs in native reserves has been considerable during the year.

Nyanza Province—Central Kavirondo : A severe outbreak of contagious bovine pleuro-pneumonia was reported and the export of trade stock through the Kibigori Veterinary Station was stopped, as several mobs of trade stock released through the veterinary quarantine were found to be infected, and caused several outbreaks in the alienated areas. The natives of this district are taking advantage of the inoculation services. During the year 2,259 cattle were double inoculated against rinderpest and vaccinated against pleuro-pneumonia with a mortality of sixty head, at a cost paid by the natives of 3,925 shillings; 1,255 trade stock passed through the Kibigori Veterinary Station, before it was closed, with a mortality of 93 head and for the inoculations 3,666 shillings were collected.

At the request of the local native councils considerable additions will be made to the veterinary staff in Central Kavirondo District and a guarantee of fees for inoculations has been made to cover the expenditure of the additional services. Centres will be established in the district for inoculations against the major diseases and it is hoped each centre will demonstrate also, through the means of trained native personnel, the necessity of protecting young stock against disease by inoculation, and promptly reporting outbreaks of contagious disease.

North Kavirondo : The success of the previous year continued throughout 1927 and natives still bring in their stock willingly for inoculation against rinderpest and pleuro-pneumonia. Three centres were in operation at Kitai, Bungoma and Kakunga.

The Kakunga Veterinary Station near Kakamega was opened at the request of the local natives and in three months three thousand and seventy cattle were double inoculated against rinderpest with a mortality of 145 head.

Bungoma and Kitai Veterinary Stations situated in North and South Kitosh were open throughout the year and 57,086 cattle passed through, including 55,286 native stock and 1,800 trade stock with a mortality of about 5 per cent. 45,228 cattle were double inoculated against rinderpest; 10,375 with anti-rinderpest serum only; 389 were tested for their immunity to rinderpest and 1,005 vaccinated against pleuro-pneumonia—142,000 shillings were collected for fees, together with Sh. 5,416/50 cents from the Kakunga quarantine and paid into the administrative office at Kakamega.

It is proposed to augment the staff by a Veterinary Officer stationed at Kakamega who will administer the veterinary work in this district.

Nandi District : Owing to the severe conditions of famine and drought, the veterinary service in this district was curtailed during the year.

A new veterinary station was established at Kaptumo and functioned from February to May ; 1,298 cattle were received, including 1,108 native stock and 192 trade stock ; 1,129 were double inoculated and 69 tested against rinderpest and 123 were vaccinated against pleuro-pneumonia. Total mortality from all causes was 56 and revenue collected was Sh. 2,654/50 cents.

Kingwal Veterinary Station was open throughout the year, but as few cattle were presented it was necessary to withdraw the Stock Inspector in charge for four months and the work was performed by periodical visits by the staff from Eldoret. The Stock Inspector returned to his duties in November. 6,287 cattle were received, including 5,284 native cattle and 1,003 trade and farm cattle. 4,211 cattle were double inoculated and 2,032 tested against rinderpest and 44 inoculated with serum only ; 3,301 cattle were vaccinated against pleuro-pneumonia. The mortality from all sources was 116 head. 16,164 shillings were collected in fees.

Lumbwa : A Veterinary Station was opened at Soudu during the year and 1,484 cattle were admitted, including 1,069 native cattle and 415 trade cattle. All the cattle were inoculated against pleuro-pneumonia and rinderpest with a mortality of 55 head. Owing to the difficulty of obtaining virus makers this station was temporarily closed towards the end of the year.

The following figures show the activities of veterinary services in the Nyanza Province for inoculation purposes and the 1926 figures are given as a comparison.

DISTRICT.	Total. Rinderpest Inoculations.		Total. Pleuro- pneumonia.		Revenue.	
	1926	1927	1926	1927	1926	1927
					<i>Shs.</i>	<i>Shs.</i>
North Kavi- rondo ..	41,540	59,151	3,350	1,005	94,266	147,916/50
Central Kavi- rondo ..	5,698	2,423	5,592	2,423	27,190/50	7,591
Nandi ..	29,236	7,552	8,633	3,264	60,594	18,829
Lumbwa ..	..	1,484	..	1,484	..	2,932
	76,474	70,610	17,575	8,276	182,050/50	177,266/50

The rinderpest inoculations are as follows : 57,701 double inoculations : 10,419 anti-rinderpest serum alone and 2,490 tests for immunity.

The cattle inoculated consisted of 67,138 native cattle and 3,472 trade cattle. The reasons for the decrease in the inoculations against rinderpest and pleuro-pneumonia have been explained.

Certain outstandings from the 1926 revenue are included in this year's total and there are no outstandings this year.

Kerio Province : Owing to veterinary restrictions this province has in the past had no facilities of selling stock, although the demand for them did exist, and the natives were willing to sell to obtain the necessary funds for the construction of dams, etc. A veterinary service was therefore made available in the Kamasia Reserve.

Owing to the cold climate and the prevalence of East Coast Fever the Timboroa Veterinary Station was closed down.

A veterinary unit is under instruction to proceed to the West Suk and Turkhana districts, and it is hoped that when the incidence of disease in the districts is known an outlet for bullocks for slaughter purposes may be possible through a veterinary station.

Kamasia : During the year the veterinary work in the Kamasia Reserve has been hampered by the scarcity of rain and lack of grazing. Several inoculation centres had to close down.

In the Kamasia Native Reserve 5,538 cattle were inoculated against rinderpest and pleuro-pneumonia. The mortality recorded was 34 animals chiefly due to redwater. This complication was successfully dealt with by the inoculation of trypanblau.

In the Uasin Gishu Masai Reserve an inoculation centre was opened and is continuing to receive cattle. To the end of the year 1,196 cattle were inoculated against rinderpest; 679 were tested for their immunity; 2,520 vaccinated against pleuro-pneumonia. Revenue collected for inoculation fees and paid into the Treasury was 15,391 shillings.

Preparations are in hand to give veterinary assistance in the N'jemp's Native Reserve; but great difficulties exist as the area is infected with trypanosomiasis.

Marakwet and Elgeyo : Another Veterinary Station was opened at Chebororwa, to inoculate stock from the Marakwet and Elgeyo Native Reserves, and during the year 3,076 native stock and 625 farm stock from neighbouring farms were

double inoculated against rinderpest and 676 cattle were tested for immunity against rinderpest and 5,337 native cattle were vaccinated against pleuro-pneumonia. A mortality of 122 head from all causes is reported. 7,344 shillings and 50 cents was collected and paid into revenue. Inoculation and revenue figures for 1926 and 1927 for the province are as follows :—

Year	Total Rinderpest Inoculations.	Pleuro-pneumonia	Revenue. Shs.
1926	17,763	17,747	20,531/50
1927	17,790	13,495	22,735/50

The Rinderpest inoculations include 10,435 double inoculations and 1,355 tests and the cattle included 10,486 native stock and 1,304 trade stock. A large number of yearling cattle were presented for inoculation.

Ukamba Province : Every endeavour has been made to assist the natives of the Machakos Native Reserve by immunisation of their stock, but in spite of every effort inoculations have decreased considerably. The reasons for the decrease are, the natives have not the money to pay the inoculation fees, and contrary to other native reserves heavy rains seriously interfered with the general arrangements. Three fresh inoculation centres were in operation within the reserve at Kilunga, M'booni and M'bitini with the Veterinary Stations at Machakos and Waterfalls Estate still active. A farm inoculation of native squatter stock was undertaken at Sultan Hamud. The following figures are a summary of inoculations :—

Rinderpest double inoculations : 26,765 native cattle were inoculated and only seven tested against their immunity. No trade stock were double inoculated and 227 inoculated with anti-rinderpest serum, making a grand total of 27,709 cattle. Only 630 cattle were vaccinated against pleuro-pneumonia.

At the Waterfalls Veterinary Station 680 cattle were tested against their immunity for East Coast Fever as against 992 in 1926. The mortality for the district inoculations due to all causes was 521 head, and it is recorded that anthrax was responsible for many deaths, 68,894 shillings were paid for inoculation fees.

During 1926 the Rinderpest Service undertook the inoculation against rinderpest of the native stock on the Yatta Plains and 33,256 head were dealt with. In 1926 in the Machakos Reserve, including the Yatta Plains, 51,227 rinderpest inoculations were performed, including 48,398 double inoculations, 2,636 tests for immunity and 189 serum alone inoculations, 1,278 pleuro-pneumonia vaccinations were

performed. The total number of cattle included 49,389 native owned and 1,838 trade stock. The revenue collected was Shs. 146,907/50 cents.

Kenya Province: An inoculation centre was established near Kyambu, but only eighty-one cattle were presented for inoculation and were dealt with without loss, at the usual scheduled charge.

As the large majority of the cattle from the Southern Kikuyu Reserve are congregated on the adjoining farms in the Kyambu, Ruiru and Thika districts, an inoculation centre was established in the latter district, on Government land, and 1,597 cattle were inoculated with a mortality of 6 head. Sh. 3,802/50 cents were collected in fees.

The Coastal Areas: Until the trypanosome infection of native cattle can be handled by some means of corrective treatment, no preventative measures can be taken to rid the coastal areas of tsetse flies, it will be difficult to organise a veterinary service which will produce desirable results.

The Galla stock on the Tana River are heavily infected with trypanosomiasis and the tsetse fly is spread by the trekking of the stock during the dry and wet seasons. It is estimated there are about 60,000 Galla cattle and 8,000 Somali cattle and numberless sheep and goats in Tanaland.

The staff stationed in the coastal area were transferred to the Kerio Province to meet the demands for an inoculation service against Rinderpest and Pleuro-pneumonia by the Kamasia and N'jemp natives.

A Veterinary Assistant was stationed at Mombasa throughout this year.

A survey of some of the existing diseases will indicate the necessity of concentrating veterinary efforts in native reserves to bring about eradication and prevent diseases assuming an enzootic form.

Contagious Bovine Pleuro-pneumonia exists in a chronic form—i.e., heavily infected areas—in the following native reserves: Central Kavirondo and Lumbwa. In a sub-acute form—i.e., with light infected areas—in the Nandi, West and East Suk, Turkhana, Masai native reserves and in most of the native reserves of the Northern Frontier Province. An

inoculation service has been offered free of charge during the year with the following results :—

Kibigori (Kavirondo)	2,913
Bungoma (Kavirondo)	1,873
Nandi	3,364
Machakos (Ukamba)	727
Elgeyo	5,337
Kamasia	7,653
Lumbwa	256
Samburu — Northern Frontier Province	32,038
Total	54,161

East Coast Fever is enzootic in the Kavirondo Reserve of the Nyanza Province, with the exception of the grazing areas of Mount Elgon, and a tremendous mortality occurs annually among the youngest stock. Heavy infection is found in the Lumbwa, Kamasia, Machakos, Kikuyu native reserves and lighter infection in the Nandi, Masai, Kitui, N'jemps, Elgeyo and coastal areas. Clean areas are found in the northern native reserves.

Anthrax and Black Quarter are known in all native reserves and several bad outbreaks of anthrax are reported from the Kikuyu and Machakos Native Reserves.

Trypanosomiasis : This disease is restricted to the Lake areas of Central, North and South Kavirondo Native Reserves ; the Kerio River watershed in West Suk and Turkhana Native Reserves ; the Northern Uaso Nyiro river watercourse in the Northern Frontier Province ; N'jemps Native Reserve ; certain areas of the Machakos and Kitui Native Reserves and all the coastal native areas.

The disease is not in a very active form and only a few deaths are reported which indicates the scarcity of tsetse fly infestation. Native herdmen know the limitation of the tsetse fly belts, which contract with the dry weather and expand during the rains, and herd their cattle in the fly-free zones. According to native information, this disease is on the increase each year. *Streptotrichosis* is prevalent among most native stock. *Plant poisoning* produces an annual toll and it is believed the disease called " Muthiuko " or " turning sickness " is caused by an unknown plant.

Pleuro-pneumonia in Goats is very prevalent and several outbreaks in native reserves have caused great losses.

GENERAL.

It is generally admitted that most of the native reserves are overstocked, and in seasons of grazing shortage large numbers of animals die from starvation, or trespass on adjoining farms frequently carrying disease with them. The Kikuyu native reserve is a case in point, where the cattle are leaving their own pastures, because the starvation point has been reached, and in consequence many parts are rapidly becoming areas covered with rank weeds and bush. The persistent overstocking of other reserves, particularly the Ukamba, is causing the conversion of fertile lands into desert.

Large herds of game assist in the starvation process of native stock, and the wretched native watches the grazing of his pastures by herds of game, which he cannot touch because the game are protected by law.

Under such conditions native stock of a desirable quality cannot thrive, and this serious position calls for a remedy. The first step is the gradual reduction and improvement of native herds by compulsory culling, eliminating the poorest animals first, and then the useless male stock. It has been ascertained that a certain native reserve carries 33 per cent. of male stock not used for breeding purpose. Most of the poorest cattle could be consumed by the natives, as they are useless for marketing purposes, and in the meantime arrangements should be made to dispose of the better class male stock on the local markets or by export.

Additional water facilities are necessary, to allow a wider range of grazing, and a considerable reduction in the number of game should be encouraged at certain periods with the object of conserving the grazing.

Sale of Native Livestock : During the year 15,974 cattle and 49,638 sheep and goats passed through Veterinary Stations from native reserves.

These figures do not represent the total trade in native stock as traders purchase many branded immune stock in native reserves and from squatters on farms : also many sheep and goats from native reserves that do not pass through Veterinary Stations.

Many cattle, sheep and goats are killed for food at markets within the native reserves. The total trade in native livestock could be estimated at an inside figure of 30,000 cattle and

100,000 sheep and goats; placing a value of £4 per head for cattle and Sh. 10 per head for sheep and goats, the annual value of this trade is worth 170,000.

The number of native bullocks required for transport and ploughing purposes is decreasing, due to the introduction of mechanical traction, but this decrease should be made good by a corresponding increase in the demand for slaughter bullocks.

NGONG VETERINARY TRAINING DEPOT.

In July of this year the Ngong boma was handed over to this department. Progress has been hampered by alterations in the demarcation of the grazing area, the salt lick and water holes.

Over five miles of fencing were erected into paddocks which have been badly damaged time after time by game breaking through. In addition considerable repairs to the cattle dip and native huts were undertaken by the resident staff on the grounds of urgency.

A scheme for the conversion of water for the supply of good water for staff, pupils and the cattle in the paddocks was agreed to and it is hoped the instalment will be shortly undertaken and save the necessity of carrying water supplies over a distance.

A dairy of nearly seventy native heifers has been collected at Ngong with four Boran bulls.

Fifty native pupils are in residence at the time of writing (January, 1928) and when full facilities are available the following system of practical training in technical veterinary work will be instituted at the Veterinary Training Depot:—

- (1) *Disciplinary.*
 - (a) Drill; squad and physical.
 - (b) Personal cleanliness, cleanliness of quarters, care of uniform and equipment and general behaviour.
- (2) *Principles of Animal Husbandry and Eugenics.*
 - (a) Care of animals; the bull, cow, calf, sheep, goats and poultry.
 - (b) Selection of animals by type.
 - (c) Elimination of males, and castration.
- (3) *Hygiene.*
 - (a) Hygiene of the animal.
 - (b) Hygiene of the building or boma.
 - (c) Hygiene of the milk supply.
 - (d) Care of the udder.
 - (e) Methods of separation of butter fat.
 - (f) Butter and ghee making.

- (4) Feeding and watering of livestock.
Recognition of good and bad grasses.
- (5) *Post-mortem Technique.*
 - (a) Specimen taking for microscopic examination—*i.e.*, blood, spleen, gland smears, etc.
 - (b) Recognition of the different organs *in situ*.
 - (c) Proper methods of conducting autopsies.
 - (d) Specimen taking for laboratory and biological tests
- (6) *Registering and recording thermometers.*
- (7) *Principles of the :—*
 - (a) Use of antiseptics.
 - (b) Sterilisation of hands and instruments.
 - (c) First aid to animals—*i.e.*, simple dressings, suturing, etc.
- (8) *Construction, building, etc., of :—*
 - (a) Cattle crush.
 - (b) Cattle bandas and paddocks.
 - (c) Sheep and goat pens.
 - (d) Poultry houses and pens.
- (9) The system of preventative inoculations against contagious and infectious animal diseases including technique of inoculation and the use of the hypodermic syringe.
- (10) Lectures on the common animal disease with demonstrations of the principal post-mortem lesions.
- (11) Principles of dipping and tick eradication.
- (12) Flaying and preparation of hides.

The resident veterinary officer works in collaboration with the Chief Veterinary Research Officer in field observations and several paddocks are reserved for this purpose. At the time of writing 177 laboratory animals are under supervision at Ngong.

A collection of local grasses was selected by the Research Worker of the Rowett Institute, Aberdeen, for analysis, with a view to conducting field experiments in deficiency diseases.

HIDES AND SKINS.

A hide and skin improvement scheme was continued throughout the year. The activities of the scheme were principally confined to the Nyanza Province, where an educational centre, at Maragoli, natives from the Kavirondo, Nandi, Kamasia and Akamba tribes received instructions in correct preparation, selection and marketing of hides.

Preparations are in hand to establish another educational centre at the Ngong Training Depot.

In order to establish a general system and allow officers of all departments to instruct natives in their districts in the methods of preparation, a pamphlet is being written describing the systems and giving illustrations of the correct way to flay a hide; with diagrams of the stretching of hides and skins and plans of drying bandas.

Fifteen demonstration centres have been established in Central and North Kavirondo and Nandi.

With the aid of the pupils, nearly 20,000 hides during the year have been sold at the average price for first grade hides Sh. 32 for frasila. The prices vary considerably for graded hides during the year from Sh. 29 per frasila for No. 1 grade and Sh. 24/50 per frasila for No. 3 grade in January, to Sh. 38 and Sh. 32 respectively in December.

The difference in price between shade-dried and sun-dried hides is Sh. 4 in favour of the shade-dried article.

In addition to the 52 pupils trained during the year and placed at demonstration centres, there are 31 pupils at present having instruction.

Arrangements are in hand to establish 23 new demonstration centres in Central and North Kavirondo and place the pupils now in training at Maragoli in charge of them. Demonstrations are given at barazas on the value of the better prepared hides and samples of leather showing faults are shown to emphasise the facts. Headway in this work is retarded by the "forced" sale of hides by itinerant traders who buy hides *en bloc* from the natives without grading. Buyers of hides should display at convenient centres the current market value in order that the native may receive full value. To quote an example, a pupil was sent with four hides to a store and he was offered Sh. 26 per frasila, but on remonstrance by a European instructor and told the correct rate was Sh. 36 to Sh. 38 per frasila the price offered was increased by Sh. 10.

Plenty of interest is shown by the native in the better preparation of hides and skins and if these bad practices could be abolished greater encouragement would be given to all people concerned in the scheme.

It is understood that rules will be considered by Government to prevent the malpractices of itinerant traders.

Greater concentration is necessary on goat skins to improve the quality by better methods and take a few hints

from Nigeria, who were in a similar position nearly twenty years ago, as from being one of the most undesirable kinds, Nigerians have now become one of the desirable kinds.

Inspection of Hides and Skins at Mombasa.

	1925.	1926.	1927.
Hides (bundles)	14,293	11,985	8,600
Skins (bundles)	2,486	1,060	2,187

GAME AS VECTORS OF DISEASE.

Game as vectors of animal disease is undoubtedly established and instances have been brought to the notice of this department during the past year where diseased game have been the means of causing heavy losses to stock.

Rinderpest: Districts were visited by some of those periodic waves of rinderpest which are difficult to account for if the factor of susceptible game is excluded. The seasonal incidence of the disease is not an explanation and is untenable when reports of outbreaks of rinderpest were preceded by or co-incident with reports of sick or dead game, chiefly eland, buffalo and wild pig were observed on the farms concerned. The outbreaks of disease could not be traced to artificial immunisation processes, since the original outbreak of these periodic waves was attributed to game many months after the previous district rinderpest inoculations had been carried out, and in no instance could the infection be traced to a bovine source.

During the outbreaks stockowners recognised the game factor as a medium of distribution and herd boys were instructed to avoid game during herding operations and report its presence on the farm. Game infection principally occurs in native reserves in which rinderpest is enzootic, and certain pastoral tribes, particularly the Masai, deliberately infect their young stock, because they recognise that sucking calves possess a greater resistance to the disease. The game factor is the connecting link between the settled areas and the native reserves for the dissemination of rinderpest, and it is important this fact should be appreciated since its significance has an important bearing on the measures of control.

Pox: Imported red deer developed a disease simulating sheep pox and three deaths were recorded. A vaccine was prepared at the Kabete Veterinary Laboratory and the deer vaccinated which prevented further mortality. From the history of the outbreak it would appear as if a captured kongoni which died in close proximity to the red deer may have been responsible for the spread of the disease.

Trypanosomiasis : Reference is made to the spread of tsetse fly by following the larger game in another part of this report.

General : A case of extensive infection with warts was observed in a captured zebra.

Carcases of game have been condemned at the Nairobi abattoir suffering from *Sacrocytosis*.

Reference is made elsewhere of the overstocking of game in certain areas and the effect on the pasturage and native stock.

Vermin : Applications are received for poison to destroy vermin such as hyenas and jackals. Large losses are reported from certain big stock farms which are appended for public interest as serious attention must be given to produce legislation similarly in force in South Africa, for the extirpation of stock-destroying vermin and to provide for the recognition and registration of vermin hunt clubs.

APPENDIX.

LOSSES OF STOCK BY VERMIN.

- (a) Killed by lions : 7 cattle, and by various vermin 212 sheep.
- (b) Killed by lions : 29 cattle ; 14 calves by hyenas and 53 sheep by leopards.
- (c) Killed by lions : 28 cattle ; 184 sheep by hyenas, leopard and wild dog, etc.

**MOMBASA—IMPORTATION OF STOCK—TABLE OF
COMPARATIVE RECORDS.**

The following stock arrived from overseas and were railed to up-country stations:—

	1925	1926	1927
Horses	34	36	54 (12 S. Afric, 7 crossbred, 35 thoroughbred)
Mules	2	..	..
Cattle	164	52	130
Dogs	100	118	116
Sheep and Goats	213	Sheep 185	97
Pigs	20	16	10
Poultry	240	395	189
Cats	8	7	2
Red Deer .. .. .	..	17	..
Guinea Pigs (for experiment) ..	..	..	50
Rabbits .. .. .	..	..	35
COASTWISE TRAFFIC ARRIVING ON MOMBASA ISLAND.			
Horses	2	..	..
Mules	4	..	..
Donkeys	47	57	76
Pigs	12	..	..
Cattle	751	323	2
Camels	54	30	11
Sheep and Goats	4,726	3,196	192
STOCK ARRIVED AT MOMBASA FROM UP-COUNTRY STATIONS.			
Cattle	739	526	477
Sheep	100	Sheep and Goats 50	..
Donkeys .. .. .	..	..	12
STOCK DEALT WITH AT THE VETERINARY STATION, MAKUPA, ARRIVING BY ROAD FROM THE MAINLAND.			
Cattle	2,821	3,669	5,415
Donkeys	10	28	91
Pigs	29	9	12
Sheep and Goats	9,247	14,550	28,113

The importations of pure-bred cattle for the last three years are as follows:—

	1925	1926	1927
Shorthorn Bulls	24	26	18
„ Cows and Heifers	13	..	..
Freisland Bulls	49	4	77
„ Cows and Heifers	36	..	..
Ayrshire Bulls	16	9	10
„ Cows and Heifers .. .. .	..	1	3
Hereford Bulls	6	..	..
Aberdeen Angus Bulls	2	1	..
Africander Bulls	2	..	..
Jersey Bulls	8	2	..
„ Cows and Heifers .. .. .	..	6	..
Kerry Bulls	1	..	..
„ Cows and Heifers	3	..	..
Red Poll Bulls	3	3	..
„ Cows and Heifers	1	..	..
Polled Hereford Bulls .. .. .	..	..	1
Black Welsh Bulls .. .. .	..	..	4
Black Polled Angus Bulls .. .. .	..	..	4
Guernsey Bulls .. .. .	..	..	1
Welsh Bulls .. .. .	..	..	12
TOTALS ..	164	52	130
TOTAL BULLS ..	111	45	127
TOTAL COWS AND HEIFERS ..	53	7	3

Slaughter Stock—Inspection of.

	1925.	1926.	1927.
Cattle	5,337	4,491	5,663
Sheep and goats ...	1,8598	1,9457	19,910

SLAUGHTER STOCK, 1927.

Nairobi and Mombasa abattoir returns show the following numbers slaughtered during the past three years:—

	1925		1926		1927	
	Nairobi	Mombasa	Nairobi	Mombasa	Nairobi	Mombasa
Cattle ..	13,331	5,337	10,427	4,491	10,811	5,663
Sheep and Goats..	19,248	18,598	20,901	19,457	23,685	19,910
Calves ..	..	..	..	..	465	..
Pigs ..	672	..	704	..	929	..

CATTLE CONDEMNED AT NAIROBI, 1927.

- 565 cattle condemned chiefly for measles.
 76 calves condemned chiefly for measles.
 84 sheep and goats condemned chiefly for dropsy and pleuro-pneumonia.
 2 pigs condemned.

BRANDS, 1927,

Registered (private)	...	...	...	242
" S " (squatters)	...	...	...	152 *
Departmental	...	...	...	336
Numeral, Departmental	...	...	...	185
Transfers	...	...	...	4
Cancellation	...	...	...	Nil

* To private individuals.

HONORARY PERMIT ISSUERS.

The thanks of the Veterinary Department are accorded to all Honorary Permit Issuers for the efficient manner in which they have carried out their duties during the year under review and for their assistance rendered to the Department.

H. BRASSEY-EDWARDS,
Acting Chief Veterinary Officer.

APPENDIX D.

ANNUAL REPORT, 1927.

(A).—STAFF MOVEMENTS.

The following officers proceeded on vacation leave during the year :—

Dr. S. H. Whitworth, Veterinary Research Officer.

Mr. J. T. Schultz, Laboratory Assistant.

Mr. W. White, Clerk.

Mr. J. Scott, Storekeeper.

The following officers returned from vacation leave :—

Mr. H. J. Gray, Laboratory Assistant.

Mr. J. Forsyth, Yard Foreman.

Mr. W. White, Clerk.

New Appointments.—Professor R. W. M. Mettam, M.Sc., M.R.C.V.S., was appointed Veterinary Research Officer with effect from 19th January, 1927, and arrived in the Colony on 8th April, after completing a course of study at the Onderstepoort Laboratory, South Africa.

Mr. S. R. Pelling was appointed in England as Laboratory Assistant, and arrived on July 10th, 1927.

Mr. J. W. Shearman was appointed locally to the Clerical Service with effect from July 18th, 1927.

Mr. A. McDougall was appointed temporarily to the post of Yard Foreman with effect from 19th November, 1927.

Promotions.—Mr. J. Forsyth, Yard Foreman, was promoted to the post of Laboratory Assistant with effect from 1st August, 1927.

Transfers.—Mr. W. White, Clerk, was transferred to the clerical establishment of the Agricultural Department with effect from 21st November, 1927.

Resignations.—Mr. E. W. Wildman, Clerk, resigned his appointment with effect from 25th June, 1927.

(B).—ADMINISTRATIVE ACTIVITIES.

Correspondence.—3,713 inward and 3,027 outward communications were dealt with during the year, a total of 6,740, and an increase of 816 over the preceding year. This does not include communications received and despatched in connection with slides and specimens submitted for examination.

9,036 such slides and specimens were received and registered during 1927, and reports on the examination of these were typed and despatched. The decrease in the number of specimens submitted as compared with 1926, is due to the discontinuance of the pleuro-pneumonia conglutination test.

Laboratory Farm.—200 acres of land were put under cultivation during the year, 80 of which were planted with maize for ensilage purposes and 20 with lucerne. The balance will be put under crops during the next rainy season.

The farm labour was also employed throughout the year on the maintenance and upkeep of roads, fences, and grazing land, the preparation of ensilage, and the transport of fuel, food-stuffs and other stores from Kabete Railway Station.

All healthy stock awaiting experiment are maintained at the Laboratory Farm.

A number of breeding stock are also kept at the Farm for the purpose of raising calves for special experimental work. The number of calves born of this herd during the year is as follows :—

Grade bull calves	...	...	32
Grade heifer calves	...	...	32
			64

(C).—BUILDINGS AND PLANT.

Buildings.—Work carried out by the Laboratory Workshop Staff comprised :—

The erection of a steel and concrete isolation building for anthrax experiments, and for the preparation of anthrax vaccine. This was commenced in 1926 and completed during 1927.

A number of old cattle sheds at the lower farm were renovated and converted into loose boxes for the housing of cattle to be utilised as special rinderpest virus makers.

General repairs and painting were carried out where necessary to the Laboratory itself, laboratory and farm outbuildings, staff bungalows, etc.

Plant.—*Steam Plant.*—This was in continuous use throughout the year, and worked satisfactorily. Towards the end of the year the boiler was thoroughly overhauled by a boilermaker from the Railway Workshops, and certain repairs and replacements were effected.

Gas Plant.—The Gas Plant was in daily commission throughout the year.

Electric Plant.—Our own electric plant, being too small for present requirements, was put out of commission at the end of May, when the Laboratory, staff quarters and other buildings were re-wired and connected up with the Nairobi Power and Lighting supply.

Refrigerating Plant.—Two refrigerating units were installed in the new wing of the Laboratory during 1927. These are utilised for the storage of serum and vaccine cultures, etc.; for the preservation of which a consistently low temperature is required.

Incubator Room.—An incubator room in the new wing was equipped and put into operation during the year. This room is of special construction, fitted with shelving all round, and equipped with a heating apparatus by which the room is maintained at a temperature suitable for the growth of pathogenic bacteria, etc.

Apparatus.—New items of apparatus installed for use in conjunction with the steam, gas or electrical plant, included:—

Two steam sterilisers.

One Manlove Alliot Steam Autoclave.

One steam cooker for use in the preparation of black-quarter vaccine.

Two gas incubators.

One gas oven.

Two centrifuges.

One electric incubator.

Seven electric hot plates for heating purposes.

General.

Water Supply.—Owing to the failure of the rains, and the inadequacy of the Municipal supply, a severe shortage of water caused considerable inconvenience during the major portion of the year. The Municipal supply has recently been considerably augmented by the installation of a larger pipe line, and it is hoped that no further difficulty will be experienced in this direction.

Workshops.—General work carried out by the Laboratory Mechanic and Workshops Staff included repairs to transport vehicles, farm implements, etc., the manufacture of serum and other packing cases, the fitting of tables, benches, shelving, etc. in Laboratory, and further improvements and extensions in the drainage, and sanitary systems.

D.—FINANCE.

EXPENDITURE.—The total amount sanctioned for the Division of Veterinary Research in the 1927 Estimates was £30,645. Of this, £12,845 was for personal emoluments,

including native labour; the balance of £17,800 being allocated for purchase of animals, production of sera and vaccine, up-keep of laboratory, apparatus, machinery and maintenance, etc.

Savings to the extent of £757 were effected on the above amounts, making the actual expenditure for the year £29,888.

REVENUE.—The amount realised from the direct sale of Laboratory products was £4,974; this sum being credited to the Laboratory revenue-earning vote. Revenue accruing from sera and vaccines issued for inoculations by the Field Staff is credited through the books of the Veterinary Division. The value of anti-rinderpest serum alone issued to the Field Staff during 1927 amounted to £25,340.

Laboratory products to the value of £3,035 were sold to other Governments during the year.

The total value of issues of Laboratory products for which charges are gazetted amounted to £30,066 in 1927. Other products to the value of £3,490 were manufactured and issued free of charge.

(E).—LIVESTOCK.

The following tabulated statement shows the number of livestock, other than small animals and poultry, dealt with during the year :—

SPECIES.	On books 1-1-1927.	Increases.	Decreases.	On hand 31-12-1927.
Horses	4	16	7	13
Mules	22	19	7	34
Donkeys .. .. .	..	1	..	1
Cattle	692	1,224	1,109	807
Sheep	56	259	186	129
Goats	28	42	52	18
Pigs	27	29	42	14

The details given below regarding increases and decreases may be of interest.

HORSES.

Increases.

Received for experimental treatment	7
Forwarded for experimental horsesickness	9
Total	<u>16</u>

Decreases.

Returned to owners after experimental treatment ...	4
Died	3
Total ...	<u>7</u>

MULES.

Increases.

Purchased for transport work	15
Received from Veterinary Field Staff	4
Total ...	<u>19</u>

Decreases.

Issued to Agricultural and Veterinary Departments	6
Died	1
Total ...	<u>7</u>

DONKEYS.

Increases.

Received for experimental treatment	1
Total ...	<u>1</u>

CATTLE.

Increases.

Born at Laboratory	94
Purchased for rinderpest serum production and experimental work	932
Received for experimental treatment, etc.	198
Total ...	<u>1,224</u>

Decreases.

Deaths, including animals killed for rinderpest virus production and post-mortem examination ...	760
Returned to owners after experimental treatment ...	104
Issued to Veterinary Field Stations, including animals for rinderpest virus production	224
Surplus cattle sold for slaughter	21
Total ...	<u>1,109</u>

SHEEP.

Increases.

Born at Laboratory	19
Purchased for experimental purposes and vaccine production	121
Received for experimental work and treatment	119
Total ...	<u>259</u>

Decreases.

Deaths, including animals killed for vaccine production and post-mortem examination	151
Surplus sheep sold for slaughter	35
Total	<u>186</u>

GOATS.

Increases.

Born at Laboratory	15
Purchased for experimental purposes	15
Received for experimental purposes	1
Exchanged with natives	11
Total	<u>42</u>

Decreases.

Deaths	41
Exchanged with natives	11
Total	<u>52</u>

PIGS.

Increases.

Born at Laboratory	25
Purchased	2
Received for experimental work	2
Total	<u>29</u>

Decreases.

Deaths	26
Sold for slaughter	16
Total	<u>42</u>

In addition to the above, 347 cattle were purchased at out-stations by the Field Staff for rinderpest virus production. These animals were taken on charge by the officers concerned, but the cost of purchase—approximately £820—was met from our "Purchase of Animals" Vote.

During the year a number of Rhode Island Red poultry were sent here for inoculation against Fowl Typhoid (Kikuyu Fowl Disease) prior to issue to Native Reserves. A total of 267 birds were so dealt with.

TECHNICAL ROUTINE.

The number of slides and specimens submitted for examination totalled 9,036.

The technical routine work is yearly increasing and successful research work is further responsible for this additional increase.

The classification of the diagnoses arrived at is as follows:—

BOVINES	TOTAL EXAMINED	8,478
Anaplasmosis	236	
Anaplasmosis, suspicious	1	
Anisocytosis	17	
Anthrax	47	
Ascaris	1	
Black quarter	19	
Broncho-pneumonia	2	
Bovine lymphangitis	4	
Contagious abortion	27	
Contagious abortion (doubtful and suspicious)	25	
Colon bacillosis	20	
Cysticercus bovis	1	
East Coast Fever	1,094	
East Coast Fever, suspicious	1	
Echinococcus cysts	2	
Heartwater	4	
Hæmorrhagic enteritis	1	
Pleuro-pneumonia	146	
Pleuro-pneumonia (doubtful and suspicious)	81	
Pleuro-pneumonia (recovered lung)	1	
Paratyphoid	20	
Redwater	369	
Rinderpest	7	
Small piroplasms	465	
Streptothricosis	7	
Septicæmia	2	
Mastitis	1	
Trypanosomiasis	66	
Tuberculosis	2	
Wireworm	1	
Unsuitable	90	
Awaiting diagnosis	7	
Negatives	5,711	

EQUINES (HORSES)	...	...	TOTAL EXAMINED	181
Ulcerative lymphangitis	...	...	...	57
Ulcerative lymphangitis, suspicious	...	...	...	7
Epizootic lymphangitis	...	...	...	3
Streptothricosis	...	...	...	4
Vascular tumour	...	...	...	1
Unsuitable	...	...	...	3
Negatives	...	...	...	106
EQUINES (MULES)	...	...	TOTAL EXAMINED	34
Biliary fever	...	...	...	2
Ulcerative lymphangitis	...	...	...	10
Unsuitable	...	...	...	3
Negatives	...	...	...	19
EQUINES (DONKEYS)	...	...	TOTAL EXAMINED	13
Ulcerative lymphangitis	...	...	...	2
Negatives	...	...	...	11
OVINES	...	...	TOTAL EXAMINED	43
Colon bacillosis	...	...	...	2
Caseous lymphadenitis	...	...	...	1
Pneumonia	...	...	...	2
Scab	...	...	...	5
Hookworm	...	...	...	2
Wireworm	...	...	...	1
Unsuitable	...	...	...	1
Negatives	...	...	...	29
CANINES	...	...	TOTAL EXAMINED	104
Anæmia	...	...	...	2
Adenoma of mammary gland	...	...	...	1
Biliary fever	...	...	...	3
Leukæmia	...	...	...	1
Tick fever	...	...	...	29
Unsuitable	...	...	...	1
Negatives	...	...	...	67
PORCINES	...	...	TOTAL EXAMINED	61
Swine fever	...	...	...	1
Swine fever, suspicious	...	...	...	1
Awaiting diagnosis	...	...	...	2
Negatives	...	...	...	57

GUINEA-PIGS	...	...	...	TOTAL EXAMINED	2
Negatives	...	...	...	...	2
CAPRINES	...	...	...	TOTAL EXAMINED	2
Heartwater	...	...	...	...	1
Unsuitable	...	...	...	...	1
AVIANS (FOWLS)	...	...	...	TOTAL EXAMINED	94
Fowl typhoid (Kikuyu fowl disease)	...	...	...	...	40
Roup	...	...	...	...	4
Fowl pox	...	...	...	...	3
Rhumatic arthritis	...	...	...	...	1
Leukæmia hepatitis	...	...	...	...	2
Peritonitis	...	...	...	...	3
Blackhead	...	...	...	...	1
Tumour of liver	...	...	...	...	1
Sarcoma of liver	...	...	...	...	1
Cystic ovary	...	...	...	...	1
Inflammation of ovary	...	...	...	...	1
Rupture of ovary	...	...	...	...	1
Rupture of uterus	...	...	...	...	1
Retained egg	...	...	...	...	2
Unsuitable	...	...	...	...	1
Negatives	...	...	...	...	31
AVIANS (TURKEYS)	...	...	...	TOTAL EXAMINED	15
Fowl typhoid (Kikuyu fowl disease)	...	...	...	...	1
Fowl pox	...	...	...	...	2
Unsuitable	...	...	...	...	1
Negatives	...	...	...	...	11
AVIANS (DUCKS)	...	...	...	TOTAL EXAMINED	5
Negatives	...	...	...	...	5
AVIANS (GEESE)	...	...	...	TOTAL EXAMINED	1
Negative	...	...	...	...	1
COCKROACH	...	...	...	TOTAL EXAMINED	1
Parasites (<i>Gordius blattæ orientalis</i>)	...	...	...	...	1
TICKS	...	...	...	TOTAL EXAMINED	1
Amblyomma variegatum	...	...	...	...	1
WATER BUCK	...	...	...	TOTAL EXAMINED	1
Negative	...	...	...	...	1

PREPARATIONS OF LABORATORY PRODUCTS FOR THE YEAR ENDING 31st DECEMBER, 1927.

PRODUCTS.	Balance on hand 31-12-26.	Prepared by the Laboratory during the year.	Used for Lab. Exp.	Issued outside the Lab. during the year.	Returned to the Laboratory.	Written off as too old for issue.	Balance on hand 31-12-1927.
Anti-Rinderpest Serum	9,300,000	18,423,250	72,500	14,446,250	373,250	16,250	13,561,500 c.c.
Anthrax Vaccine, 1st	20,500	26,018	680	13,958	2,120	34,000	Nil doses.
" " 2nd	16,940	25,258	640	14,078	2,240	29,720	" "
Blackquarter Vaccine, 1st	3,070	15,080	..	18,020	540	340	330 "
" " 2nd	3,002	15,200	..	18,060	540	340	342 "
" " Liquid	Nil	14,550	..	14,550	..	..	Nil "
Bluetongue	14,594	11,790	..	40	..	11,996	14,348 "
Colon Bacillosis Vaccine	237	7,990	..	7,620	111	..	718 "
Contagious Abortion Vaccine	Nil	620	..	620	..	..	Nil "
Kikuyu Fowl Disease Vaccine	"	14,049	..	14,049	..	..	" "
Laikipia Lung Disease Vaccine	"	23,650	..	16,205	..	7,445	" "
Pleuro-pneumonia Vaccine	"	431,964	..	431,964	..	..	" "
Paratyphoid Serum	"	841	..	841	..	..	" "
" Vaccine	"	3,504	..	3,504	..	..	" "
Redwater and Anaplasmosis Vaccine	"	1,303	..	1,303	..	..	" "
Sheep-pox Vaccine	"	11,800	..	11,800	..	..	" "
Trypanblue Bovine	232	402	31	570	2	..	35 "
" Canine	30	370	2	340	..	..	59 "
Ulcerative Lymphangitis	103	14	..	112	5 courses.
Wireworm Remedy Powder	64,100	594,600	..	569,400	11,300	..	100,600 doses.

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DETAILS OF ISSUES OF LABORATORY PRODUCTS.

PRODUCTS.	Issued to Dept. Officers.	Issued to Stock-owners.	Issued to other countries.	Total Issues for 1927.
Anti-Rinderpest Serum	12,670,750	315,500	1,460,000	14,446,250 c.c.
Anthrax Vaccine 1st	5,630	8,328	..	13,958 doses.
" " 2nd	5,630	8,448	..	14,078 "
Blackquarter Vaccine 1st	1,740	15,080	1,200	18,020 "
" " 2nd	1,750	15,110	1,200	18,060 "
" " Liquid	3,500	11,050	..	14,550 "
Bluetongue Vaccine .. .. .	..	40	..	40 "
Colon Bacillosis Vaccine	30	7,590	..	7,520 "
Contagious Abortion Vaccine .. .. .	..	620	..	620 "
Kikuyu Fowl Disease Vaccine	553	13,496	..	14,049 "
Laikipia Lung Disease Vaccine .. .. .	..	16,205	..	16,205 "
Pleuro-pneumonia Vaccine	319,138	99,966	12,860	431,964 "
Paratyphoid Serum .. .. .	..	841	..	841 "
" Vaccine .. .. .	..	3,504	..	3,504 "
Redwater and Anaplasmosis	46	1,257	..	1,303 "
Sheep-pox Vaccine .. .. .	..	11,800	..	11,800 "
Trypanblue Bovine	461	109	..	570 "
" Canine	206	134	..	340 "
Ulcerative Lymphangitis	39	73	..	112 courses.
Wireworm Remedy Powder	28,400	526,200	14,800	569,400 doses.

TECHNICAL RESEARCH.

RINDERPEST.

(1).—THE ELIMINATION OF REDWATER AND GALLSICKNESS INFECTIONS.

The increasing risk of losses from redwater and gallsickness in cattle undergoing rinderpest immunisation (simultaneous method) consequent on the use of rinderpest blood containing both infections, particularly in those born and reared on estates where dipping at short intervals combined with thorough hand-dressing is regularly carried out from, or shortly after, birth, necessitated urgent attention being given to the introduction of a method of obtaining rinderpest virus free of redwater and gallsickness.

Various methods were investigated, viz. :—

- (A).—The substitution of peritoneal washings for virulent bovine blood.
- (B).—The substitution of nasal secretion for virulent bovine blood.
- (C).—The substitution of blood of a goat reacting to rinderpest for virulent bovine blood.
- (D).—The use of virus makers (cattle) born and reared on estates where dipping is regularly carried out.

(A).—*Peritoneal washings.* The method of obtaining such was as follows : 5 litres of a 0.6 per cent. potass. nitrate solution in sterile tap water was injected into the peritoneal cavity of a beast, reacting to rinderpest, usually on the 4th day of the temperature reaction, three hours prior to the beast being bled to death for virus for hyper-immunising purposes, and some of the fluid present in the cavity collected immediately after death usually in 0.5 per cent. citrate solution to prevent coagulation.

Taking into consideration the peritoneal washings would be collected from recovered redwater-gallsickness cattle, and the difficulty experienced in obtaining washings free of red-cells it was considered advisable to eliminate the risk of redwater and gallsickness infections being present in the washings; they were filtered after dilution through a Berkefeld or Seitz filter and the filtrate inoculated to susceptible cattle either alone or simultaneously with a prescribed dose of anti-serum.

An interval of from 18 to 24 hours or more usually elapses between the hour of despatch of virus from the Laboratory and its use in the field, and the possibility of non-reactions and non-conferring of immunity occurring in

susceptible cattle when inoculated with other than fresh virus and the prescribed doses of anti-serum thus entered into consideration, and it was necessary to determine whether the inoculation of other than fresh filtrate and the prescribed doses of anti-serum would produce a reaction and confer immunity.

The following experimental inoculations were carried out :—

(a).—*Subcutaneous inoculation of fresh peritoneal washings :—*

1,565 inoculated with 5 c.c. undiluted washings.

Result.—Reaction to rinderpest commencing on the 5th day.

1584; 1618; 1631; 1612; inoculated with 2 c.c.; 5 c.c.; 10 c.c.; and 2 c.c. respectively, of a mixture of equal parts of washings and 0.5 per cent. citrate solution.

Result.—Reaction to rinderpest commencing on the 4th; 4th; 3rd; and 4th days, respectively.

1626 inoculated with 2 c.c. of washings collected in equal parts of a mixture of 0.5 per cent. citrate solution: 25 parts, and bouillon Martin 25 parts.

Result.—Reaction to rinderpest commencing on the third day.

Summary.—Subcutaneous inoculation of fresh peritoneal washings produced rinderpest. Total in experiment, 6.

(b).—*Subcutaneous inoculation of fresh peritoneal washings and simultaneously anti-rinderpest serum :—*

1398 and 1400 inoculated with 2 c.c. undiluted washings and anti-serum at the rate of 20 and 45 c.c., respectively per 100 kilos, body weight.

Result.—Reaction to rinderpest commencing on the 5th and 4th day respectively.

1398 was subsequently bled to death for virus.

1400 recovered and when tested on its immunity with virulent bovine blood was found to have acquired immunity.

1622 inoculated with 2 c.c. washings collected in equal parts of 0.5 per cent. citrate solution and simultaneously with anti-serum at the rate of 45 c.c. per 100 kilos, body weight.

Result.—Reaction to rinderpest, commencing on the 5th day ending in recovery.

Summary.—Subcutaneous inoculation of fresh peritoneal washings and simultaneously anti-serum at the rate of 20 and 45 c.c. respectively, per 100 kilos, body weight, produced rinderpest. Total in experiment, 3.

(c).—*Subcutaneous inoculation of other than fresh peritoneal washings.*

1672 inoculated with 5 c.c. of washings collected in equal parts of 0.5 per cent. citrate solution and kept at 5° C. for 10 days.

Result.—Reaction to rinderpest from the 6th day. Animal bled to death for virus on the 11th day.

1561 inoculated with 5 c.c. of washings collected in equal parts of a mixture of 0.5 per cent. citrate solution, 25 parts and bouillon Martin 25 parts, and kept at room temperature for 18 hours.

Result.—Reaction to rinderpest from the 3rd day. Animal bled to death for virus on the 6th day.

Summary.—Peritoneal washings stored at 5° C. for 10 days and at room temperature for 18 hours, respectively, transmitted rinderpest.

The commencement of the temperature reaction to the washings stored for 10 days 5° C. was delayed.

Further experiments are necessary to determine whether simultaneous inoculation with other than fresh washings and anti-serum will always produce a reaction and confer immunity.

(d) *Subcutaneous inoculation of fresh filtrate of peritoneal washings :—*

(1).—Washings diluted in normal saline.

1570 and 1588 inoculated with 10 c.c. and 5 c.c., respectively, of a Berkefeld filtrate of a dilution of one of washings in 99 of saline=1/100.

Result.—No reaction to rinderpest.

Both animals subsequently reacted to the inoculation of 2 c.c. virulent bovine blood.

Summary.—Peritoneal washings diluted in saline (1-100) and filtered through a Berkefeld did not transmit rinderpest.

NOTE.—1438 control for the virulence of the filtrate was inoculated with 5 c.c. of the filtrate alone.

Result.—No reaction to rinderpest; when tested on its susceptibility with virulent bovine blood, 1438 reacted to rinderpest.

Summary.—Washings collected in equal parts of 0.5 per cent. citrate solution and filtered through a Berkefeld filter and stored for 18 hours at room temperature prior to injection, inoculated alone or simultaneously with anti-rinderpest serum did not produce rinderpest.

Resumé of Results : Inoculation of.

- (a).—Fresh peritoneal washings produced rinderpest.
- (b).—Fresh peritoneal washings and simultaneously anti-rinderpest serum produced rinderpest.
- (c).—Other than fresh peritoneal washings produced rinderpest with sometimes a delay in the commencement of the temperature reaction.
- (d).—Fresh Berkefeld filtrate of fresh washings diluted 1-100 in normal saline did not produce rinderpest. Washings collected in 0.5 per cent. citrate solution, equal parts, or in 75 parts of 0.5 per cent citrate solution and shaken with beads for half-an-hour and filtered through a Berkefeld or Seitz filter transmitted rinderpest.

(The commencement of the temperature reaction was delayed).

Washings collected in equal parts of a mixture of 0.5 per cent. citrate solution 25 parts, and bouillon Martin 25 parts, and shaken with beads for half-an-hour and filtered fresh through a Berkefeld and Seitz, respectively, did not transmit rinderpest.

- (e).—Washings collected in 0.5 per cent. citrate solution, 25 parts of washings to 75 parts of citrate solution, shaken with beads and filtered fresh through a Berkefeld filter and simultaneously anti-rinderpest serum, did not transmit rinderpest. Filtrate of other than fresh washings collected in 0.5 per cent. citrate solution, equal parts and shaken for 5 hours in a mechanical shaker did not transmit rinderpest.
- (f).—Other than fresh Berkefeld filtrate of washings in 0.5 per cent. citrate solution, equal parts, alone or simultaneously with anti-rinderpest serum, did not transmit rinderpest.

Conclusions.

- (1).—Inoculation of fresh peritoneal washings alone or with the prescribed dose of anti-serum produces a reaction to rinderpest in susceptible cattle.
- (2).—Inoculation of peritoneal washings alone, kept for 18 hours at room temperature or for several days at 5° C. produces rinderpest, but a large number of susceptible cattle should be inoculated with other than fresh washings and simultaneously with the prescribed dose of anti-serum to determine whether a reaction always occurs.
- (3).—The substitution of fresh peritoneal washings for virulent blood for rinderpest immunisation (simultaneous method) is not generally recommended owing to the difficulty of obtaining washings free of red-cells and consequent risk of the washings producing redwater and gallsickness.
- (4).—Rinderpest virus, free of red-cells and redwater-gallsickness parasites may variably be obtained by filtration of washings through a Berkefeld or Seitz filter.

The conditions necessary for successful filtration would appear to be as follows, *viz.* :—

- (a).—Collection of the washings in citrate solution prior to coagulation.
- (b).—Shaking the mixture with beads, after collection, (microscopical examination of the mixture after being well-shaken shows the leucocytes are broken down).
- (c).—Further dilution of the mixture after shaking, so that it passes through the Berkefeld or Seitz without difficulty after making the vacuum with a Geryk Pump.
- (5).—The substitution of fresh filtrate of fresh peritoneal washings for virulent blood is not generally recommended owing to the varying results in obtaining a virulent filtrate.

(B).—*The substitution of nasal secretion for virulent bovine blood.*—Nasal secretion free of red-cells was collected from a beast showing a well-marked rinderpest nasal discharge, and used as follows, *viz.* :—

Method 1.—Subcutaneous inoculation of fresh unfiltered nasal secretion in normal saline or bouillon Martin.

(a).—Diluted in saline in the proportion of 1 of nasal secretion to 99 of saline=1-100.

1611 inoculated 25-3-27 with 2 c.c. of the dilution.

Result.—Temperature reaction to rinderpest from 2nd day. Animal bled to death for virus on the 7th day after inoculation.

(b).—Diluted in saline in the proportion of 1 of nasal secretion to 499 of saline=1-500.

1575 inoculated 25-3-27 with 5 c.c. of the dilution.

Result.—Temperature reaction to rinderpest from 7th day. Animal bled to death for virus on 12th day after inoculation.

(c).—Diluted in saline in the proportion of 1 of nasal secretion to 999 of saline=1-1000.

1605 inoculated 25-3-27 with 5 c.c. of the dilution.

Result.—Temperature reaction to rinderpest from 9th day. Animal bled to death for virus on 14th day after inoculation.

(d).—Diluted in bouillon Martin in the proportion of 1 of nasal secretion to 49 of bouillon Martin=1-50.

1655 inoculated with 1 c.c. on 28-4-27.

Result.—Temperature reaction to rinderpest from the 2nd day. Animal subsequently bled for virus.

Summary.—Fresh nasal secretion diluted 1-50; 1-100; 1-500; and 1-1000, produced rinderpest. The commencement of the temperature reaction was delayed with the higher dilutions, viz.: 1-500 and 1-1000.

Method 2.—Filtrate of fresh nasal secretion.

(a).—Fresh nasal mucus diluted in bouillon Martin in the proportion of 1 of secretion to 9 of bouillon Martin and shaken with beads for half-an-hour and bouillon Martin added to make a 2 per cent. dilution. Again shaken with beads and filtered through a Berkefeld filter.

1654 inoculated 28-4-27 with 2 c.c. of the filtrate.

Result.—Temperature reaction to rinderpest from 4th day. Animal bled to death for virus on the 6th day.

(b).—Fresh nasal secretion diluted 1-100 in normal saline and filtered through a Berkefeld filter.

1598 inoculated 25-3-27 with 5 c.c. of the dilution.

Result.—Temperature reaction to rinderpest from 7th day.

Method 3.—Other than fresh filtrate.

(a).—The nasal secretion was diluted in bouillon Martin (2 c.c. in 98 c.c. of bouillon Martin) and shaken with beads and filtered through a Berkefeld and 10 per cent. of bovine serum added and then put in tubes, sealed and kept in the ice-chest at 5° C. for 24 hours.

1681 inoculated 29-4-27 with 10 c.c. of the filtrate.

Result.—Temperature reaction to rinderpest from 4th day.

(b).—Nasal secretion treated as above, but kept at 5° C. for 8 days.

1451; 1437, each inoculated with 5 c.c. of the 8-day old filtrate.

Result.—Neither reacted to rinderpest. Both proved susceptible on immunity test.

(c).—Nasal secretion 2 per cent. in bouillon Martin filtered through a Berkefeld and kept at 5° C. for 24 hours. Not shaken prior to filtering.

C. 1462 5 c.c. subcutaneously 7-5-27.

Result.—No reaction. Animal proved susceptible when subsequently tested on its immunity.

Summary.

- (1).—Inoculation of fresh nasal secretion diluted in bouillon Martin 1-50 and in saline 1-100; 1-500; 1-1000, respectively, produced rinderpest. The commencement of the temperature reaction was delayed with the higher dilutions, viz.: 1-500 and 1-1000.
- (2).—Fresh filtrates of a dilution of nasal secretion 1-50 in bouillon Martin and 1-1000 normal saline, respectively, produced rinderpest, the reaction commencing on the 4th and 7th day, respectively.
- (3).—Nasal secretion diluted in bouillon Martin, well-shaken with beads and filtered through a Berkefeld filter, 10 per cent. bovine serum added and kept in ice-chest for 24 hours (tubes sealed) transmitted rinderpest.

- (4).—Nasal secretion diluted in bouillon Martin, well-shaken with beads prior to filtering through a Berkefeld and kept after filtering for 8 days at 5° C. did not transmit rinderpest.
- (5).—Nasal secretion diluted in bouillon Martin, not shaken prior to filtering through a Berkefeld, and kept after filtering for 24 hours in ice-chest, did not transmit rinderpest.

Conclusions.

- (1).—Inoculation of fresh nasal secretion alone produces rinderpest.
- (2).—Further transmission experiments are necessary to determine whether fresh nasal secretion can be substituted for virulent blood for rinderpest immunisation (simultaneous method).
- (3).—Subcutaneous inoculation of fresh nasal secretion from a reacting beast should be of assistance in the field for infecting cattle destined for virus makers. The procedure at present adopted for obtaining virus for immunisation of cattle on farms where dipping is regularly carried out is as follows, *viz.* :—

A susceptible beast is inoculated with virulent blood supplied by the Laboratory and a susceptible beast selected from the dipped herd infected by contact with the beast reacting to inoculation of the Laboratory blood, a difficulty is sometimes experienced in the field in infecting the selected virus makers by contact; this may be overcome by inoculating the latter subcutaneously with nasal secretion collected from the reacting beast; the method employed for collecting nasal secretion is as follows :—

About 50 c.c. of previously boiled, and allowed to cool tap water or 0.5 per cent. citrate solution are put in a flask and the mucus membrane of the nostrils swabbed with a little cotton-wool held with a pair of forceps, and the cotton-wool then inserted into the flask containing the water or citrate solution and the contents of the flask well-shaken, and a few c.c. of the dilution inoculated.

- (4).—Other than fresh filtrates of nasal secretion variably transmitted rinderpest.

NOTE.—Prior to completion of this Report, 7 head of susceptible cattle, including 4 South African Friesland bulls and 3 grade oxen were inoculated subcutaneously with doses varying from 2 to 5 c.c. of

nasal secretion collected as described above in 100 c.c. of 0.5 per cent. citrate solution and simultaneously anti-serum at doses varying from 15 c.c. to 80 c.c. per 100 kilos, body weight.

Result.—All reacted and made a good recovery.

The indications are that nasal secretion may be substituted for virulent blood, and the risk of transmission of redwater and gallsickness excluded.

The obtaining of sufficient nasal secretion for the immunisation of large numbers of cattle would no doubt present some difficulties, but this could possibly be overcome by infecting two or more controls according to the number of cattle submitted for immunisation.

(C).—*The substitution of blood of a goat reacting to rinderpest for virulent bovine blood.*—With a view to determining the value of goat virus for rinderpest immunisation (simultaneous method) a number of cattle were experimentally inoculated under Laboratory supervision. Cattle of various ages were selected, *e.g.* :—

Lot 1.—Consisted of 248 unweaned calves, age 6 months, approximately, kindly placed at disposal by G. Colville, Esq., N'dabibi Estate, Gilgil.

Lot 2.—Consisted of 118 weaned animals of from 18 months to 3 years kindly placed at disposal by the Right Honourable Lord Delamere at Soysambu Estate.

Lot 3.—Consisted of 42 weaned cattle varying in age from 12 months to 4 years and upwards, approximately, which were kindly placed at disposal by the Right Honourable Lord Delamere.

All cattle put in experiment were kept on daily morning temperature and subsequently tested on their immunity.

The goat blood was collected in equal parts of 0.5 per cent. citrate solution from a goat which was reacting to the subcutaneous inoculation of virulent bovine blood (1st passage).

Lot 1.—The following report of results of inoculation of Lot 1, was submitted by Dr. S. H. Whitworth, Veterinary Research Officer, who carried out the experimental inoculation *in loco*, in May-June, 1927.

248 unweaned calves aged 6 months approximately were placed at disposal for experimentation and observation. All the cattle were weighed and the doses of serum given accurately determined.

The following is a summary of the results :—

Of the 248 head, 116 of these each got 3 c.c. citrated goat virus and anti-serum at the rate of 25 c.c. per 100 kilos, and 132 a similar dose of goat virus and anti-serum at the rate of 30 c.c. per 100 kilos, body weight. The results were as follows :—

Total reacted	... 130 = 52%
No reaction	... 118 = 48%

Reactions usually commenced from the 5th to the 6th day, sometimes on the 9th day.

Immunity Test.—118 of the non-reactors, and 32 reactors were re-inoculated on the 15th day after the date of the original inoculation, each with 2 c.c. citrated bovine virulent blood and anti-serum at the rate of 25 c.c. per 100 kilos, body weight.

Result.—29 of the 118 non-reactors = 24.5 per cent. gave a temperature reaction, but no objective symptoms were observed.

4 of the 32 reactors = 12 per cent. approximately, gave a temperature reaction, but no objective symptoms were noted.

Early in September, 1927, i.e., three months after the above experiment, some of the calves inoculated in May and June, 1927 contracted rinderpest. They were all double inoculated with laboratory virulent blood, and the same doses of serum as were given in May and June experiment with the following results :—

72 reacted = 28.8 per cent. of the total of 248 head.

Blood collected from several of the reactors produced rinderpest in susceptible cattle.

Summary.—An original inoculation of the unweaned calves, total 248 in experiment, with goat virus and simultaneously the prescribed doses of anti-serum and a subsequent inoculation with virulent bovine blood and simultaneously the prescribed doses of anti-serum did not always confer immunity. Three months later, i.e., after weaning, a percentage reacted to rinderpest by contact and to double inoculation with virulent bovine blood and anti-rinderpest serum.

Note.—A percentage of unweaned calves have some resistance and do not react to inoculation of virulent bovine blood.

The following cattle were also inoculated at N'dabibi Estate, in June, 1927.

102 unweaned calves, aged 6 months approximately, were inoculated on the 27-6-1927, each with 2 c.c. citrated virulent bovine blood and anti-serum at the rate of 25 c.c. per 100 kilos, body weight.

Total reacted	...	76 = 74.5%
Non-reactors	...	26 = 25.5%

Immunity Test.—All non-reactors were re-inoculated on the 13th day after the date of the original inoculation each with 2 c.c. citrated virulent blood.

Result.—Four gave a temperature reaction but showed no objective symptoms.

Blood from one of the above was inoculated to a susceptible beast but did not produce rinderpest.

Lot 2.—The following report of results of inoculation of Lot 2 was furnished by Dr. S. H. Whitworth who carried out the experiment.

The cattle for experimental inoculation numbered 120 head. They were in good condition, and varied in age from approximately 18 months to 3 years; each was branded with a consecutive number.

On 9-8-1927, each animal was inoculated simultaneously with 5 c.c. citrated blood, ex laboratory goat No. 318, plus anti-rinderpest serum at the rate of 30 c.c. per 100 kilos. body weight. The body weight of each animal was gussed.

From 10-8-1927 to 11-9-1927, inclusive, the cattle were put on daily morning temperatures.

One animal was found to be branded A.M., and another was discontinued from the experiment on 10-8-1927, apparently suffering from snake bite. This animal was destroyed by the Manager of the Estate on 22-8-27. 118 head, therefore, remained for experimental observations.

The following is a summary of the results :—

Reactions to Goat Virus and Simultaneously Anti-serum.

Temperature reactions commenced in individual cases on the 3rd and succeeding days until the 9th day after double inoculation.

Up to, and including the 9th day after double inoculation, 67 head (or 56.78 per cent.) reacted to goat virus plus anti-rinderpest serum.

The following tables give the number of reactions which commenced on individual days.

TABLE NO. 1.

Days after D.I. . .	3	4	5	6	7	8	9	Total 67 head.
Number of reactions	1	12	16	17	12	5	4	

Contact reactions.—Between the 10th and 18th days after double inoculation a further 13 head (or 11 per cent.) contracted rinderpest by contact.

The following table gives the number of reactions which commenced on individual days between the 10th and 18th inclusive.

TABLE NO. 2.

Days after D.I. . .	10	11	12	13	14	15	16	17	18	Total 13 head.
Number of reactions	5	1	3	0	3	0	0	0	1	

This leaves 38 head (or 32.22 per cent.) non-reactors to goat virus.

As a precautionary measure, all the non-reactors received anti-rinderpest serum at the rate of 20 c.c. (approximately), per 100 kilos, body weight, on the 12th day after the original double inoculation.

Immunity Test.—All the experimental lot were re-double inoculated with bovine virus plus anti-serum at the rate of 30 c.c. (approximately) per 100 kilos, body weight, on 27-8-1927, i.e., the 18th day after the original double inoculation, with the result that 35 head (or 29.66 per cent.) reacted to rinderpest. These cattle did not react to the original double inoculation.

Three head (or 2.54 per cent.) failed to give a temperature reaction to either double inoculation.

The following tables give the number of reactions which commenced on individual days after the re-double inoculation on 27-8-1927.

TABLE NO. 3.

Days after D.I. . .	3	4	5	6	7	8	9	Total 35 head.
Number of reactions	3	19	9	2	1	0	1	

No reactions commenced after the 9th day. Daily morning temperatures were discontinued on 11-9-1927, i.e., the 15th day after the immunity test inoculation.

Tables 1 and 3 may be represented in per centages of reactions to goat and bovine virus, as follows:—

TABLR NO. 4.

Days after inoculation ..	3	4	5	6	7	8	9	
Percentage reaction to Goat virus ..	1.5	18.0	24.0	25.3	18.0	7.5	6.0	Total reactions 67 head.
Percentage reaction to Bovine virus ..	8.57	54.3	25.7	5.7	3.0	0.0	3.0	Total reactions 35 head.

It can be seen from this table that there are more delayed reactions to goat virus than is the case with bovine virus.

Severity of Reactions.—At the time this experiment was conducted, approximately 1,200 head of cattle of similar age were double inoculated by the rinderpest service, using bovine virulent blood, and anti-rinderpest serum at the rate of 30 c.c. (approximately) per 100 kilos, body weight. The clinical symptoms shown by cattle reacting to bovine virus were more severe than those observed in cattle reacting to goat virus.

Lot 3.—Consisted of 42 head, varying in age from 15 months to 4 years old approximately. Of this total, 7 were found to be immune. This leaves a balance of 35 susceptible cattle, which were inoculated on 9-8-1927, each with 2 c.c. citrated blood of goat 304 reacting to rinderpest, and simultaneously with anti-rinderpest serum at the rate of 30 c.c. per 100 kilos body weight. Each beast was weighed prior to inoculation, and the dose thus actually determined.

Cattle were put on daily temperatures from the 3rd day after inoculation. Those which failed to react were tested on their immunity on the 13th day after the date of the original inoculation with 2 c.c. of virulent bovine blood and simultaneously 30 c.c. per 100 kilos body weight anti-rinderpest serum.

Result.—Reactions commencing up till the 9th day inclusive after inoculation, 22 = 62 per cent.

Reactions commencing from the 10th till the 14th day inclusive after inoculation (contact infection), 7 = 20 per cent.

Non-reactors, 6 = 17 per cent.; when tested on their immunity with virulent bovine blood all reacted to rinderpest.

Conclusions.

- (1) First passage of bovine rinderpest virus through a goat produces an attenuation of the virus.
- (2) First passage of bovine rinderpest virus through a goat fails, in some instances, to produce a reaction to rinderpest.
- (3) Immunity is not conferred in cattle which do not react.
- (4) Susceptible cattle which fail to react contract rinderpest by contact from the reactors.
- (5) The first passage of bovine virus through a goat is unsuitable for rinderpest immunisation.

(D).—*The use of Virus-makers (cattle) born and reared on Estates where dipping is regularly carried out.*—To determine the incidence of redwater and gallsickness in cattle born and reared on estates where dipping is regularly carried out from or shortly after birth, a number of young stock were obtained from various estates and railed to the Laboratory, kept under tick-free conditions and their blood (5 c.c.) inoculated to newly born calves.

In some instances, blood was collected on the estate and forwarded to the Laboratory and inoculated to a newly born calf within 24 hours after collection. The newly born calves utilised for testing the blood were kept under tick-free conditions at the Laboratory, put on daily temperature and blood smears collected and examined on various dates.

The following observations were recorded :—

(a) Cattle born on Estate " S " where 7 days dipping, not combined with hand-dressing, is regularly carried out.

Lot 1.—Consisted of 7 heifers, age 20 months ot 2 years.

Result.—Blood of 6 produced redwater = 85% approx.

Blood of 6 produced anaplasmosis = 85% approx.

Lot 2.—7 cattle, age 18 months, approximately, born and bred on the above-mentioned Estate. A bottle of blood from each was forwarded to the Laboratory.

Result.—Blood of 6 produced redwater = 85%

Blood of 6 produced anaplasmosis = 85%

(b) Cattle born and reared on an estate where short interval dipping (3 days) combined with hand-dressing is regularly carried out from or shortly after birth.

Lot 1.—Pooled blood of 3 cattle, Nos. 1, 2, and 3, ages, approximately, 6 months, did not transmit redwater and anaplasmosis.

1, 2 and 3 reacted to both when tested on their susceptibility. The calf used for testing blood of Nos.

1, 2 and 3, when tested on its immunity reacted to anaplasmosis.

Pooled blood of 3 cattle, Nos. 4, 6 and 6, age, approximately, 6 months.

Result.—Did not transmit redwater.

4, 5 and 6, when tested on their susceptibility reacted to redwater. Observations were discontinued prior to termination of the incubative period of anaplasmosis.

Calf used for testing the blood of 4, 5 and 6 reacted to redwater and anaplasmosis when tested on its susceptibility.

(c) Cattle born and reared on an estate where short-interval dipping, not combined with hand-dressing, is carried out from or shortly after birth.

Lot 1.—Ex Estate "M. F." consisted of 33 bulls, age 20 months approximately. Five were bled and their blood (5 c.c.) inoculated to newly born calves.

Result.—Blood of 2 transmitted redwater = 40%
Blood of 3 transmitted anaplasmosis = 60%

The 33 bulls were subsequently inoculated each with 5 c.c. redwater and gallsickness blood.

Result.—31 reacted to redwater = 93% approx.
14 reacted to anaplasmosis = 40% approx.

Lot 2.—Ex Estate "K" blood of 2 cattle aged about 6 months.

Result.—Produced anaplasmosis, but no redwater. The 2 calves used for test, when tested on their immunity with redwater and gallsickness blood reacted to redwater.

Conclusions.

1. A large percentage of the young stock (18 to 20 months) born and reared on an estate where dipping at 7 days interval, not combined with hand-dressing, is regularly carried out do not escape redwater and gallsickness.

2. Young stock aged (6 months) born and reared on an estate where 3 days dipping, combined with hand-dressing is regularly carried out, escaped redwater and gallsickness. Total in experiment, 6.
3. A large percentage of the young stock (20 months old), born and reared on an estate where 3 days dipping, not combined with hand-dressing, is regularly carried out, escaped redwater, and a smaller percentage anaplasmosis.
4. Short interval dipping, combined with hand-dressing, decreases the incidence of redwater and gallsickness, but increases the risk of complications with redwater and gallsickness consequent on rinderpest immunisation.

The possibility of obtaining supplies of cattle, suitable for rinderpest virus-makers, susceptible to redwater and gallsickness from estates where short-interval dipping, combined with thorough hand-dressing is carried out, is receiving attention.

(2).—*Rinderpest—Prophylactic Vaccination.*

The value of extracts of material collected from cattle reacting to rinderpest (virus-makers) immediately after they had been bled to death for virus usually on the fourth day of the temperature reaction, and treated by the following methods, was investigated. Susceptible grade cattle of about 20 months were subcutaneously inoculated with the extract and subsequently tested on their immunity with virulent blood; in a few instances, inoculated cattle were put in contact with rinderpest reacting cattle immediately after inoculation.

Method 1.—Inoculation of extract alone (2 inoculations), the treated pulp incubated prior to inoculation; material pulped with a Latapie pulper and normal saline in the proportion of 1 of pulp to 9 of saline containing toluol so as to make 1 per cent. toluol of the total bulk, added, then filtered through muslin and incubated at 38° C. for varying periods and stored in the ice-chest at 0° C. or 5° to 10° C. for varying periods.

(a) Spleen pulped 11-8-1927, treated as above, incubated for 72 hours and stored in ice-chest at 0° C.

- C. 1978.—1st inoculation 16-8-1927. Dose at the rate of 30 c.c. per 100 kilos.
- C. 1978.—2nd inoculation 25-8-1927. Dose at the rate of 30 c.c.s per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—1-9-1927. Inoculated 2 c.c. virulent bovine blood.

Result.—Temperature reaction to rinderpest on the 5th, 6th and 7th days. Maximum 104° C. Animal recovered.

Re-tested on its immunity 16-12-1927 with 2 c.c. virulent bovine blood.

Result.—No reaction.

(b) Spleen pulped 19-8-1927, treated as above, incubated for 96 hours and stored at 0° C.

C. 1970, 1999, 2007 and 2025.—1st inoculation 26-8-1927. Dose at the rate of 30 c.c. per 100 kilos.

2nd inoculation 2-9-1927. Dose at the rate of 30 c.c. per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—10-9-1927. 1970, 1999, 2007 and 2025 were each inoculated subcutaneously with 2 c.c. virulent bovine blood.

Result.—1970, 1999, 2007 did not react.

2025 temperature reaction from the 4th to 7th day inclusive. Maximum 105.6° F., 5th day. Blood collected on the 6th day and inoculated to a susceptible beast produced rinderpest.

1970, 1999, 2007 and 2025 were re-tested on their immunity on the 16-12-1927, each with 2 c.c. virulent bovine blood.

Result.—1970 and 1999 reacted to rinderpest. Blood collected from both during the reaction, produced rinderpest.

2007 and 2025 gave no temperature reaction.

Spleen pulped 9-9-1927, treated as above, but incubated for 72 hours, stored at 0° C.

2067, 2204.—1st inoculation 12-9-1927. Dose at the rate of 30 c.c. per 100 kilos.

2nd inoculation 19-9-1927. Dose at the rate of 30 c.c. per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—16-12-1927, 2 c.c. virulent bovine blood subcutaneously.

Result.—2067 and 2204 reacted to rinderpest.

(c).—Liver pulped 8-9-1927. Normal saline in proportion of 1 of pulp to 5 of saline containing toluol so as to make 1 per cent. toluol of the total bulk added, filtered through muslin, incubated for 48 hours at 38° C. and stored at 0° C.

Cattle 1989. 1st inoculation 10-9-1927. Dose at the rate of 30 c.c. per 100 kilos.

2nd inoculation 17-9-1927. Dose at the rate of 30 c.c.'s per 100 kilos.

Result.—From the 6th day after the date of the second inoculation temperature reaction to rinderpest (contact infection) and lasting until the 14th day. Animal recovered.

(d).—Small intestines. Pulped 9-9-1927. Normal saline in proportion of 1 of intestines to 5 of saline, and toluol to make 1 per cent. of the total bulk added. Filtered through muslin, incubated for 72 hours and stored at 5° C.

Cattle 2071. 1st inoculation 12-9-1927 at the rate of 30 c.c. per 100 kilos.

2nd inoculation 19-9-27. Dose at the rate of 30 c.c. per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—16-12-1927. Inoculated subcutaneously with 2 c.c. virulent bovine blood.

Result.—Reaction to rinderpest commencing on the 3rd day. Animal died on the 13th day.

(e).—Muscle pulped 15-9-1927. Normal saline in proportion of 1 of muscle to 5 of saline, and toluol to make 1 per cent. of the total bulk added, filtered through muslin, incubated for 48 hours and stored at 5° C.

Cattle 2192 and 2198. 1st inoculation 23-9-1927. 2nd inoculation 30-9-1927 at the rate of 30 c.c. per 100 kilos, respectively.

Result.—No reaction to rinderpest.

Immunity Test.—16-12-1927. Each inoculated with 2 c.c. virulent bovine blood.

Result.—Both reacted to, and died of rinderpest.

Method 2.—*Two inoculations of pulp, stored in ice-chest after being treated.*—Spleen pulped 11-8-1927. Physiological water in the proportion of 1 of pulp to 9 of saline and toluol so as to make 1 per cent. of the total bulk added. Stored at 5° C.

Cattle 1987. 1st inoculation 16-8-1927. 2nd inoculation 25-8-1927. Both at the rate of 30 c.c. per 100 kilos.

Result.—Slight temperature reaction on the 8th, 9th, and 10th day after the date of the original inoculation—maximum 103°F. on the 9th day.

Immunity Test.—1-9-1927. 2 c.c. virulent bovine blood subcutaneously.

Result.—No reaction.

Re-tested on its immunity 16-12-1927 with 2 c.c. virulent bovine blood.

Result.—No reaction.

Spleen 11-8-1927. Treated as above, but stored at 5° C. for 7 days prior to inoculation.

2010. 1st inoculation 19-8-1927 at the rate of 30 c.c. per 100 kilos. 2nd inoculation 25-8-1927, similar dose.

Result.—No reaction to rinderpest.

Immunity Test.—1-9-1927. 2 c.c. virulent bovine blood—irregular temperature—reaction to rinderpest from 2nd to the 7th day. Maximum 103°F.

2010 was re-tested on its immunity on the 16-12-27 with 2 c.c. virulent bovine blood.

Result.—No reaction.

Method 3.—One inoculation of formalin extract, stored at 0° C. for 48 hours.

(a).—Spleen pulped 9-8-1927 and equal parts saline containing formalin to make 1-1000 formalin of the total bulk added. Stored in ice-chest for 48 hours at 0° C. and centrifuged. Supernatant fluid used.

1895 inoculated 11-8-1927, at the rate of 30 c.c. per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—18-8-1927. 2 c.c. of virulent bovine blood, subcutaneously.

Result.—Reacted to rinderpest and subsequently bled to death for virus.

(b).—Spleen of the same beast treated as above, but deposit diluted with saline, 1 of deposit to 9 of saline, and inoculated.

1908 inoculated 11-8-1927 at the rate of 30 c.c. per 100 kilos.

Result.—No reaction to rinderpest.

Immunity Test.—18-8-1927—2 c.c.'s of virulent bovine blood.

Result.—Reacted to rinderpest and subsequently bled to death for virus.

(c).—*Spleen of same beast treated as above, undiluted deposit inoculated.*

1928 inoculated 11-8-1927. Dose at the rate of 15 c.c. per 100 kilos.

Result.—Reacted to rinderpest, and animal subsequently bled to death for virus.

Summary of inoculation of susceptible cattle with various extracts.

(1).—The inoculations at intervals of seven to nine days of toluol extracts of spleen, liver, small intestines and muscle.

(a).—Spleen extracts incubated for 72 hours prior to inoculation did not produce rinderpest (3 in experiment); when tested on their immunity all 3 reacted to rinderpest.

(b).—Spleen extract incubated for 96 hours and stored for three days at 0° C. prior to inoculation, did not produce rinderpest (4 in experiment); when tested on their immunity on the 15th day after the date of the original inoculation—one reacted to rinderpest, the remaining 3 did not react; re-tested on their immunity on the 97th day after the date of the original immunity test, 2 which failed to react to the original test reacted to rinderpest, of the remaining two, neither, including the beast which reacted to the original immunity test, reacted to rinderpest.

(c).—Liver extract incubated for 48 hours did not produce rinderpest (1 in experiment), the animal contracted rinderpest by contact.

(d).—Small intestines extract incubated for 72 hours did not transmit rinderpest (1 in experiment); when tested on its immunity 95 days after the date of the original inoculation reacted to, and died of rinderpest.

(e).—Muscle extract incubated for 48 hours did not transmit rinderpest (2 in experiment); when

tested on their immunity on the 84th day after the date of the original inoculation both reacted to, and died of rinderpest.

(2).—Two inoculations at intervals of 9 and 6 days, respectively, of toluol extracts of spleen, not incubated but stored for 5 and 7 days, respectively, at 5° C. prior to inoculation.

(a).—Extract of spleen stored for 5 days produced rinderpest (1 in experiment); when tested on its immunity 15 days after the date of the original inoculation, and on the 107th day after the date of the original immunity test animal proved to be immune.

(b).—Extract of spleen stored for 7 days at 5° C. did not produce rinderpest; when tested on its immunity on the 11th day after the date of the original inoculation animal reacted to rinderpest; when re-tested on the 107th day after the date of the original immunity test, animal proved to be immune.

(3).—*One inoculation formalised extract of spleen pulp centrifuged.*

(a).—Formalised spleen extract stored for 48 hours at 0° C. and then centrifuged and supernatant fluid inoculated, did not produce rinderpest (1 in experiment); animal reacted to rinderpest on immunity test 7 days later.

(b).—Formalised spleen extract stored for 48 hours at 0° C. and centrifuged (1 in experiment), deposit diluted in normal saline, 1 in 9, did not produce rinderpest.

(c).—Formalised spleen extract stored for 48 hours at 0° C. and centrifuged (1 in experiment), deposit inoculated and produced rinderpest.

Method. 4.—Subcutaneous inoculation of extract and virulent bovine blood (simultaneous method).—Toluol extracts of the following, viz.: liver, small intestines, muscle, and spleen, were inoculated simultaneously with 2 c.c. virulent bovine blood.

(A).—*Liver Extract.*—Extract prepared as follows, viz.: minced 8-9-1927, normal saline at the rate of 1 of liver to 5 of saline, containing toluol to make 1 per cent. of the total bulk added, mixture then filtered through muslin, incubated 72 hours at 38° C. and stored in ice-chest at 0° C.

C2224, grade, 2½ years, inoculated 12-10-1927 with extract, dose 20 c.c. per 100 kilos body weight, and simultaneously 2 c.c. virulent bovine blood.

Result.—Reacted to rinderpest with well-marked clinical symptoms and recovered.

(B).—*Small intestines extract.*—Extract prepared as follows: Minced 9-9-1927, normal saline at the rate of 1 of intestines to 5 of saline, containing toluol to make 1 per cent of the total bulk added, filtered through muslin, incubated 72 hours and stored at 5° C. since removal from incubator.

C2273, grade, 2½ years, inoculated 12-10-1927. Dose 20 c.c. per 100 kilos body weight, and simultaneously 2 c.c. virulent bovine blood.

Result.—No reaction. Animal probably immune. Tested on its immunity on the 16-12-1927. Result: No reaction.

C2297, grade, 2½ years, inoculated with the above extract on 3-11-1927. Dose 100 c.c. per 100 kilos and simultaneously 2 c.c. virulent blood.

Result.—Reacted to rinderpest and recovered.

C2335, grade, 2½ years, inoculated with the above extract on 3-11-1927. Dose 50 c.c. per 100 kilos and simultaneously 2 c.c. virulent bovine blood.

Result.—Reacted to rinderpest and recovered. Marked symptoms.

(C).—*Muscle Extract.*—Extract prepared as follows, viz.: Minced 14-9-1927, normal saline in the proportions of 1 of muscle to 5 of saline containing toluol to make 1 per cent. toluol of total bulk, incubated 48 hours at 38° C. and stored at 5° C.

(a).—C.2245, grade, 2½ years, inoculated 12-10-27, with extract at the rate of 20 c.c. per 100 kilos body weight and simultaneously 2 c.c. virulent bovine blood.

Result.—On the 6th and 7th day temperature elevated, maximum 106°F. returning to normal evening of 7th day.

(b).—C.2407, grade 2 years, inoculated on 3-11-27 with muscle extract at the rate of 100 c.c. per 100 kilos and simultaneously 2 c.c. virulent bovine blood.

(c).—C.2301, grade, 2 years. inoculated on 3-11-27 with extract at the rate of 50 c.c. per 100 kilos and simultaneously 2 c.c. virulent blood.

Result.—C.2407 gave a marked reaction and recovered.
C.2301 gave a marked reaction and recovered.

Extract prepared as follows, *viz.* : Minced 27-10-1927, normal saline in the proportion of 1 of muscle to 4 of saline containing toluol to make 1 per cent. toluol of the total bulk added, incubated 72 hours and stored at 5° C.

(d).—C.2294, grade, 2 year old, inoculated 3-11-27 with extract at the rate of 100 c.c. per 100 kilos body weight, simultaneously and 2 c.c. virulent blood.

(e).—C.2406, grade, 2 year old, inoculated 3-11-27, with extract at the rate of 50 c.c. per 100 kilos and simultaneously 2 c.c. virulent blood.

Result.—C.2294 gave a mild reaction and recovered.
C. 2406 gave a marked reaction and died of rinderpest-pneumonia on the 22nd.

(D).—*Spleen Extract.*—Extract prepared as follows, *viz.* : Minced 22-9-1927, normal saline in the proportion of 1 of spleen to 9 of saline containing toluol to make 1 per cent. toluol of the total bulk added. Incubated 48 hours and stored at 5° C.

(a).—2175 (?) grade, 2½ years, inoculated 30-9-27 with extract at the rate of 20 c.c. per 100 kilos body weight and simultaneously 2 c.c. virulent blood.

Result.—Reacted to rinderpest, marked symptoms, animal died on the 20th day after inoculation, sequel of rinderpest.

(b).—Extract of same spleen and same method of preparation as above, but extract centrifuged and supernatant fluid used.

2158, grade, 2½ years, inoculated 30-9-1927, with extract at the rate of 20 c.c. per 100 kilos and simultaneously 2 c.c. virulent blood.

Result.—Reacted to rinderpest and recovered.

(c).—Extract of same spleen and same method of preparation as above, but extract centrifuged and deposit used.

2170, grade, 2½ years, inoculated 30-9-1927, with extract at the rate of 20 c.c. per 100 kilos body weight and simultaneously 2 c.c. virulent blood.

Result.—Reacted to rinderpest and recovered.

(d).—Extract of spleen, prepared as follows, viz.:
Minced 15-9-1927, saline in the proportion of 1 of spleen to 5 of saline containing toluol to make 1 per cent. toluol of the total bulk added. Incubated 48 hours and stored at room temperature.

1718, grade, inoculated 22-10-1927, with extract at the rate of 20 c.c. per 100 kilos and simultaneously 2 c.c. virulent blood.

Result.—No reaction. Animal proved to be immune to rinderpest.

2389 and 2397 inoculated 3-11-1927 at the rate of 100 and 50 c.c. respectively, per 100 kilos body weight and 2 c.c. virulent blood.

Result.—2389 reacted to rinderpest and recovered—marked reaction.

2397 reacted to rinderpest and recovered—mild reaction.

(e).—Extract spleen prepared as follows: Minced 17-9-1927, saline in the proportion of 1 of extract to 5 of saline, containing toluol to make 1 per cent. of the total bulk added, incubated for 72 hours and stored at 5° C.

2296 and 2308 inoculated 3-11-1927 with extract at the rate of 100 and 50 c.c. per 100 kilos body weight, respectively, and 2 c.c. virulent blood.

Result.—Both reacted to rinderpest and recovered.

(f).—Extract of spleen prepared as follows: Minced 28-10-1927, saline in the proportion of 1 of spleen to 4 of saline containing toluol to make 1 per cent. toluol of the total bulk added, incubated for 48 hours and stored at 5° C.

2358 and 2370 inoculated subcutaneously 3-11-1927 with extract at the rate of 80 and 40 c.c. respectively, per 100 kilos and 2 c.c. virulent blood.

Result.—2358 reacted to rinderpest and died of rinderpest.
2370 reacted to rinderpest and died of rinderpest.

(E).—A mixture of extracts of the following spleens treated with 1 per cent. toluol.

Extract dated 28-10-1927; 1 of extract in 4 of saline.

Extract dated 15-9-1927; 1 of extract in 5 of saline.

Extract dated 27-10-1927; 1 of extract in 4 of saline.

(a).—2307, 2350, each inoculated 3-11-1927, with a mixture of equal parts of the above extracts. Dose 80 and 40 c.c. per 100 kilos, respectively, and 2 c.c. virulent blood simultaneously.

Result.—Both reacted to rinderpest and recovered.

Method 5.—*Formalised extracts of spleen and intestines prepared as follows:* Minced I-12-1927, saline added to equal parts of minced spleen and intestines (1000 grammes of each) in the proportion of 1 of spleen and intestines to 4 of saline.

Commercial formalin was added to make 1 per cent. of the total bulk, extract incubated for 72 hours at 38° C. then stored at room temperature.

(a).—*Inoculation of the above prepared extract and simultaneously 2 c.c. virulent blood.*

2528; 2533; 2537, inoculated 14-12-1927, with the above extract at the rate of 10, 20, 40 c.c. per 100 kilos, body weight, respectively, and simultaneous, 2 c.c. of virulent blood.

Result.—All three reacted to rinderpest.

2528 and 2533 died of rinderpest complicated with red-water.

2537 recovered.

Method 6.—*Inoculation of the above prepared extracts and 6 days later, 2 c.c. virulent bovine blood.*

(a).—2545; 2534; and 2536, inoculated subcutaneously 16-12-1927, with the above prepared extracts at the rate of 10, 20, and 40 c.c.'s, respectively, per 100 kilos body weight and 6 days later with 2 c.c. virulent bovine blood.

Result.—2545 reacted to rinderpest from the 3rd day after inoculation of the virus and died on the 6th day. No rinderpest lesions seen on post-mortem. Cause of death unknown.

2534 reacted to rinderpest from the 3rd to 6th day after inoculation of the virus. Animal recovered.

2536 reacted to rinderpest from the 3rd to 7th day after inoculation of the virus. Animal recovered.

Method 7.—*Inoculation of the above prepared extracts, and the inoculated cattle put in contact, in same stall, with rinderpest reacting cattle.*

(a).—2523; 2538; 2521, inoculated 16-12-1927, subcutaneously with the above prepared extract at the rate of 10, 40, and 60 c.c. respectively, per 100

kilos body weight; and then put in contact with reacting rinderpest cattle. Animals kept in contact till 17-1-1928.

Result.—2523, irregular temperature reaction. 2538, irregular temperature reaction. 2521, irregular temperature reaction.

Immunity Test.—2523, inoculated on 11-1-1928 with 2 c.c. virulent bovine blood.

Result.—No reaction.

Remaining 2 cattle to be tested on their immunity at a later date.

Summary.

(1).—*Subcutaneous inoculation of toluol extracts and simultaneously virulent blood.*

(a).—Liver extract, incubated for 72 hours and stored 34 days at 0° C. and simultaneously 2 c.c. virulent bovine blood (1 in experiment).

Result.—Animal reacted to rinderpest and recovered.

(b).—Small intestines extract, incubated for 72 hours and stored at 5° C. for from 33 to 36 days and simultaneously 2 c.c. virulent bovine blood (3 in experiment).

Result.—Two reacted to rinderpest and recovered. The remaining animal proved to be already immune to rinderpest prior to being put in experiment.

(c).—Muscle extract, incubated for 48 hours and stored at room temperature for, from 3 to 5 days at 5° C. prior to inoculation (5 in experiment).

Result.—All reacted, 4 of which recovered. The remaining animal died of rinderpest.

(d).—Spleen extract, incubated for from 48 hours to 72 hours, and kept at room temperature for from 6 to 49 days (10 in experiment).

Result.—9 reacted of which 3 died of rinderpest. The remaining animal proved to be immune to rinderpest prior to being put in experiment.

(2).—*Subcutaneous inoculation of a mixture of spleen extract of different dates and simultaneously 2 c.c. virulent blood.*

(a).—Equal parts of spleen extracts prepared on the following dates, 14-9-1927; 23-10-1927, and 27-10-1927, incubated for from 48 to 72 hours and inoculated 3-11-1927, and simultaneously virulent blood (2 in experiment).

Result.—Both reacted to rinderpest and recovered.

(3).—*Subcutaneous inoculation of formalised extract of equal parts of spleen pulp and small intestines in normal saline, and simultaneously virulent blood.* (1 of pulp to 4 of saline).

(a).—Commercial formalin added to make 1 per cent of the total bulk, incubated for 72 hours and kept 10 days at room temperature. (Total in experiment 3).

Result.—All reacted, two of which died of rinderpest, complicated with redwater.

(b).—Subcutaneous inoculation of the above extracts prepared as above and 6 days later, 2 c.c. virulent blood. (3 in experiment).

Result.—All reacted to rinderpest and recovered.

(4).—*Subcutaneous inoculation of formalin extract of equal parts of spleen and small intestines prepared as above.*

(a).—Inoculated cattle put in contact with rinderpest reacting cattle immediately after inoculation and kept in contact (3 in experiment) for 32 days.

Result.—Irregular temperature reactions were recorded.

Immunity Test.—1 of the 3 cattle, viz : 2523 inoculated on the 26th day of contact with 2 c.c. virulent blood.

Result.—No reaction.

The 3 will be re-tested on their immunity at a subsequent date.

Conclusions.

- (1).—1 per cent. toluol extracts of spleen, etc., incubated for 48 hours or more, produce no reaction to rinderpest, but in some instances, they confer a temporary immunity.
- (2).—1 per cent. toluol extracts of spleen, etc, not incubated, but stored at 5° C. immediately after preparation possess a varying degree of virulency.
- (3).—Inoculation of non-virulent toluol extracts or formalin does not confer a resistance to simultaneous inoculation of virus.
- (4).—Inoculation of non-virulent formalin extracts does not confer a resistance to the inoculation of virus 6 days later.
- (5).—Inoculation of non-virulent formalin extracts conferred some resistance to contact infection.

In discussing the prophylactic inoculation of rinderpest by spleen extracts, various aspects of fundamental importance, including the following, should enter into consideration, viz. :—

1. Standardisation of extract.
2. Nature of the immunity conferred.
3. Susceptibility of cattle.

(1).—*Standardisation*.—Observations already made show that spleen extracts may be prepared which retain some virulency for some days, at least, when stored at 5° C. and that the degree of virulency varies in different lots of spleen extracts; the difficulty of maintaining *in vitro* rinderpest virus at a degree of virulency is well-known, and it does not appear practicable to test and conserve each lot of extract at the requisite standard of virulency during the period which must necessarily elapse between the date of preparation, and its use in the practice.

(2).—*Nature of Immunity*.—It is well known that in order to confer 100 per cent. of immunity by the simultaneous method (virus and anti-serum) the use of fresh virus is of fundamental importance; at the present stage of our knowledge, the inoculation of non-virulent extracts, produce, in some instances, a temporary immunity, but data is not yet available to arrive at a definite conclusion as to the nature of the immunity conferred by more or less virulent extracts.

(3).—*Susceptibility*.—The differences in susceptibility of Kenya cattle are known, and must enter into consideration in the prophylactic inoculation with extracts which contain other than fresh virus.

THE EFFECTS OF TARTARIC EMETIC ON THE VIRUSES OF RINDERPEST AND *TRYPANOSOMA VIVAX* "IN VITRO."

Experiments carried out at the Veterinary Laboratory, Nigeria, Northern Provinces, and recorded by the Veterinary Pathologist, in his Annual Report for 1926, showed that whereas virulent rinderpest blood containing vivax infection treated with tartar emetic, 1 in 20,000 parts of citrated blood, was virulent for rinderpest, the vivax infection was destroyed in five minutes.

During the period under review an opportunity occurred of carrying out a similar experiment.

Rinderpest blood containing *T. vivax* infection was treated as above and then inoculated to a beast No. 2679 susceptible to both infections.

Result.—The animal reacted to rinderpest and recovered.

Blood smears collected daily were negative on examination for *T. vivax* infection; 23 days later, 2679 was re-inoculated with untreated blood containing *T. vivax* infection. A reaction to vivax commenced on the 10th day; blood smears confirmed the existence of vivax infection.

The use of tartaric emetic should thus be of practical value in rinderpest immunisation operations in vivax infected areas for obtaining supplies of rinderpest blood free of vivax infection, but would not overcome the risk of recurrence of vivax and other trypanosome infections, consequent on the rinderpest reaction, in infected cattle submitted for immunisation.

EAST COAST FEVER.

During the period under review, a number of susceptible grade cattle, and, in a few instances, calves, were put in experiment to : (a) determine which method or combination of methods of inoculation produces the greatest percentage of reactions; (b) compare the mortality from East Coast Fever which occurs by the various methods; (c) ascertain whether an original inoculation confers a resistance to re-inoculation, and (d) whether a higher resistance to natural infection is conferred by re-inoculation.

The transmissibility of East Coast Fever by inoculation of emulsions of infected ticks, species *Rhip. appendiculatus*, and the immunity conferred in cattle which react to inoculation of emulsions of infected ticks was also investigated.

This experimental work was undertaken chiefly with a view to elaborating a method of inoculation which would produce the greatest percentage of reactions to East Coast Fever, and the lowest death rate from inoculation and subsequent exposure to natural infection.

Experimental East Coast Fever immunisation work carried out and recorded by investigators, notably Sir Arnold Theiler, and also by the writer, showed that whereas the intravenous inoculation of spleen pulp of an East Coast Fever beast in the later stages of the disease produces a percentage of reactions, and some mortality, a percentage of the inoculated cattle do not give an apparent reaction to East Coast Fever, and that a larger percentage of the inoculated animals which definitely react to East Coast Fever survive natural infection in comparison with cattle which give an "indefinite" or no apparent reaction to inoculation.

Other experimental East Coast Fever work included the following :—

Immunisation of unweaned calves.

Prophylactic inoculation with spleen extract.

All cattle put in experiment were kept under daily observation, daily morning temperature recorded, and smears collected and examined on various dates.

(1) *Various methods of inoculation of material collected from infected cattle.*—The methods made use of, the percentage of reactions obtained, and the percentage of mortality, were as follows :—

1. Subcutaneous inoculation of blood.
2. Subcutaneous and intracutaneous inoculation of blood.
3. Subcutaneous and intravenous inoculation of blood.
4. Subcutaneous and intrasplenic inoculation of blood.
5. Subcutaneous inoculation of spleen pulp.
6. Subcutaneous and intracutaneous inoculation of spleen pulp.
7. Subcutaneous and intravenous inoculation of spleen pulp.
8. Subcutaneous inoculation of blood mixed with spleen pulp.
9. Subcutaneous and intracutaneous inoculation of blood mixed with spleen pulp.
10. Subcutaneous and intravenous inoculation of blood mixed with spleen pulp.
11. Subcutaneous, intracutaneous and intravenous inoculation of blood mixed with spleen pulp.
12. Intravenous inoculation of spleen pulp and subcutaneous and intradermal inoculation of blood.
13. Intravenous inoculation of spleen pulp and subcutaneous and intradermal inoculation of blood mixed with spleen pulp.
14. Intravenous inoculation of spleen pulp.
15. Intravenous inoculation of spleen pulp mixed with blood.
16. Intravenous inoculation of gland juice. (Dose, 1 c.c.)
17. Subcutaneous and intradermal inoculation of gland juice. (Dose, 1 c.c.)

1.—*Subcutaneous inoculation of blood.*

Dose : 10 c.c.

Total in experiment : 7.

Result :

	Approximate percentage.
Temperature reaction with Koch's bodies ...	0 = 0.00
Temperature reaction with no Koch's bodies	1 = 14.00
Non-reactors	6 = 85.00
Mortality	Nil.

2.—*Subcutaneous and intracutaneous inoculation of blood.*

Dose : 10 c.c.

Total in experiment : 41.

Result :

	Approximate percentage.
Temperature reaction with Koch's bodies ...	5 = 12.2
Temperature reaction with no Koch's bodies	11 = 26.8
Non-reactors	25 = 60.9
Total mortality	1 = 2.67

3.—*Subcutaneous and intravenous inoculation of blood.*

Dose : 10 c.c.

Total in experiment : 7.

Result :

Non-reactors	7 = 100.00
Mortality	Nil.

4.—*Subcutaneous and intrasplenic inoculation of blood.*

Dose : 10 c.c.

Total in experiment : 4.

Result :

Non-reactors	7 = 100.00
Mortality	Nil.

5.—*Subcutaneous inoculation of spleen pulp.*

Dose : 5 to 10 c.c.

Total in experiment : 6.

Result :

	Approximate percentage.
Temperature reaction with Koch's bodies ...	3 = 50.00
Temperature reaction with no Koch's bodies	1 = 16.60
Non-reactors	2 = 33.30
Total mortality from East Coast Fever ...	1 = 16.00

6.—*Subcutaneous and intracutaneous inoculation of spleen pulp.*

Dose : 5 c.c. subcutaneously, 1 c.c. intradermally.

Total in experiment : 5.

Non-reactors	5 = 100.00
Total mortality	Nil.

7.—*Subcutaneous and intravenous inoculation of spleen pulp.*

Dose : 5 c.c. intravenously and 5 c.c. subcutaneously.

Total in experiment : 7.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	1 =	14.20
Temperature reaction with no Koch's bodies	1 =	14.20
Non-reactors	5 =	71.00
Total mortality from East Coast Fever ...	1 =	14.20

8.—*Subcutaneous inoculation of blood mixed with spleen pulp.*

Dose : 5 c.c.

Total in experiment : 6.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	1 =	16.60
Temperature reaction with no Koch's bodies	2 =	33.30
Non-reactors	3 =	50.00
Total mortality		Nil.

9.—*Subcutaneous and intracutaneous inoculation of blood mixed with spleen pulp.*

Dose : 5 c.c. subcutaneously ; 1 c.c. intracutaneous.

Total in experiment : 8.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	2 =	25.00
Temperature reaction with no Koch's bodies	1 =	12.50
Non-reactors	5 =	62.50
Total mortality		Nil.

10.—*Subcutaneous and intravenous inoculation of blood mixed with spleen pulp.*

Total in experiment : 4 (3 calves, 1 20-months'-old beast).

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	1 =	25.00
Temperature reaction with no Koch's bodies	1 =	25.00
Non-reactors	2 =	50.00
Total mortality		Nil.

11.—*Subcutaneous, intracutaneous and intravenous inoculation of blood mixed with spleen pulp.*

Total in experiment : 11 (6 calves and 5 20-months'-old beasts).

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	3 =	27.20
Temperature reaction with no Koch's bodies	4 =	36.30
Non-reactors	4 =	36.30
Total mortality	1 =	9.00

12.—*Intravenous inoculation of spleen pulp, and subcutaneous and intradermal inoculation of blood.*

Dose : 10 c.c. intravenous, 5 c.c. subcutaneously, and 2 c.c. intradermally.

Total in experiment : 29 (23 2-year-old cattle and 6 6-months calves).

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	10 =	34.40
Temperature reaction with no Koch's bodies	5 =	17.20
Non-reactors	14 =	48.20
Total mortality from East Coast Fever ...	2 =	6.80

13.—*Intravenous inoculation of spleen pulp and subcutaneous and intradermal inoculation of blood mixed with spleen pulp.*

Dose : 10 c.c. intravenously, 2 c.c. subcutaneously, and 2 c.c. intradermally.

Total in experiment : 62.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	19 =	30.60
Temperature reaction with no Koch's bodies	35 =	56.40
Non-reactors	8 =	12.80
Total mortality from East Coast Fever ...	7 =	10.12

14.—*Intravenous inoculation of spleen pulp.*

Dose 10 c.c.

Total in experiment : 164.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	53 =	32.30
Temperature reaction with no Koch's bodies	34 =	20.70
Non-reactors	77 =	46.90
Total mortality from East Coast Fever ...	11 =	6.70

15.—*Intravenous inoculation of spleen pulp mixed with blood.*

Dose 10 c.c.

Total in experiment : 14.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	6 =	42.80
Temperature reaction with no Koch's bodies	4 =	28.00
Non-reactors	4 =	28.00
Total mortality from East Coast Fever ...	1 =	7.00

16.—*Intravenous inoculation of gland juice (material collected from the living beast with a syringe and a needle).*

Dose : 1 c.c.

Total in experiment : 6.

Result :

		Approximate percentage.
Temperature reaction with Koch's bodies ...	1 =	16.60
Non-reactors	5 =	82.50
Total mortality		Nil.

17.—*Subcutaneous and intradermal inoculation of gland juice (material collected from the living beast with a syringe and needle).*

Dose 1 c.c. subcutaneously and 1 c.c. intradermally.

Total in experiment : 6.

Result :

		Approximate percentage.
Temperature reaction with no Koch's bodies	1 =	16.60
Non-reactors	5 =	82.50
Total mortality		Nil.

SUMMARY OF RESULTS OF TRANSMISSION EXPERIMENTS.

Method	% of Reactions with Koch's bodies in gland smears.	% of Temperature reactions only.	% of non-reactors.	% of Mortality.
BLOOD :				
Subcutaneous	0	14	85	0
" and Intracutaneous	12.2	26.8	60.9	2.7
" and Intravenous..	0	0	100	0
" and Intrasplenic..	0	0	100	0
SPLEEN PULP :				
Subcutaneous	50	16.6	33.3	16
" and Intracutaneous	0	0	100	0
" and Intravenous ..	14.2	14.2	71	14.2
BLOOD MIXED WITH SPLEEN PULP :				
Subcutaneous	16.6	33.3	50	0
" and Intracutaneous	25	12.5	62.5	0
" and Intravenous ..	25	25	50	0
Subcutaneous, Intracutaneous and Intravenous	27.2	36.3	36.3	9
SPLEEN PULP :				
Intravenous and Blood Intracutaneous, and Subcutaneous..	34.4	17.2	48.2	6.8
SPLEEN PULP MIXED WITH BLOOD :				
Subcutaneous and Intracutaneous and Spleen Pulp Intravenous	30.6	56.4	12.8	10.12
SPLEEN PULP INTRAVENOUS ..				
	32.3	20.7	46.9	6.7
SPLEEN PULP MIXED WITH BLOOD INTRAVENOUS				
	42.8	28	28	7
GLAND JUICE INTRAVENOUS ..				
	16.6	0	82.5	0
GLAND JUICE SUBCUTANEOUS AND INTRACUTANEOUS.. .. .				
	0	16.6	82.5	0

Conclusions.

- (1).—East Coast Fever is transmissible by various methods or combination of methods of inoculation of the following material collected from an East Coast Fever reacting beast.
 - (A).—Blood.
 - (B).—Spleen pulp.
 - (C).—Blood mixed with spleen pulp.
 - (D).—Gland juice.
- (2).—None of the methods invariably produce a reaction.

(3).—The largest percentage of reactions occur from the intravenous inoculation of spleen pulp, and simultaneously subcutaneous, and intradermal inoculation of spleen pulp mixed with blood; with the exception of gland juice, dose 1 c.c. which produced 16 per cent. of reactions: blood alone gives the smallest percentage of reactions, average 28.8 per cent. Inoculation of spleen pulp produces reactions varying from Nil to 87 per cent., approximately.

(4).—The percentage of death rate varies in different lots of cattle from Nil to 16 per cent.

(Average mortality from inoculation of blood alone was 1.6 per cent. approximately.

Average mortality from inoculation of spleen or blood mixed with spleen was 7.5 per cent.)

(2).—

(a) *Whether an original inoculation produces a resistance to re-inoculation, and (b) Whether a higher resistance to natural infection is conferred by re-inoculation.*

A number of susceptible cattle were originally inoculated by one of the following methods, and subsequently re-inoculated and, in some instances, subsequently exposed to natural infection.

(1).—Blood subcutaneously and intradermally.

(2).—Blood subcutaneously.

(3).—Blood mixed with spleen pulp subcutaneously and intradermally.

(4).—Spleen pulp subcutaneously and intradermally.

(5).—Spleen pulp subcutaneously.

(6).—Blood subcutaneously and intravenously.

(7).—Gland juice intravenously.

(8).—Gland juice subcutaneously and intracutaneously.

(9).—Blood intracutaneously and intrasplenically.

(1).—3 inoculations and subsequent exposure (8 grade, 2-year-old heifers).

(a) 1st inoculation, 11-7-1927.—10 c.c. blood subcutaneously, and 10 c.c. blood intradermally.

Total in Experiment : 8.

Result.—None reacted.

2nd inoculation, 6-8-1927—8 c.c. of a mixture of equal parts of East Coast Fever, blood and spleen pulp, intravenously, and 2 c.c. intradermally.

Total in experiment : 8.

Result.—None reacted.

3rd inoculation, 5-9-1927—10 c.c. intravenously of a mixture of equal parts of blood and spleen pulp, and 2 c.c. subcutaneously.

Total in experiment : 8.

Result.—3 reacted (2 recovered and 1 died). Gland smears showed Koch's bodies, 3 gave a temperature reaction, the remaining 2 did not react.

Exposure.—The 7 surviving cattle were exposed on 2-11-1927. 1 died of East Coast Fever.

Total mortality from East Coast Fever from inoculation and exposure, 2=25 per cent.

Note.—Of the above 8 cattle which did not react to the first and second inoculation, 6 = 75 per cent. reacted to a third inoculation, of which 1 = 16 per cent. died of East Coast Fever.

(b) 1st inoculation 11-5-1927. 4 grade oxen, 20 months, 5 c.c. blood subcutaneously, and 1 c.c. blood intradermally.

Total in Experiment : 4.

Result.—1 reacted and recovered, 3 did not react.

2nd inoculation 9-6-1927. 3 non-reactors, inoculated each with 5 c.c. spleen pulp subcutaneously.

Result.—None reacted.

3rd inoculation 6-7-1927. 3 non-reactors inoculated each with 5 c.c. spleen pulp intravenously, and 5 c.c. subcutaneously.

Result.—1 gave a temperature reaction, 2 did not react.

Exposure.—The 3 were exposed on 10-8-1927.

Result.—1 gave a temperature reaction; the remaining 2 proved to be immune.

(c) 1st inoculation 11-5-1927. 4 grade oxen, age about 20 months—5 c.c. blood subcutaneously.

Result.—None reacted.

2nd inoculation 9-6-1927. 3 got 10 c.c. spleen pulp subcutaneously.

Result.—None reacted.

3rd inoculation 6-7-1927. 3 got 5 c.c. spleen pulp subcutaneously, and 5 c.c. intravenously.

Result.—None reacted.

Exposure.—2 were exposed on the 10-8-1927.

Result.—1 reacted and recovered. 1 gave a temperature reaction.

(d) 8 Grade Heifers, age approximately 20 months to 2 years.

1st inoculation, 5-9-1927. 8 c.c. subcutaneously and 1 c.c. intradermally of spleen pulp mixed with blood, equal parts.

Result.—2 reacted and recovered, 6 did not react.

2nd inoculation, 5-11-1927. The 2 reactors and 6 non-reactors to the original inoculation each got intravenously 10 c.c. of a mixture of equal parts of spleen and gland pulp and blood.

Result.—2 temperature reactions.

3rd inoculation. The 4 reactors and 4 non-reactors were again inoculated on the 7-12-1927, each with 10 c.c. spleen pulp intravenously.

Result.—None reacted.

Exposed.—29-12-1927.

Result.—8 reacted, of which 2 died of East Coast Fever.

(e) 4 Grade Cows and 1 two-years-old ox.

1st inoculation, 11-5-1927, each 10 c.c. spleen pulp subcutaneously and 1 c.c. intradermally.

Result.—None reacted.

2nd inoculation, 9-6-1927, each got 10 c.c. spleen pulp subcutaneously.

Result.—1 reacted and recovered. 3 did not react.

3rd inoculation, 6-7-19127. One non-reactor got 5 c.c. subcutaneously and 5 c.c. intravenously of spleen pulp.

Result.—No reaction.

Exposure.—10-8-1927. The non-reactor to the 3 inoculations reacted to exposure and died of East Coast Fever.

The reactor to the second inoculation was exposed on 6-7-1927; gave a temperature reaction and recovered. A non-reactor to the 1st and 2nd inoculations and which was not re-inoculated again was exposed on 10-8-1927, and reacted to East Coast Fever.

(2).—Two inoculations, 6 oxen (four years old and upwards).

(a) 1st inoculation, 6-7-1927, each inoculated with 5 c.c. blood intravenously, and 5 c.c. blood subcutaneously.

Result.—None reacted.

2nd inoculation, 20-7-1927, 5 non-reactors inoculated each with a mixture of equal parts of blood and spleen pulp, 5 c.c. subcutaneously and 5 c.c. analfold.

Result.—None reacted.

Exposed.—1-9-1927. The 5 non-reactors were exposed on 1-9-1927.

Result.—4 reacted and died of East Coast Fever, the remaining one died of other causes on 21-9-1927.

(b) 10 oxen, four years old and upwards :

1st inoculation, 11-7-1927, each got 5 c.c. subcutaneously, and 5 c.c. analfold. Blood.

Result.—2 reacted and recovered, 2 gave a temperature reaction; 6 did not react.

2nd inoculation, 20-7-1927. Eight, namely, the 2 reactors, and 2 temperature reactors, and 4 non-reactors, each got 5 c.c. subcutaneously, and 5 c.c. intravenously of spleen pulp mixed with blood, equal parts.

Result.—2 gave a temperature reaction, 6 did not react.

Exposure.—7 were exposed 6-9-1927, and 21-9-1927, respectively.

Result.—3 reacted and recovered, 1 reacted and died of East Coast Fever, 1 gave a temperature reaction and 2 did not react.

(c) 6 Oxen, about two years old :

1st inoculation, 17-12-1927, each got 10 c.c. subcutaneously, and 3 c.c. intradermally, blood.

Result.—2 gave a temperature reaction, 4 did not react.

2nd inoculation, 21-1-1928, each got 10 c.c. intravenously, 2 c.c. subcutaneously, and 2 c.c. intradermally of spleen pulp mixed with blood.

Result.—1 reacted to East Coast Fever, and showed Koch's bodies in gland smears; 4 gave a temperature reaction.

Exposed.—22-2-1928.

Result.—3 reacted and showed Koch's bodies; 2 temperature reactions; 1 non-reactor. Of the 6 exposed, 1 died of East Coast Fever.

(d) 3 Grade Oxen, and 3 Calves aged 2 months :

1st inoculation, 20-6-1927, each got 10 c.c. of a mixture of equal parts of spleen pulp and blood, subcutaneously.

Result.—1 reacted and recovered, 5 gave a temperature reaction.

2nd inoculation, 20-7-1927, 6 got 5 c.c. subcutaneously and 5 c.c. intravenously of spleen pulp mixed with blood, equal parts.

Result.—None reacted.

A G R

- he non-reactors was exposed on the
 reacted and recovered from East Coast
- Exposure.*—1 of t
 10-8-1927, and
 Fever.
- (e) 3 Grade Oxen : , 11-5-1927, each got 10 c.c. subcut-
 1st inoculation
 aneously spleen pu and died of East Coast Fever, the
Result.—1 reacted
 remaining 2 dⁿ, 4-6-1927. The 2 non-reactors to the
 2nd inoculation each got 5 c.c. intravenously and 5 c.c.
 original inoculation spleen pulp.
 subcutaneously of reacted.
Result.—Neither non-reactors were exposed on 30-6-1927.
Exposure.—The 2; 1 died, 1 killed *in extremis*.
Result.—2 reacted
- (f) 6 Grade Oxen : n, 28-9-1927, 1 c.c. intravenously gland
 1st inoculation
 juice. ; 5 non-reactors.
Result.—1 reacted on, 5-11-1927. The 5 non-reactors got
 2nd inoculation c.c. spleen and gland pulp.
 intravenously 10 temperature reaction.
Result.—5 gave reactor and 5 non-reactors were exposed
Exposed.—The 1. The beast which reacted to inocu-
 lation contracted natural infection and recovered; the
 remaining 5 have not reacted.
- (g) 6 Grade Oxen :
 1st inoculation, 28-9-1927, 1 c.c. subcutaneously and
 1 c.c. intracutaneously gland juice.
Result.—1 gave a temperature reaction; 5 non-reactors.
 2nd inoculation, 5-11-1927, the 1 reactor and 5 non-
 reactors got 10 c.c. spleen and gland pulp intravenously.
Result.—3 definitely reacted; 1 gave a temperature reac-
 tion; 2 non-reactors.
Exposed.—5-11-1927.
Result.—Of the 6 exposed, 2 definitely reacted and re-
 covered.
- (h) 4 Grade Oxen :
 1st inoculation, 3-10-1927, 10 c.c. subcutaneously
 blood, and intradermally 2 c.c. blood.
Result.—1 reacted; 3 non-reactors.
 2nd inoculation, 5-11-1927. The 3 non-reactors got
 10 c.c. spleen and gland pulp intravenously.
Result.—1 reacted and died of East Coast Fever; 2 tem-
 perature reactions.
 The 3 survivors were exposed on 5-11-1927.

Result.—1 definitely reacted and recovered.

(i) 4 Grade Oxen :

1st inoculation, 5 c.c. intracutaneous and intrasplenic, of blood.

Result.—None reacted.

2nd inoculation, 5 c.c. subcutaneously and intravenously peptonised spleen pulp.

Result.—1 reacted and killed for material; 3 did not react.

Exposed to natural infection.—2 non-reactors were exposed.

Result.—1 reacted and died of East Coast Fever.

(3).—One inoculation.

(a) 3 Grade Oxen, each inoculated 11-5-1927, with 10 c.c. spleen pulp, subcutaneously.

Result.—3 reacted and recovered.

Immunity Test.—The 3 reactors were exposed on 10-8-1927; all reacted to East Coast Fever; 1 of which died of East Coast Fever, 1 recovered, and the remaining one died on the 20th day of East Coast Fever complicated with anaplasmosis.

(b) 24 Grade Oxen, four years old, each inoculated 10-6-27, with 10 c.c. peptonised spleen pulp intravenously.

Result.—8 reacted and Koch's bodies in gland smears; 13 temperature reactions; 3 non-reactors.

Exposed.—13-7-1927, 19.

Result.—8 reacted and recovered; 11 non-reactors.

(c) 7 Grade Oxen, inoculated 6-7-1927, each with 5 c.c. intravenously, and 5 c.c. subcutaneously of spleen pulp.

Result.—1 reacted and was used for material; 1 gave a temperature reaction; the remaining 5 did not react.

Exposure.—5 non-reactors and 1 temperature reactor were exposed on the 10-8-1927.

Result.—Of the 5 non-reactors, 2 died of East Coast Fever; 1 gave a temperature reaction, 1 did not react, and 1 died of other causes.

(d) 1 Grade Ox, inoculated 6-8-1927, with blood mixed with spleen pulp, intravenously, subcutaneously and intradermally.

Result.—No reaction.

Exposed to natural infection on 12-10-1927.

Result.—Reacted and recovered.

(e) 6 Grade Oxen, inoculated on 17-12-1927, with 5 c.c. blood, subcutaneously, and 1 c.c. intradermally.

Result.—3 reacted; 3 non-reactors.

Exposed to natural infection on 16-1-1928.

Result.—5 reacted; 1 non-reactor; mortality, 3.

SUMMARY.

	In Ex- peri- ment	Reacted	Non- reactors	Mor- tality
THREE INOCULATIONS.				
(a) 1ST INOCULATION—Blood subcutaneously and intradermally	8	0	8	0
2ND INOCULATION—Blood mixed with spleen pulp, intravenously and intradermally	8	0	8	0
3RD INOCULATION—Blood mixed with spleen pulp, intravenously and subcutaneously	8	6	2	1
* Exposed to natural infection	7	?	?	1
* Not under daily observation—exposed on owner's estate.				
(b) 1ST INOCULATION—Blood subcutaneously and intradermally	4	1	3	0
2ND INOCULATION—Spleen pulp subcutaneously (non-reactors)	3	0	3	0
● 3RD INOCULATION—Spleen pulp intravenously and subcutaneously (non-reactors)	3	1	2	0
Exposed to natural infection (non-reactors)	3	1	2	0
(c) 1ST INOCULATION—Blood subcutaneously	4	0	4	0
2ND INOCULATION—Spleen pulp subcutaneously	3	0	3	0
3RD INOCULATION—Spleen pulp subcutaneously and intravenously	3	0	0	0
Exposed to natural infection	2	2	0	0
(d) 1ST INOCULATION—Blood mixed with spleen pulp, subcutaneously and intradermally	8	2	6	0
2ND INOCULATION—Blood mixed with spleen pulp and gland pulp intravenously	8	2	6	0
3RD INOCULATION—Spleen pulp intravenously	8	0	8	0
Exposed to natural infection	8	8	0	2
(e) 1ST INOCULATION—Spleen pulp subcutaneously and intradermally	4	0	4	0
2ND INOCULATION—Spleen pulp subcutaneously and intradermally	4	1	3	0
EXPOSED TO NATURAL INFECTION:				
Reactors	1	1	0	0
Non-reactors	1	0	0	0
3RD INOCULATION—Spleen pulp subcutaneously and intravenously	1	0	1	0
EXPOSED TO NATURAL INFECTION:				
Non-reactors	1	1	0	1

SUMMARY.

	In Ex- peri- ment	Reacted	Non- reactors	Mor- tality
TWO INOCULATIONS.				
(a) 1ST INOCULATION—Blood subcuta- neously and intravenously ..	4	0	6	0
2ND INOCULATION—Blood and spleen pulp subcutaneously and intra- dermally	5	0	5	0
Exposed to natural infection..	5	4	1	0
(b) 1ST INOCULATION—Blood subcuta- neously and intradermally ..	10	4	6	0
2ND INOCULATION—Blood plus spleen pulp subcutaneously and intra- venously	8	2	6	0
Exposed to natural infection..	7	5	2	1
(c) 1ST INOCULATION—Blood subcuta- neously and intradermally ..	6	2	4	0
2ND INOCULATION—Blood mixed with spleen pulp subcutaneously and in- tradermally.. .. .	6	5	1	0
Exposed to natural infection ..	6	5	1	1
(d) 1ST INOCULATION—Spleen pulp and blood subcutaneously	6	6	0	0
2ND INOCULATION—Spleen pulp and blood subcutaneously and intra- venously	6	0	6	0
EXPOSED TO NATURAL INFECTION:				
Non-reactors	1	1	0	0
(e) 1ST INOCULATION—Spleen pulp sub- cutaneously	3	1	2	1
2ND INOCULATION—Spleen pulp sub- cutaneously and intravenously ..	2	0	2	0
EXPOSED TO NATURAL INFECTION:				
Non-reactors	2	2	0	2
(f) 1ST INOCULATION—Gland juice, 1 c.c. intravenously	6	1	5	0
2ND INOCULATION—Spleen and gland pulp intravenously	5	5	0	0
EXPOSED TO NATURAL INFECTION:				
1 Reactor, 5 Non-reactors ..	6	1	5	0
(g) 1ST INOCULATION—Gland juice, 1 c.c. subcutaneously and intradermally	6	1	5	0
2ND INOCULATION—Spleen and gland pulp intravenously.. ..	6	4	2	0
Exposed to natural infection ..	6	2	4	0
(h) 1ST INOCULATION—Blood subcuta- neously and intradermally ..	4	1	3	0
2ND INOCULATION—Spleen and gland pulp intravenously	3	1	2	1
Exposed to natural infection ..	3	1	2	0

The following results were obtained from one inoculation and a subsequent exposure:—

SUMMARY.

	In Ex- peri- ment	Reacted	Non- reactors	Mor- tality
ONE INOCULATION.				
(a) Spleen pulp subcutaneously ..	3	3	0	0
Exposed to natural infection ..	3	3	0	2
(b) Spleen pulp intravenously ..	24	21	3	1
Exposed to natural infection ..	19	8	11	0
(c) Spleen pulp intravenously and sub- cutaneously ..	7	2	5	0
Exposed to natural infection ..	6	3	3	2
(d) Blood and spleen pulp intravenously, subcutaneously and intradermally ..	1	0	1	0
Exposed to natural infection ..	1	1	0	0
(e) Blood, subcutaneously and intrader- mally ..	6	3	3	0
Exposed to natural infection ..	6	5	1	3

Conclusions.

(1) An original inoculation does not always confer a resistance against re-inoculation; an original inoculation with blood gives less protection against re-inoculation than an original intravenous inoculation with spleen pulp, or spleen pulp intravenously and simultaneously, subcutaneously and intradermally blood mixed with spleen pulp.

(2) Re-inoculation does not confer a higher resistance to natural infection.

An intravenous inoculation with spleen pulp and simultaneously subcutaneous and intradermal inoculation of blood mixed with spleen pulp, produces a larger and more marked, percentage of reactors and a greater resistance to natural infection in comparison with an original and subsequent inoculation by the other methods, or combination of methods.

A percentage of susceptible cattle which do not react to an original inoculation, and one or two subsequent inoculations, are not protected against a reaction, and death from East Coast Fever when exposed to natural infection. On estates where losses are occurring from East Coast Fever, and no facilities exist for controlling the disease, an original inoculation by the method which produces the larger, and more

marked, percentage of reactions, and most resistance to natural infection, *viz.*, the intravenous inoculation of spleen pulp and simultaneously subcutaneous and intradermal inoculation of spleen pulp mixed with blood, is indicated.

TRANSMISSION EXPERIMENTS WITH EMULSIONS OF TICKS :
SPECIES, *Rhip. appendiculatus*.

- (1) *Intravenous inoculation of emulsion of larvæ which engorged on East Coast Fever Cattle.*

History of Larvæ.—Two separate lots were utilised, *viz.*, 1262 and 1315 lots.

1262 Lot.—The adult females were fed on heifer 1825 at Onderstepoort, oviposition, 20-9-1926; larvæ hatched, 3-11-26; the larvæ were fed on 1262 at Kabete from the third to the seventh day of the temperature reaction to East Coast Fever; during this period from 5 to 10 per cent. of the red cells of 1262 contained parasites.

1315 Lot.—The adult females were fed on 1197 at Onderstepoort, and collected 3-11-1926; oviposition, 18-11-1926; larvæ hatched between 8-12-1926 to 18-12-1926, when en route to Nairobi; the larvæ were fed on 1315 at Kabete; from the 13th to the 17th day of the temperature reaction during this period from 75 to 90 per cent. of the red cells contained parasites.

1262 Lot.—The following weaned calves, Nos. 846, 901 and 899, ages 9, 13 and 8 months respectively, were intravenously inoculated on 31-12-1927, each with 2½ c.c. of an emulsion in normal saline of 1 larva to 1 p.c. of saline.

Result.—None reacted.

Immunity Test.—901 and 899 were subsequently tested on their immunity by inoculation with emulsions of ticks or material collected from infected cattle on exposure.

Result.—Both reacted to East Coast Fever. 846 died of other causes prior to being put in immunity test.

1315 Lot.—15 head of cattle varying in age from 5 months to two years, were intravenously inoculated on the 22-12-1927, each with 1 c.c. of an emulsion in normal saline of 10 larvæ to 1 c.c. of saline. The larvæ engorged on East Coast Fever reacting beast 1315.

Result.—None reacted,

Immunity Test.—The following when exposed reacted to and recovered or died of East Coast Fever :—

1031	...	died of East Coast Fever.
901	...	recovered.
945	...	recovered.
655	...	died of East Coast Fever.
1112	...	recovered.
1104	...	died of East Coast Fever.
1125	...	died of East Coast Fever.
955	...	died of East Coast Fever.

1034, 952 and 7899 were subsequently inoculated with spleen pulp and survived exposure.

525 and 527 were not exposed.

846 and 890 died of other causes.

Summary.

(1) *Intravenous inoculation of an emulsion of engorged larvae collected from an East Coast Fever reacting beast did not produce East Coast Fever.* (Total in experiment, 18.) Animals subsequently tested on their immunity proved to be susceptible.

(2) *Intravenous inoculation of an emulsion of naturally attached engorged nymphs collected from 1264.*

1264.—Contracted East Coast Fever naturally; reaction commenced on 20-12-1926; animal died on the evening of 25-12-1926; nymphs collected on the morning of 26-12-1926.

During the reaction, 8 to 10 per cent. of the red cells contained parasites.

Calves 1031 and 952, ages 7 and 8 months respectively, were inoculated intravenously on 26-12-1926, each with 1 c.c. of an emulsion in normal saline of 1 nymph to 1 c.c. of saline.

Result.—Neither reacted.

Immunity Test.—1031 and 952 were subsequently tested on their immunity by inoculation of emulsions of ticks, or material collected from infected cattle, or exposure.

Result.—1031 died of East Coast Fever; 952 survived.

Summary.

Intravenous inoculation of an emulsion of naturally attached nymphs did not produce East Coast Fever or confer immunity.

(3) *Intravenous, subcutaneous and intracutaneous inoculation respectively of nymphal ticks which engorged as larvæ on an East Coast Fever beast and which were fed for 96 hours prior to emulsifying.*

(a) 418 inoculated on 15-4-1927, intravenously with 5 c.c. of an emulsion of nymphs.

893 inoculated on 15-4-1927, subcutaneously with 5 c.c. of an emulsion of nymphs.

415 inoculated on 15-4-1927, intracutaneously with 5 c.c. of the same emulsion.

(Emulsion made up in saline, 1 c.c. to a nymph.)

History of Ticks (Regd. Nos. 23 and 24).—The adult females were fed on 1197, at Onderstepoort, and collected on 3-11-1926; oviposition, 18-11-1926; larvæ hatched between the 8-12-1926 and 18-12-1926, when en route to Nairobi; the larvæ were fed on 1315 at Kabete, and collected engorged on 17-1-1927, and had moulted on 2-2-1927, fed on scrotum of immune East Coast Fever beast for 96 hours, then emulsified, and inoculated as above.

Result.—418 and 893 reacted to East Coast Fever; 418 was slaughtered for material. 893 was subsequently exposed to natural infection, reacted and recovered. 415 did not react, and when subsequently inoculated with spleen pulp did not react; when exposed to natural infection, gave a temperature reaction and recovered.

(b) 185, 1028, 954 and 947 were each inoculated intracutaneously with 5 c.c. of an emulsion of nymphal ticks which were fed as larvæ on East Coast Fever beast No. 1315, and which were fed for 96 hours prior to emulsifying.

History of Ticks (Regd. No. 20).—Adults fed on 1197 at Onderstepoort and collected 3-11-1926; oviposition, 18-11-1926; larvæ hatched between the 8-12-1926 and 18-12-1926; larvæ fed on 1315 at Kabete from 8-1-1927; collected, 14-1-1927; had moulted on 2-2-1927, and fed on scrotum of 900 for 96 hours prior to emulsifying and inoculation. Ticks of the same lot produced East Coast Fever in the control beast used in determining their infectivity.

Result.—None reacted.

Immunity Test.—185, 1028, 954 and 947 were inoculated with spleen pulp of an East Coast Fever beast and subsequently exposed.

Result.—185 and 947 gave no apparent reaction to inoculation of spleen pulp; both reacted on exposure; 947 died of East Coast Fever. 1028 and 954 both reacted to inoculation of spleen pulp; both reacted on exposure. 954 died of East Coast Fever.

(c) 523, 590, 896 and 381, each inoculated subcutaneously with 5 c.c. of an emulsion of nymphal ticks (Regd. No. 20) which fed as larva on an East Coast Fever beast, 1315, and which were fed for 96 hours prior to emulsifying.

Result.—None reacted.

History of ticks.—As above.

Immunity Test.—523, 590, 896 and 381, each inoculated with spleen pulp, on two separate occasions, of an East Coast Fever beast and subsequently exposed.

Result.—523, 590 and 896 did not react to inoculation of spleen pulp; 381 gave a temperature reaction. The four were exposed to natural infection. 590, 896 and 381 each gave a temperature reaction and survived exposure; 381 gave no apparent reaction and survived.

Summary.

Subcutaneous inoculation.—Of emulsion of nymphal ticks which engorged as larvæ on an East Coast Fever beast and fed for 96 hours prior to emulsifying, variably transmitted East Coast Fever.

Intravenous inoculation.—Of nymphal ticks which engorged as larvæ on an East Coast Fever beast and fed for 96 hours prior to emulsifying, transmitted East Coast Fever (1 in experiment).

Intracutaneous inoculation.—Of emulsion of nymphs which engorged as larvæ on an East Coast Fever beast and were fed for 96 hours prior to emulsifying, did not transmit East Coast Fever.

Non-reactors subsequently proved susceptible to inoculation of spleen pulp or to exposure.

Note.—The 1 reactor to subcutaneous inoculation of tick emulsion and which was subsequently exposed, reacted to East Coast Fever, and recovered.

- (4) *Inoculation of emulsion of nymphs which engorged as larvæ on an East Coast Fever beast, and which were fed for 96 hours prior to emulsifying and simultaneously blood of a beast reacting to East Coast Fever.*

History of Ticks (Batches Nos. 23 and 24).—The adult females were fed on 2-11-1927 at Onderstepoort and collected on 3-11-1926; oviposition, 8-11-1926; larvæ hatched 8-12-1926 to 18-12-1926; fed on 1315 at Kabete and collected engorged 17-1-1927; moulted, 2-2-19. '27.

Blood used for inoculation was collected from 773 when reacting to East Coast Fever; blood showed *Theileria parva* parasites fairly frequent.

950, 949, 948, 1035 each inoculated subcutaneously 15-4-1927 with 5 c.c. of an emulsion of nymphal ticks (*see above*) (each c.c. contained 1 nymph), fed for 96 hours prior to emulsifying and simultaneously 5 c.c. intracutaneous and 5 c.c. subcutaneous blood of 773.

Result.—950 reacted and died of East Coast Fever; 949 did not react to East Coast Fever, but died of red-water; 948 and 1035 did not react to East Coast Fever.

Immunity Test.—948 and 1035 inoculated with spleen pulp of an East Coast Fever beast on three separate occasions.

Result.—948 reacted; 1035 did not react.

Exposed.—10-8-1927.

Result.—Both proved immune.

Summary.

Subcutaneous inoculation of nymphs which engorged as larvæ on an East Coast Fever beast and fed for 96 hours prior to emulsifying and simultaneously intracutaneous and subcutaneously blood of an East Coast Fever reacting beast, produced East Coast Fever and death in 25 per cent. of the inoculated cattle (4 in experiment).

The survivors were tested on their immunity with spleen pulp of an East Coast Fever beast; one reacted to East Coast Fever and recovered, the other gave no apparent reaction; neither reacted when exposed to natural infection.

Conclusions.

(1) Transmission of East Coast Fever is not effected by larval or nymphal ticks which are emulsified and inoculated immediately after engorging on an East Coast Fever beast, and no immunity is conferred in such inoculated cattle.

(2) East Coast Fever is *variably* produced by subcutaneous and intravenous inoculation respectively of an emulsion of nymphal ticks which engorged as larvæ on an East Coast Fever beast, and fed for 96 hours prior to emulsifying. (Intracutaneous inoculation of the same emulsion did not produce East Coast Fever; 1 in experiment.)

(3) The immunity conferred in animals which react to inoculation is not complete against natural infection.

(4) Subcutaneous inoculation of emulsions of nymphs which engorged as larvæ on an East Coast Fever beast and fed for 96 hours prior to emulsifying and simultaneously intracutaneous and subcutaneous inoculation of blood of an East Coast Fever beast *variably* produces East Coast Fever.

(5) The inoculation of nymphal ticks which engorged as larvæ on an East Coast Fever beast and which were fed for 96 hours prior to emulsifying does not offer better prospects of producing a reaction and immunity to natural infection than intravenous inoculation of spleen pulp or intravenous inoculation of spleen pulp and simultaneously subcutaneous and intradermal inoculation of blood mixed with spleen pulp.

IMMUNISATION OF UNWEANED CALVES.

A number of unweaned grade calves varying in age from two to seven months were put in experiment to determine whether unweaned calves possess a resistance to East Coast Fever and whether a reaction to natural infection confers an immunity against natural infection.

The outline of the experiment was as follows :—

- (1) The calves were infected with nymphal ticks, species *Rhip. appendiculatus*, which engorged as larvæ on an East Coast Fever reacting beast.
- (2) The period of incubation, and duration of the disease from the commencement of the temperature reaction until the termination of the reaction and death, recorded.
- (3) Survivors tested on their immunity.

The following are the details of the experiments :—

Experiment No. 1.—9 calves, aged three to seven months, infested on 24-12-1926 with nymphal ticks.

History of nymphs.—Larvæ, the progeny of adults collected at Onderstepoort, were fed on East Coast Fever beast 1173 at Onderstepoort on 8-11-1926; engorged larvæ collected 12-11-1926. The larvæ had moulted on 28-11-1926. Nymphs fed in the ears of the following calves :—

	Age, months.	Nymphs fed.	Nymphs attached and engorged.
1241	4	13	4
1541	3	12	8
1347	3½	10	4
1240	4	6	6
1032	7	4	1
1540	3	6	5
1238	4	20	6
1348	3	9	6
1239	4	6	3

Results.—1241, 1541, 1240, 1032, did not react; 1540, 1238, 1348, 1239, reacted and died of East Coast Fever; 1347, reacted to East Coast Fever and recovered.

Incubation period and duration of disease :—

		Incubation, days.		Duration, days.
1540	...	8	...	24
1238	...	15	...	21
1348	...	15	...	13
1239	...	14	...	15
1347	...	17	...	17

Experiment No. 2.—4 Calves, aged two to three months, infested with nymphal ticks, 25-1-1927.

History of Ticks (Regd. No. 27).—Adults engorged on 1825, at Onderstepoort, on 1-9-1926; oviposition, 20-9-1926; larvæ hatched 3-11-1926 and placed on East Coast Fever reacting beast 1264 at Kabete on 22-12-1926 at 12.30 p.m.; 1264 died at 12 a.m. on 26-12-1926; larvæ collected 26-12-1926; all had moulted on 25-1-1927.

		Aged, months.		Nymphs fed.		Nymphs attached.
1554	...	2	...	4	...	3
1545	...	2½	...	5	...	5
1544	...	3	...	4	...	2
1555	...	2	...	5	...	1

Result.—None reacted.

Experiment No. 3.—2 calves, aged two and six months respectively, infested with nymphal ticks on 22-2-1927.

History of ticks (Regd. No. 21).—The adults were collected from 1197, at Onderstepoort, on 3-11-1926; oviposition, 18-11-1926; larvæ fed on 1315 East Coast Fever reacting beast at Kabete, 8-1-1927; collected, 15-1-1927; nymphs had moulted on 2-2-1927.

		Aged, months.		Nymphs fed.		Nymphs attached.
901	...	6	...	6	...	6
1553	...	2	...	6	...	6

Result.—Neither reacted.

Note.—Nymphs of the same lot produced East Coast Fever (*see* below).

Summary.

Of the 15 unweaned grade calves infested with from 4 to 20 nymphal ticks which engorged on East Coast Fever reacting cattle, 5 reacted to East Coast Fever (of these 5 reactors, 4 died of East Coast Fever = 80 per cent; 1 survived = 20 per cent.), the remaining 10 did not react.

Incubation period of the reactors varied from 8 to 17 days. The duration of the disease varied from 13 to 24 days; average, 18 days.

IMMUNITY TESTS OF (a) REACTORS, AND (b) NON-REACTORS.

(a) *Reactors.*

1347 weaned 17-5-1927, and exposed to natural infection from 17-5-1927.

Result.—Irregular temperature reaction from the 15th to 41st day, maximum 103.4° F. 29th day; smears, 16-6-1927, Koch's bodies. Animal recovered.

(b) *Non-reactors.*

The following non-reactors were tested on their immunity: 1554, 1545, 1544, 1555, 1240, 1032, 901, 1553, 1241, and 1541.

1554, 1545, 1544, 1555, re-infested on the 18-2-1927 with nymphal ticks.

History of Ticks (Regd. No. 21).—(See above.)

		Nymphs fed.		Nymphs attached and engorged.
1554	...	7	...	6
1545	...	4	...	4
1544	...	4	...	3
1555	...	4	...	3

Result.—1554 reacted to East Coast Fever from the 14th day; duration of disease, 17 days. Animal recovered.

Exposed.—From 16-6-1927 to natural infection.

Result.—Reaction to East Coast Fever from the 13th day. Maximum temperature, 104.6° F., on the 16th day; gland smears, 17th day, Koch's bodies; animal died on 6-8-1927. Smears showed spirillum infection but no Koch's bodies.

1555, 1545, 1544, did not react.

1545, 1544, and 1555 were inoculated intravenously on 26-3-1927 with emulsion of adult ticks which engorged as nymphs on a East Coast Fever reacting beast and fed for 96 hours prior to emulsifying.

Result.—1545, temperature reaction to East Coast Fever from the 7th day; duration of disease, 12 days; animal died of East Coast Fever on 14-4-1927; gland and spleen smears, Koch's bodies numerous.

Reinoculation on 6-7-1927, subcutaneously and intravenously with spleen pulp, 10 c.c.

Result.—No reaction.

Exposed to natural infection, 10-8-1927.

Result.—No reaction.

1541 inoculated 9-6-1927 intravenously and subcutaneously 10 c.c. spleen pulp.

Result.—No reaction.

Reinoculated 6-7-1927, 10 c.c. spleen pulp, intravenously and subcutaneously.

Result.—No reaction.

Animal not exposed to natural infection; died as result of an accident.

1241 inoculated 9-6-1927, intravenously, 10 c.c. spleen pulp.

Result.—No reaction.

Reinoculated 6-7-1927, intravenously and subcutaneously, 10 c.c. spleen pulp.

Result.—No reaction.

Exposed to natural infection, 10-8-1927 to 26-8-1927. Removed from exposure camp, 26-8-1927. Temperature reaction, 19th day to 25th day, maximum, 103° F. No smears collected.

Summary of Immunity Tests.

(1) The animal, *viz.*, 1347, which reacted to the original infestation and survived, again reacted to East Coast Fever when exposed to natural infection.

(2) Of the 10 non-reactors to the original infestation, 8 reacted to East Coast Fever when tested on their immunity; of these 8, 5 died of East Coast Fever, 3 reacted and recovered. Two did not react.

(3) 1 of the non-reactors, *viz.*, 1554, to the original infestation when tested on its immunity by reinfestation with nymphal ticks of another batch, reacted to East Coast Fever and recovered, and when subsequently exposed to natural infection again reacted to East Coast Fever and died subsequently of cachexia, sequel of the East Coast Fever reaction, associated with spirillum infection.

1544 reacted to the original infestation and when subsequently inoculated intravenously and subcutaneously with spleen pulp of an East Coast Fever beast again reacted to East Coast Fever.

General Summary of Experiments.

(1) 80 per cent. of unweaned calves which reacted to infestation with nymphæ which engorged as larvæ on an East Coast Fever reacting beast died of East Coast Fever; 20 per cent. recovered.

(2) The incubation period varied from 8 to 17 days; duration of the disease from the commencement of the temperature reaction varied from 13 to 24 days; average, 18 days.

(3) Of the 10 non-reactors which did not react to the original infestation, 5 subsequently died of East Coast Fever on immunity tests = 50 per cent.; 3 reacted and recovered = 30 per cent.; and 2 did not react = 20 per cent.

(4) 2 of the 3 calves = 66 per cent., which reacted to an infestation with ticks and recovered, again reacted to East Coast Fever on exposure.

(5) 1 calf which reacted to intravenous inoculation with emulsion of fed adult infected ticks, again reacted to reinoculation with spleen pulp.

Conclusions.

In comparison with cattle of from about 20 months to 2 years old and upwards, recovered from Redwater and Gallsickness, and exposed to natural infection in an infected camp, the mortality from East Coast Fever in unweaned calves (vaccinated against redwater and gallsickness), infested by hand, is lower; in the former the mortality is approximately 95 per cent.; in the unweaned calves an 80 per cent. mortality occurred in the experiments.

In comparison with cattle of from 20 months to 2 years and upwards exposed in an infected camp, the duration of the disease is longer in unweaned calves infected by hand.

Observations made over a large number of susceptible grade cattle of from 20 months to 2 years old and upwards, exposed to natural infection in the exposure camp at the Laboratory, show that the duration of the disease from the commencement of the termination reaction to death is approximately 9 to 10 days.

The immunity conferred by recovery from a natural attack of East Coast Fever is not necessarily absolute and complete against natural reinfection.

It would appear that the immunity in calves which survive an original natural infection is built up by natural reinfection.

EXPERIMENTAL PROPHYLACTIC INOCULATION AGAINST EAST
COAST FEVER WITH SPLEEN EXTRACT.

A number of cattle were put in experiment to determine the value of spleen extract.

The spleen was collected from a beast in the later stages of East Coast Fever and treated as follows :—

After mincing in a Latapie, it was mixed in the proportion of 1 gramme to 5 c.c. of saline and toluol to make 1 per cent. of the total bulk, added; the mixture was then incubated for forty-eight hours at 38° C., and stored at 5° C. till required for use.

The cattle put in experiment included :—

- (a) Animals which had been previously inoculated for East Coast Fever and were reacting to natural infection.
- (b) Animals which had previously been inoculated for East Coast Fever and subsequently exposed to natural infection.
- (c) Animals not previously inoculated for East Coast Fever.

Lot (a) consisted of 3 cattle, Nos. 1712, 1713 and 1717.

History.—1712, 1713 and 1717 were each inoculated 6-7-1927 with blood of an East Coast Fever beast and reinoculated on 20-7-1927 with spleen pulp and blood of an East Coast Fever beast.

Result.—1712 gave a doubtful reaction to East Coast Fever; 1713 reacted to East Coast Fever and recovered; 1717 gave a doubtful reaction.

1712 was exposed to natural infection on 6-9-1927.

Result.—Reacted to East Coast Fever from 10-10-1927.

On 12-10-1927, inoculated subcutaneously with spleen extract at the rate of 30 c.cs. per 100 kilos, body weight, animal survived.

1713 was exposed to natural infection on 21-9-1927.

Result.—Reacted to East Coast Fever from 11-10-1927.

On 12-10-1927, inoculated subcutaneously with spleen extract at the rate of 30 c.c. per 100 kilos, body weight, animal survived.

1717 was exposed to natural infection on 21-9-1927.

Result.—Reacted to East Coast Fever from 14-10-1927.

On 18-10-1927, inoculated with spleen extract at the rate of 30 c.c. per 100 kilos, body weight, animal survived.

Summary.

3 cattle which had been inoculated for East Coast Fever and subsequently exposed to natural infection were treated, when reacting to natural infection, with spleen extract; all three recovered.

Note.—Recoveries were in all probability not due to inoculation of extract, but owing to the resistance acquired from artificial immunisation.

Lot (b) consisted of 3 cattle, Nos. 1423, 1443 and 1505.

History.—1423, 1443 and 1505 were inoculated on 6-8-1927 with spleen pulp of an East Coast Fever beast.

Result.—1423 did not react; 1443 reacted to East Coast Fever and recovered; 1505, an indefinite reaction to East Coast Fever.

1423 was exposed to natural infection on 12-10-1927.

Result.—Reaction to East Coast Fever from 30-10-1927.

On 12-10-1927, 19-10-1927, 26-10-1927, inoculated subcutaneously with extract at the rate of 0.5 c.c. per 2.5 kilogrammes, body weight, and on 2-11-1927 with 200 c.c. extract; animal survived, reaction to East Coast Fever.

1443 was exposed on 12-19-1927.

On 12-10-1927, 19-10-1927 and 26-10-1927, inoculated subcutaneously with extract at the rate of 0.5 c.c. per 2.5 kilogrammes, body weight.

Result.—No reaction.

1505 was exposed on 12-10-1927.

On 12-10-1927, 19-10-1927 and 26-10-1927, inoculated subcutaneously with extracts at the rate of 0.5 c.c. per 2.5 c.c. kilogrammes; 1505 reacted to natural infection from the 2-11-1927, and died of East Coast Fever on the 21-11-1927.

Summary.

Of the three cattle inoculated for East Coast Fever on 6-8-1927, and subsequently exposed and inoculated with spleen extract on the day of exposure, and at weekly intervals, 1 died of East Coast Fever, 1 reacted and recovered, the remaining beast did not react on exposure.

Note.—1423, which reacted to natural infection and recovered, probably owed its resistance to the original inoculation, 6-8-1927.

Lot (c) 1430, 2002, and 1476, were exposed on 12-10-1927.

1430, inoculated with toluol spleen extract on 12-10-1927, 19-10-1927 and 26-10-1927, at the rate of 0.5 c.c. per 2.5 kilogrammes, and on 1-12-1927, with 1 c.c. per 2.5 kilogrammes of 1 per cent. commercial formalin spleen extract; animal reacted to East Coast Fever from the 47th day of exposure and was slaughtered *in extremis*.

2002, inoculated with spleen extract on 12-10-1927, 19-10-1927 and 26-10-1927, at the rate of 0.5 c.c. per 2.5 kilogrammes, and on the 7-11-1927, with extract at the rate of 0.5 c.c. per kilogramme; 2002 reacted to East Coast Fever from the 24th day of exposure, and died of East Coast Fever on the 33rd day.

1476, inoculated with spleen extract on 12-10-1927, 19-10-1927 and 26-10-1927, at the rate of 0.5 c.c. per 2.5 kilogrammes, and on the 2-11-1927, with extract at the rate of 5 c.c. per 2.5 kilogrammes; animal reacted to East Coast Fever from the 18th day of exposure and died on the 26th day.

Summary.

None of the three cattle, which had not previously been inoculated for East Coast Fever, but which were inoculated with extract on day of exposure and on subsequent dates during the period of exposure, were protected by inoculation of extract.

Conclusions.

Spleen extract, prepared as above, has no prophylactic value in the treatment of East Coast Fever.

EAST COAST FEVER.

During the period 10-6-1927 to 9-2-1928, a total of 217 laboratory cattle consisting of discontinued rinderpest experimental cattle, surviving rinderpest virus-makers, and heifers purchased for the N'gong Training Depot, were inoculated for East Coast Fever and pleuro-pneumonia, at the Laboratory, and transferred to the Veterinary Training Depot, N'gong, where they were exposed to East Coast Fever natural infection.

The results so far obtained show that provided good field conditions exist, viz. abundance of grazing and watering facilities, the mortality from exposure to natural infection in inoculated cattle is considerably less in comparison with inoculated cattle exposed under adverse field conditions.

It is not generally recognised that a percentage of inoculated cattle, when exposed, react to natural infection and that cattle reacting to natural infection require good grazing and sufficient water within easy distance.

INVESTIGATIONS INTO LUNG DISEASES OF LAMBS AND SHEEP.

During the course of the year under review, investigations were continued on Lung Diseases of Sheep and Goats, by Professor R. W. M. Mettam, Veterinary Research Officer, who furnishes the following Report in connection therewith :—

In the Annual Report for 1926, a preliminary account of the research into Laikipia Lung Disease of Lambs and Sheep was given by Dr. S. H. Whitworth.

He gave a brief survey of the epidemiology, symptoms, and history of the disease, and also mentioned the manufacture of a vaccine for use in the Laikipia district. The demand for the vaccine has steadily increased in amount, so that it is felt some good must be accruing from its use. At the present, it is considered safest to use a sterile vaccine, the organisms being killed by disinfectant.

Owing to pressure of work in other directions Dr. Whitworth did not carry out any systematic research on Laikipia Lung Disease during 1927, but he was responsible for the preparation of the vaccine until he departed on leave in October. As a result of continued heavy mortality in lambs, investigations were continued in June, 1927.

From various accounts received, it would appear that there was a very serious mortality of lambs in the Nanyuki-Laikipia-Ngobit country in 1927. Reports of a similar affection have also come from the Rift Valley and Kipkabus, but it may be stated that, judging from the number of sheep lungs received for routine examination and diagnosis, the disease has probably a very widespread distribution throughout Kenya. The opinion must not be accepted from the last sentence that Laikipia Lung Disease is the one and only cause of pneumonia lesions in sheep in this Colony, as quite a large percentage of the lungs received for diagnosis were affected with lesions the cause of which could not be demonstrated. Constant watch is being kept for that peculiar form of sheep pneumonia known in South Africa as "Jagziekte," and in the northernmost States of America as "progressive pneumonia," but, so far, no cases

have been detected. Only a prolonged and careful examination of all morbid specimens received at the Laboratory will decide whether this condition exists in Kenya.

During the third week in June, 18 lambs, averaging one month old, were brought to the laboratory for experiment. The following information was given by the owner; "These lambs were dropped on the high plains, 6,600-7,000 feet above sea level, between Rumuruti and Nyeri. The plains are bordered by forest or thick bush. Squatter sheep exist on an adjacent farm, while the native sheep and goats in the Reserve, near Nyeri, are 'rotten' with respiratory diseases. The wild herbivora that roam over these plains are apparently healthy for no unusual mortality was noticed amongst them."

The owner asserted that he had never seen symptoms in adult sheep as noticed in the 18 lambs (see below), but according to native evidence adult sheep in the Kikuyu Reserve about Nyeri are commonly affected. The affected lambs were considered to be suffering from "something new"—(Ngobit Lung Disease)—and not genuine Laikipia Lung Disease, but subsequent research will show that the disease known as "Ngobit Lung Disease" is the same as "Laikipia Lung Disease."

The pathognomonic symptom of the so-called Ngobit disease was a very marked necrosis of tongue, palate and lips. Thus, while these necrotic lesions are regarded by many farmers and by the natives as being a differential feature between Ngobit and Laikipia Lung Diseases, etiologically the two diseases are without any doubt caused by the same organisms. One animal (*i.e.*, of the 18 original lambs) showed arthritic lesions of the carpi and elbows while the owner stated that he had seen hepatic abscesses in lambs dead of the Ngobit disease. Both these lesions are frequently found in the so-called Laikipia Lung Disease and would serve to emphasise, if necessary, that Laikipia Lung Disease and Ngobit Lung Disease are one and the same and that, in order to avoid confusion, the latter name should be dropped entirely in favour of the former which, although itself unsuitable, has priority of earlier selection to support its claim to name this particular infectious pleuro-pneumonia of sheep and lambs.

ADDENDUM.

Recently an outbreak of a serious disease of sheep was investigated at Kipkabus where over 50 sheep out of a flock of 200 had died (25 per cent.). Preliminary pathological and

bacteriological investigations carried out *in loco* and continued at the Laboratory proved the disease to be genuine Laikipia Lung Disease. Inquiries continued to be received from all over the settled parts of the country, and show that the disease has probably a very widespread distribution.

CAUSE OF LAIKIPIA LUNG DISEASE.

As the result of bacteriological research into the thoracic lesions of the original lambs sent to the Laboratory an organism was isolated which, on subsequent experiments, reproduced the disease in experimental animals. The same organism was recovered from goat No. 359 sent to the Laboratory as a case of inf. pleuro-pneumonia of goats and from the sheep examined at Kipkabus. Inoculation of the organism isolated from goat 359 into the pleural cavity of sheep 3065 killed the latter animal in 72 hours with all the symptoms of acute Laikipia Lung Disease. From sheep 3065 the same organism was received in pure culture. Numerous other instances may be quoted to prove that Koch's postulates have been satisfied and there is doubt that the same organism repeatedly isolated from fatal cases of Laikipia disease can be regarded as the primary bacterial agent in this infection. In some cases, the organism was obtained in pure culture from the lungs and pleural lesions, but in the majority of animals it was heavily contaminated, especially in the lungs and joints. The secondary bacterial flora was very mixed and included staphylococcus pyogenes albus, citreus and aureus; B. pyocyaneus; B. necrosis; short chained gram positive Streptococci and others including sporulating anaerobes of undetermined species. The role of these bacteria some of which are normal saphrophytes of the normal respiratory mucosa, is being investigated for at least both the B. pyocyaneus and the streptococci are capable *per se* of causing a purulent pneumonia. The same organism, generally heavily contaminated, has been recovered from all cases in which there have been joint lesions.

The organism is a small pleomorphic bacillus, .5 μ —2 μ long by .8 μ —4 μ wide. It is non-acid fast and gram negative. It is non-sporulating and feebly mobile. It stains very readily with all the usual aniline dyes and with giemsa.

It grows best under aerobic conditions, but it is a facultative anaerobe. Growth occurs on all the usual laboratory media but is especially luxuriant in those containing serum or blood. Growth is very poor in media containing carbohydrates.

On solid media which has become dry, growth will be either very poor or absent; in any case the organism tends to die out on agar or solid media after β weeks or so.

Good growth occurs in bouillon, especially 10 per cent. serum bouillon; there is evidence of the formation of a toxin in liquid media but this point has not yet been definitely settled. In 2 per cent. glycerine bouillon and 10 per cent. serum bouillon; the organism becomes very pleomorphic and long forms, often very spiral, may be noticed up to 10 μ in length. Growth is very feeble in the various carbohydrate broths. Involution forms are noticed in old cultures—both solid and liquid, while in young agar colonies the organism may appear distinctly coccobacillary.

The carbohydrate reactions are as follows:—

No reaction in dextrose, dulcitol, rhamnose, salicin and inositol; doubtful or very slight acidity in lactose, mannitol and arabinose; acid but no gas in saccharose, dextrin, raffinose, sorbitol and xylose. Lead acetate cultures are not blackened while litmus milk becomes acid but no clotting. Indol is not formed, and nitrates are not reduced.

Despite the above information the organism has not yet been classified on the lines laid down in "Bergey's Manual of Determinative Bacteriology."

Transmission experiments have been made to sheep and goats. Small Laboratory animals have also been used, but owing to the prevalence of some fatal epidemic amongst guinea-pigs the results obtained with these animals can only be regarded as highly unsatisfactory. Rabbits also proved practically useless in these experiments as they invariably died either from coccidiosis or from sheer poverty. Those animals, both rabbits and guinea-pigs, that did survive for any length of time after inoculation of cultures or pulmonary material did not show any constant lesions when they eventually came for autopsy beyond small abscesses at the point of inoculation. Further work is necessary in connection with small animals. The same may be said of the goat experiments, but as a natural case of the disease has been investigated in one animal it is certain that goats are naturally susceptible but the presence of an unknown fatal disease in locally purchased experimental goats has greatly hindered the progress of experimental work with these animals. Fortunately, some goats that were inoculated with material (including cultures) died from manifestly typical Laikipia disease.

Details of the transmission experiments are given below in tabular form, and the discussion follows later.
TRANSMISSION OF LAIKIPIA DISEASE TO SHEEP EXPERIMENTALLY BY VARIOUS ROUTES.

No. of Animal. Date of Birth.	Route of Inoculation.	Dosage.	Origin of Material.	Result.	Duration after Inoculation.	Result.
2902 16-8-27	Conjunctiva	A few drops	Cultures 95, 97, 102	Killed for exp. purposes	15 weeks	Marked hydrothorax. Lungs normal.
2864 ?	Conjunctiva	A few drops	?	+	42 days	Congestion of lungs with pea like abscesses full of pus. Oedematous.
2898 5-8-27	Intratracheal	4 c.c.	Culture D	Killed for exp. purposes	13 weeks	N.u.
3040	Intratracheal	3 c.c.	Culture B	..	Alive after 6 weeks	Showing very remarkable temperature variations. On 21-12-27 a drop of 12 degrees.
2903 16-8-27	Intratracheal	4 c.c.	Cultures 95, 97, 102	..	Killed for Expurpose in 14 weeks	Areas of red hepatisation only.
3036 ?	Intrapulmonary	5 c.c.	Cultures 688, 689,	+	72 hours	Acute pleuro-pneumonia with effusions.
3037 ?	Intrapulmonary	5 c.c.	Cultures 669, 670	+	72 hours	Acute pleuro:pneumonia with effusions.

+ Signifies death.

TRANSMISSION OF LAIKIPI DISEASE TO SHEEP EXPERIMENTALLY BY VARIOUS ROUTES.—*Contd.*

No. of Animal. Date of Birth.	Route of Inoculation.	Dose.	Origin of Material.	Result.	Duration after Inoculation.	Result.
3046 ?	Intrapulmonary	3 c.c.	Pus from chest of Sheep 2650	+	96 hours	Acute pleuro-pneumonia with effusions.
2650 ?	Intrapulmonary	3 c.c.	Pus from lung of 3058	+	192 hours	Acute pleuro-pneumonia with effusions.
3043 ?	Intrapulmonary	5 c.c.	Cultures 672, 673	..	Alive after 22 days	Apparently well.
3050 ?	Intrapulmonary	5 c.c.	Culture 671	..	Alive after 22 days	Alive but showing diurnal variation of temperature.
2618 ?	Intravenously	4 c.c.	Cultures 95, 97, 102	+	In 22 days	Congestion and oedema of lungs. Pus in both carpi, and bacillus recovered therefrom.
2868 ?	Intravenously	5 c.c.	Cultures 26, 27	+	Within 12 hours	Acute septicæmia. On P.M., lungs in acute congestion.
2942 3-8-27	Intravenously	1.5 c.c.	Culture 117	+	In 6 days	Pus in tarsi, carpi, R. elbow, L. stifle, fetlock. Solid areas in lungs.

+ Signifies death.

TRANSMISSION OF LAIKIPIA DISEASE TO SHEEP EXPERIMENTALLY BY VARIOUS ROUTES—*Contd.*

No. of Animal. Date of Birth.	Route of Inoculation.	Dose.	Origin of Material.	Result.	Duration after Inoculation.	Result.
2536 16-7-25	Intravenously	10 c.c.	Culture 10	+	Within 12 hours	Acute septicæmia.
2826 29-12-26	Intravenously	40 c.c.	Of blood from Lamb 2858—a natural case of Laikipia Lung Disease	..	In 7 days showed a temperature of 103-106 which lasted for 10 days. Recovered	Killed for observation. Marked congestion and oedema of lung.
3048 ?	Subcutaneously	5 c.c.	Culture	+	In 72 hours	Oedema and congestion.
3058 ?	Per Os.	200 c.c.	Culture	+	In 17 days	Acute pleuro pneumonia.
2904 16-8-27	Subcutaneously	(a) 2 c.c. (b) 3 c.c.	Cultures	Still alive	(a) 3 months (b) 2 months	Twice inoculated with three months between first and second inoculation.
2769 ?	Intravenously	4 c.c.	Cultures	Still alive	2½ months	
2948 31-8-27	Subcutaneously	3 c.c.	Pus from joints of 2942	Alive	4 months	

+ Signifies death.

TRANSMISSION OF LAIKIPIA LUNG DISEASE TO GOATS.—*Contd.*

No. of Animal.	Route of Inoculation.	Dose.	Origin of Material.	Result.	Duration after Inoculation.	Result.
Goat 297	Intravenously	3 c.c.	Culture 160	..	Alive after 4 months	Condition very poor. Some oedema of neck.
Goat 308	Conjunctiva	A few drops	Emulsion of cultures 95, 97, 102	..	..	Transferred to another experiment ; <i>vide</i> below
Goat 308	Intrapulmonary	5 c.c.	Emulsion of lung of Goat 359	+	7 days	Acute pleuro-pneumonia Organism of Laikipia Lung Disease recovered in pure culture from thoracic fluids and lungs.

+ Signifies death.

DISCUSSION OF THE TRANSMISSION EXPERIMENTS.

(a) In Goats.—Seven animals have been chosen at random from the protocols. Of these, 1 died from an extraneous cause (No. 342), 2 were alive after 4 months, while the remaining 4 animals died in experiment at periods varying between 12 hours and 27 days. Fatal results followed inoculation of cultures (Nos. 317, 313, 323), and of lung emulsion (No. 308), while non-fatal results also followed actual contact with diseased sheep and after inoculation of cultures (No. 297) and lung emulsion (No. 324). No. 324 is in poor condition (17-1-28), but No. 297 is quite healthy. As regards the route of inoculation, the one intrapulmonary inoculation (No. 308) was fatal while the intravenous route, though fatal in Nos. 232, 313, and 317, failed to kill Nos. 297 and 324. Further experiments, as outlined before, are being carried out in the transmission of this disease to goats by contact, cultures and infective material.

(b) In Sheep.—Over 50 sheep, adults and lambs, have been experimented upon and a selection is given in the above table. It will be noticed that the intrapulmonary inoculation was invariably fatal (Nos. 2650, 3046, 3036, etc., but up to date negative in two cases inoculated with culture (Nos. 3043, 3050). All other routes of inoculation were tried, sometimes with success but at other times with apparent failure. Thus sheep 2864 died 42 days from purulent pneumonia after a few c.c. of a culture was dropped on to the conjunctiva while lamb 2902 was proved at autopsy to show only a hydrothorax 15 weeks after being similarly treated.

The intravenous route was invariably rapidly fatal and care had to be exercised with the dose of culture as 5 c.c. and over produced rapidly fatal effects in 12—24 hours with symptoms of acute pulmonary oedema and congestion. With amounts below 5 c.c. of culture death did not supervene for periods varying between 1—3 weeks but there were as a rule both typical pneumonic and joint lesions. The minimal lethal dose of a 24-hour agar culture given intravenously is in the neighbourhood of 1 c.c. Subcutaneously, large doses of culture and virulent material may be given but very often they are followed at the site of inoculation by abscess formation or by a rapidly spreading purulent extravacation of the subcutaneous tissues. Subcutaneous inoculations gave on the whole very irregular results.

Drenching proved very successful in the one case tried.

ATTEMPT TO REPRODUCE THE DISEASE IN HEALTHY LAMBS BY CLOSE CONTACT WITH NATURAL CASES.

Frequent attempts have been made to determine whether, by placing healthy lambs and kids in close contact with natural cases of the disease and with cases infected experimentally, the

disease can be transmitted by actual contact. In no case up to the present has a positive result been obtained.

Nasal discharge, organ emulsion, etc., was rubbed on the bucal and nasal mucosa of healthy animals but also without effect.

The failure of these simple transmission experiments, which are at the present time being repeated, is important as it involves the question of the transmission of the disease under natural conditions in the field. It is generally accepted that most primary pulmonary diseases are contracted through the respiratory tract, e.g., bovine contagious pleuro-pneumonia, but the experiments carried out in connection with this disease would show that in Laikipia Lung Disease, infection may reach the lungs by the blood or lymph stream from the alimentary canal or subcutaneous tissues. Constant observations were made on the umbilical cord in order to see whether infection might gain access to the lungs of newly-born lambs by this channel but in every case examined the cord was quite healthy, as were the umbilical vessels and the ductus venosus. The manner of infection under field conditions has, therefore, not been finally explained.

MORBID ANATOMY.

Lesions are found in connection with the respiratory system, in the pleural cavity and less frequently in the joints. There is generally a gastro-arteritis of variable severity with most constant lesions in the duodenum and caecum. The mucosa is never ulcerated; it is merely deeply injected and swollen. The mesenteric lymphatic glands, like the lymphatic glands generally throughout the body, are much enlarged, frequently haemorrhagic and very moist and swollen. Sections are juicy, swollen, granular and often markedly saturated with blood. The lymphatic glands most noticeably affected are those in association with the alimentary and respiratory systems. In three cases, the pharyngeal glands contained a thick somewhat dry caseous greenish pus. Tongue and palatine lesions were found in many natural cases and in one experimental case (Sheep 3058). These lesions are ulcerations of the mucosa and may be the size of a florin. On cross section they are wedge shaped with the base superficial and are composed of necrotic grayish material separated from the adjacent healthy tissue by a well-marked fibrous ring.

There is nothing constant about the changes noted in the glandular tissues beyond a more or less marked state of congestion. In three cases the liver was full of necrotic lesions similar in appearance to the ordinary foci of bacillary necrosis. These lesions were observed, however, in a sheep that died

twenty-one days after inoculation of a broth culture sterilised by .5 per cent formalin. No bacteriological work has yet been done on these livers.

The respiratory mucosa of nose, pharynx and trachea was more or less acutely injected; very often it had a deep port wine colour, but there were variants of this colour. The mucosa was also very moist and was in some cases covered by slimy or inspissated clots of mucous, in some cases, greenish in colour. The mucous was often very abundant in the nasal cavities and filled up the various meati and covered the turbinated bones.

As a rule the bronchi showed similar changes as noted for the trachea.

The main lesions were found in the thoracic cavity. There was generally a variable quantity of rather offensive dirty yellow fluid, sometimes distinctly purulent. In a few cases this fluid was absent.

Both parietal and visceral pleura were deeply injected and showed either a dirty easily scraped-off deposit or adhesions where were either fresh and easily torn or old and fibrous. In very early cases, the nature of this material was a pale yellow-brown jelly, but it soon becomes quite fibrous.

The lungs show abscesses, one or several, of different sizes. They may be situated anywhere in the organ but probably most frequently in the main lobe. The abscesses may be numerous and pea-like or fewer in number and varying in size up to a walnut. In either case, they are separated off from the adjacent lung tissue by a well-defined ring of inflammatory tissue which tends to become distinctly fibrous in older cases. Inside the abscesses is a thick dirty, creamy yellow pus very often with an offensive odour. These abscesses may be unopened and well-marked off from the surrounding lung tissue or they may have burst into the pleural cavity or a bronchus with the result that the pus lies free in the chest cavity or the lumen of a bronchial tube.

The condition may affect one or both lungs and there may be a unilateral or bilateral pleurisy or empyema. If the collection of fluid is very great the lungs may have completely collapsed. Irrespective of the abscesses, lungs are generally in a varying state of acute congestion and oedema.

As might be expected, the pericardium is gravely affected. It may be hidden in the pleuritic effusion, or covered by gelatinous deposit or fibrous adhesions. In one case there was a collection of pus in the pericardial sack with fresh adhesions between the parietal and visceral serosa.

In both natural and experimental cases pathological changes were found in the joints of the limbs. These most commonly affected were elbows, carpi, fetlock, shoulder, tarsi, stifle and hip. The joints were very swollen and much enlarged. They were firm and on section were seen to be distended with pus of a very similar nature as that described in the chest lesions. The pus was distributed between various ligaments and was only confined by the capsular ligament. The synovial membrane was in a variable state of congestion but no ulceration was noticed. In one animal the abscess in carpi had burst and had developed a chronic sinus of the joint. Similar lesions were observed in the proximal digital sheaths of some animals.

Symptoms.—Nothing is known about the period of incubation except that in experimental cases it averages between 1—30 days. Under natural conditions it would appear to be in the neighbourhood of the former time in new-born lambs, but there is no evidence at all how long it may be in older lambs or adults.

There is equal doubt as to the course of the disease. In very acute cases it may be 1—10 days or longer but chronic cases may live for many months or even years. Whether all adult sheep which on autopsy are found to be suffering from chronic Laikipia disease contracted the disease in their early days or at some unknown period during adolescence is not known, but it may be taken as true, as proved by experiment, that the susceptibility of sheep to this disease decreases as they get older. There is as yet not the slightest evidence available to show that any immunity develops after a mild attack of the disease or in adult animals. The symptoms may be described as (a) acute and (b) chronic.

In Acute Cases.—The temperature ascends to 106° F., or 107° F., and is accompanied by listlessness, weakness, disinclination to move, grunting, loss of appetite and great thirst. The animal either lies down or stands apart with the head depressed and back slightly arched. The extremities are warm and constipation is frequently observed. There are manifested all the symptoms of acute pneumonia, *viz.*, grunting or moaning, increased or violent respiratory movements with bellows like action of the flanks. Coughing of a soft or moist character is present and may occur in paroxysms. Respirations may exceed 100 per minute but may be much slower. They may be stertorous or sniffling breathing while in every case a nasal discharge appears from the first. This discharge is thick, slimy, muco-purulent and, in the later phases, often tinged with blood. It is from time to time blown out of the anterior nares to clear the passages and facilitate the ingress

of inspired air. This discharge may be licked away by the tongue, or if it is blown away, it falls on surrounding objects and other animals.

In fatal cases, the high temperature is maintained for several days to a fortnight and then finally drops to 98° F., or so before death. Weakness, emaciation and prostration are very marked and progressive, while there is no diminution of the respiratory distress. Death occurs more or less suddenly, especially if the animal is moved or driven. Prolonged decubitus has not been noticed. Apparently the animal is easier and more comfortable standing than in the recumbent position. Buccal lesions are indicated by profuse salivation, tenderness about the lips during manipulation, and by complete anorexia. Salivation however, may be present in cases uncomplicated by mouth lesions and in these cases is probably due to the marked congestion or inflammation of the pharynx and contiguous mucosae.

The animal may be awkward or stiff in its gait but joint lesions have not been observed in acute cases.

If the symptoms are less marked or if the animal survives after a fortnight or so of the disease the case passes into the subacute or chronic phase.

It is difficult to say if acute cases ever completely recover. The pathology of the disease would appear to indicate that such an event must be very rare. Dissolution or chronic pneumonia are the two sequels of acute Laikipia disease. No arthritis has been diagnosed in acute cases.

In Chronic Cases.—The symptoms vary considerably in intensity. They may pass unnoticed and pulmonary lesions only found at post-morteming the animal for some reason or other. The animal may be in poor condition, be less active than the rest of the flock and tend to lag behind. There may be a chronic nasal discharge and coughing. Such animals are known as "lungers" and would appear to be dangerous as they are possibly responsible for disseminating the infection in the herd. Both goats and sheep may be "lungers" and such cases should be regarded by farmers with suspicion and the best advice that can be given on such animals is that they should be immediately destroyed.

A certain percentage of animals apparently recover from an acute attack but, for some unknown reasons, suddenly become ill again, show a high temperature for a few days and all the symptoms of acute pneumonia. Recovery may be apparently complete from this relapse but in a certain percentage of cases joint lesions supervene. The animal becomes very stiff and lame. It may lie down all the time or simply

crawl about. The affected joints are swollen, hot and painful. They eventually burst and discharge a thick pus mixed with synovia. Such cases may recover spontaneously or the animal becomes progressively thinner, more helpless and eventually die. These joint lesions may be accompanied by great wasting of the affected limbs.

Joint lesions of the sheep are little understood and in this Colony they should be regarded as possibly a sequel to acute Laikipia disease. Many animals recover, unnoticed by the farmer or herd, but they are chronically lame for the rest of their life. Such animals may be only noticed when the flock is chased or driven as they lag behind. The interpretation of these sudden arthritic lesions is difficult but they would appear to be embolic and follow breaking down of pulmonary abscesses for some reason or other, and the appearance of emboli in the circulation.

Diagnosis of Laikipia Lung Disease.—There should be no difficulty in this respect. The acute pulmonary symptoms, the high mortality, the age of the animals affected, and the highly contagious nature of the disease should permit of an immediate recognition of the disease in sheep, and will be readily confirmed after a couple of post-mortems.

Some farmers, however, have in the past confused this disease with foot and mouth, and sheep-pox. The latter may be diagnosed by the typical cutaneous pox lesions which are absent in Laikipia Lung Disease, while in typical cases of foot and mouth, there are present the characteristic buccal and digital lesions.

While, therefore, there can be little doubt as to the diagnosis of Laikipia disease in sheep, there may be much difficulty in recognising the disease in goats because of the presence in these animals of a specific pleuro-pneumonia. The main guide to the diagnosis of Laikipia disease in goats would be whether there is any concomitant or prevalent infectious respiratory affections in lambs as it is well known that sheep are more susceptible than goats to ovine infectious pleuro-pneumonia. Moreover, there are differences in the pathology of the two diseases which are easily recognised at autopsy.

As mentioned elsewhere in this report, further research is required on the prevalence and epidemiology of goat respiratory diseases in Kenya.

Treatment.—There is no medicinal treatment for Laikipia Lung Disease. When the disease has been diagnosed on the farm, energetic measures should be taken in the way of segregating sick and in-contact lambs, vaccination of in-contacts and new born animals and attention to the hygiene of the

lambling bomas. Destroy by fire all carcasses and infective material. Kill off all "chronic lungers" which are simply reservoirs of the virus and responsible for maintaining infection.

The vaccine issued by the Laboratory is a prophylactic. It does not cure the disease. If it is given to animals already infected or those in the incubative stage, it will simply kill them by causing a violent reaction.

The vaccine is quite sterile and is absolutely incapable of causing pneumonia as it is simply composed of bacilli sterilised by a disinfectant. During 1927, several experimental vaccines were issued with generally very satisfactory results. In one instance, the farmer reported a very heavy mortality subsequent to the use of the vaccine. No explanation can be given of this loss beyond emphasising that animals sick with pneumonia at the time of inoculation will die if the vaccine is used. In a large number of animals inoculated at the Laboratory with the vaccine, no fatal case has ever appeared. Until, therefore, farmers, who have had bad results with the vaccine, send into the Laboratory fuller information *re* the mortality as well as specimens, etc., it will not be possible to find any scientific explanation for these fatal cases.

DISEASES OF THE GOAT.

PRESENT KNOWLEDGE OF RESPIRATORY DISEASES OF THE GOAT IN KENYA.

From the latter end of 1927, the pulmonary lesions occurring in the goat were investigated by Professor R. W. M. Mettam, Veterinary Research Officer. This research was prompted by several factors, namely:—(a) the prevalence of a common and fatal disease of goats purchased locally from the natives, (b), the occurrence of so-called contagious pleuro-pneumonia of goats in the Kikuyu native reserve and on the Ngobit, and (c), the view held by some sheep farmers that Laikipia Lung Disease is perpetuated by goats which suffer extensively from respiratory diseases and possibly keep the Laikipia infection alive on certain farms.

As the result of preliminary experiments, the following conclusions have been definitely determined, *viz*:—

- (a).—That contagious pleuro-pneumonia of goats as described in the literature occurs in Kenya though its prevalence is not yet known.
- (b).—That the disease occurring at Kabete in locally purchased animals is a definite and specific disease. It shows marked features which afford a differential diagnosis from infectious pleuro-pneumonia. In the sub-adjointed table it is compared with takosis and

infectious pneumonia, both well-known diseases of goats fully described in the literature. It will be seen that the disease has a very marked resemblance to takosis, but it would be premature to claim that the two diseases are the same.

It certainly has little in common with infectious pneumonia. According to Wooldridge the latter disease is a form of hæmorrhagic septicaemia affecting the goat. Fortunately hæmorrhagic septicaemia is not known in East Africa in any of the domestic animals, so that, if Wooldridge is correct in coupling infectious pneumonia with caprine hæmorrhagic septicaemia, additional strength is lent to the evidence that the progressive goat disease that is so widespread in the Kikuyu country is not infectious pneumonia.

Unfortunately, so far, little evidence has been forthcoming to permit of an opinion concerning the part played by the goat in the transmission of Laikipia lung disease or if the bacillary lung diseases of ovines and caprines are entirely specific. The question will only be solved by a series of cross inoculation experiments with virulent material from each species.

It is interesting to note a paper by Poulton in which a severe outbreak of a contagious pleuro-pneumonia affecting sheep and goats is described in Uganda and Tanganyika during the great war. Sheep are described as dying from the same disease as the goats, but less numerously and with milder pulmonary lesions in the respect that necrosis was not so frequently observed. In inf. pleuro-pneumonia of goats in Tanganyika Schellhase was quite unable to reproduce the disease in cattle and sheep by the inoculation of virulent material so that it would appear that Poulton was either dealing with two separate and quite specific diseases at the same time, *viz.*: inf. pleuro-pneumonia of goats and inf. pleuro-pneumonia of sheep or simply Laikipia lung disease in which disease both sheep and goats are affected. However, as noted before it cannot just at present be dogmatically laid down one way or the other if that sheep and goats have each a specific infectious pneumonia. Reference to recent literature, *e.g.*, Schellhase, Hutyra and Marck, would appear to support the view that inf. pleuro-pneumonia of goats affects that species exclusively.

The other local disease of goats, which in order to prevent confusion may be called Kikuyu disease of goats, may eventually be proved to be takosis or a variant of that disease.

This disease only came to light when goats, used for the production of rinderpest virus, died at periods varying from 9—56 days following the inoculation of the virus. At first

it was thought that the animals were dying from rinderpest though it is well known that caprines are fairly resistant to the disease. It was soon found, however, that goats in other experiments, *e.g.*, anthrax, died from the same disease as did also animals at the farm which were supposed to be healthy and available for experiment. Moreover, blood from goats that died at the farm (natural cases of Kikuyu disease of goats) and had not been inoculated with cattle plague virus did not set up rinderpest in susceptible cattle. This test repeated twice—proved beyond all doubt that the goat disease was not rinderpest.

It is an interesting fact that India loses 75 per cent. of the goats used for the production of rinderpest virus from infectious pleuro-pneumonia. Experience in Kenya is that there may be a heavy mortality following the bleeding of virus goats, but not from the same cause as observed in India. It is possible that goats purchased from natives are in various stages of this disease and that a fatal termination is precipitated by the reaction set up by the rinderpest virus or some other agent so that the animal eventually dies at a varying period of 1—8 weeks following inoculation.

The two diseases, *inf. pleuro-pneumonia* and *Kikuyu disease of goats*, will now receive more detailed attention.

B.—*Kikuyu Disease of Goats.*

Some points in connection with the prevalence of this disease have already been noted. Animals of all ages and both sexes are affected, but so far the disease has only been noticed in locally purchased animals and kids born on the Laboratory farm. It is not known whether Angora goats are susceptible, but both the diseases, *takosis* and *inf. pleuro-pneumonia*, have been particularly studied in Angoras and there appears to be no reason why these animals should not succumb to this particular disease.

Reference to the histories of the Laboratory born animals which died from the disease shows that lesions were very well marked in kids of 12 weeks old. Of the 27 animals which have come to autopsy during the past 3 months 11 were born and bred at Kabete while the remaining 16 were purchased from the natives in the neighbourhood. These figures would indicate that the disease is very prevalent in native stock though it is difficult to confirm this statement from the natives themselves who are very reticent when questioned about the health of their animals. But from what can be seen of the native goats in the neighbourhood of Kabete it would appear very certain that they are severely infected with this disease.

There are given in column form in table 1 differentiating features between this disease, takosis and inf. pleuropneumonia, but it is now necessary to deal with this Kikuyu goat disease more fully.

Etiology.—At present nothing definite can be said of the cause of this disease. Diplococci have been isolated from the fluids, lungs, and spleen, but no experimental inoculations have yet been carried out. The diplococci are gram positive and grow well on ordinary agar forming very minute roundish, slight opaque colonies. Broth is rendered turbid, but there is no gas formation and very little deposit.

It is noteworthy that in broth the organism assumes a chain form (4—6 cocci), is firmly gram positive and in smears could be described as a streptococcus brevis.

It is interesting to note that Montgomery, during the war, at this Laboratory isolated a diplococcus from a disease of goat which he called diplococcosis. The main character of this disease was a milky fluid in the serous cavities. Unfortunately his protocols cannot be found for the time being, but it is possible he was dealing with this very same disease.

To determine whether the cause was a filterable virus serous fluids or minced lung tissue was diluted and filtered through a Berkefeld candle and inoculated to goats. After 35 days there was no rise or fall of temperature and the animals were still in excellent condition. It is still too early, however, to dogmatise that the cause of the disease is not a filter passer. It is noteworthy that in America Mohler and Washburn isolated a gram positive micrococcus from cases of takosis, which, we have noted above, bears a great resemblance to this disease of goat at present under discussion.

Symptoms and Cause.—The period of incubation is not known, but judging from the charts of animals inoculated with blood from fatal cases of the disease and of emulsions of lesions it would appear to be between 7—10 days.

The disease, in its later stages at any rate, is not accompanied by any high fever, but in animals kept under observation and temperatured twice a day, no definite course of fever has been found. There are small mild daily fluctuations, but at times the curve may be quite steady. It will always be found that for some days prior to death the temperature falls well below 100°F., even down to 96°F. and this may continue for a few days. A subnormal temperature always indicates approaching death.

The main symptoms are unthriftiness, gradual but progressive loss of condition, a dry erect coat, arched back and shivering, appetite always to be excellent. At first there is

nothing at all wrong with the bowels, but as the animal loses condition there is noticed a gradual but increasing diarrhoea, which is light brown in colour and not offensive. Dysentery has never been observed, and the diarrhoea has never become profuse. The eyes always appear bright and clear, but towards the end there may be noticed a slight lacrimation.

There is a constant but generally mild catarrhal discharge from the nose, but never very copious. Coughing and rapid breathing are not noticed. The visible mucosa are very pale and moist.

The course or duration of the disease is quite unknown. It is probably prolonged and lasts for months. The animal becomes much thinner and weaker while the diarrhoea increases in amount. Death may be sudden and quite unexpected or it may be preceded by an accentuation of the visible symptoms so that the unfortunate goats with loosely drooping ears presents a wretched abject appearance. The temperature is now markedly subnormal, down to 95°F.—98°F. or so. There may be, at this stage, increased respirations and a very pendulous abdomen with hollow sunken flanks. Death is probably due to exhaustion, or to actual inanition so great is the emaciation in some cases.

Pathological Anatomy.—The carcase is very thin. Generally there is brownish faecal soiling of the tail, perineum and hindquarters. There may be slight serous lacrimination and a fairly pronounced catarrhal brownish nasal discharge. The visible mucosae are very pale.

On cutting the skin the paleness of the connective tissues and musculature may be most striking. Fat is greatly reduced in amount, and is very pale and watery. Around the kidneys it may have been entirely replaced by a serous gelatinous fluid. An animal in really good condition never came up for autopsy.

The blood may appear to be scarce in amount. This always very fluid, often distinctly watery, and stains poorly.

The serous cavities contain a varying amount of clear fluid. The serosa are very pale and moist. The fluid is generally a very pale milky colour, but in a few cases it was sanaceous and in these cases there was a pyo-peritoneum. Generally the fluid is odourless, but when purulent it was offensive. In every case examined there was fluid in the pericardial sac, in all but two there was fluid in the peritoneal cavity, but in half the cases the pleural cavity was empty. The fluid showed no tendency to coagulate. In these cases in which the peritoneal fluid was purulent there were adhesions between the viscera and the parietal peritoneum and between

the viscera themselves. From this purulent peritoneal fluid a streptococcus (diplococcus) brevis was recovered in pure culture.

Constant and very noticeable changes were found in connection with the heart. That organ was very flabby, soft and much dilated, especially the left ventricle. Naked eye examination was reminiscent of the heart in cases of gousiekte in sheep which is a disease of sheep in South Africa characterised by a degenerative myocarditis caused by the toxin of the plant *Vangueria pygmaea*. The myocardium was soft, moist, and light brown in colour.

The lungs very frequently showed purple solid areas affecting parts of the cranial and cardiac lobes, but similar streaky purple areas could be seen in parts of the main lobe. These areas sank in water, were depressed beneath the level of the surrounding normal lung parenchyma, purple pink in colour and fleshy. Sections were granular and contained much blood. Abscesses or necrotic lesions were not noticed.

Pleuritic adhesions were in no case observed and there was no possibility of confounding these lesions with those encountered in infectious caprine pleuro-pneumonia. There were no constant or gross lesions in the larynx, trachea or bronchi. These tubes had a very moist mucosa which sometimes showed streaky hæmorrhagic patches.

The spleen was generally enlarged and showed a varying degree of tumor splenis. Sections were usually swollen, dark in colour, soft and moist. The splenic corpuscles were not as a rule particularly prominent.

The parachymatous organs such as liver and kidneys showed no marked features. In colour they were much paler than normal, being a light brown with here and there a tinge of purple. Sections were pale and moist and generally soft. Pin point red hæmorrhagic dots in the cortex of the kidneys were commonly observed, while the middle zones of the hepatic lobules frequently contained a yellowish pigment.

Gastro-intestinal lesions are usually found, especially in stomach and small intestines (duodenum). The mucosa is flushed, moist and swollen. There is no ulceration, but the lesions may be fairly extensive in the stomach. Along the rest of the tract similar, but patchy and generally small, areas may be observed. The colon and rectum are as a rule quite normal. In some cases the pallor of the intestinal mucosa was very marked.

The lymphatic glands are much enlarged, especially the bronchial and mesenteric. They are enveloped in a moist jelly-like connective tissue and sections are considerably swollen

and simply exude water and fluid. Very rarely they are haemorrhagic. The mesenteric glands may be as much as 3 inches long by $\frac{1}{4}$ — $\frac{1}{2}$ inch in thickness. The red marrow of the femur was pale and gelatinous.

There were no observable lesions in the sexual organs or central nervous system.

The pathological anatomical diagnosis may be summarised as follows: Dilated and flabby heart; hepatisation of the lung; hydrops of pericardial, pleural and peritoneal cavities; tumor splenis; congestion of stomach and duodenum.

The pathological histology of the disease has not been investigated. Careful watch was kept for intestinal parasites, but none were ever seen.

Discussion and Summary.

1. There is a very prevalent disease amongst Kikuyu goats, characterised by progressive weakness, emaciation and anaemia while in the later stages there is diarrhoea, pendulous abdomen and nasal catarrh. The mortality would appear to be very high.

2. The disease has been observed in kids born and bred on the Kabete Laboratory farm and apparently affects animals of all ages. Kids only 12 weeks old have died from the disease.

3. No causal factor has yet been determined although gram positive diplostreptococci have been obtained in pure culture from lungs, spleen and serous fluids. No inoculation experiments have yet been carried out with this organism. Blood parasites and protozoa have not been found in smears and cannot be held responsible for the profound anaemia. Intestinal parasites may be also excluded.

4. The disease is not caprine rinderpest for inoculation of blood from goats dead of the disease into susceptible cattle is without result.

5. A summary of the pathological anatomical changes found in the disease have been given in the paper. The two most remarkable features are the dilated flabby heart and the very profound anaemia.

Further research is necessary to determine whether the cardiac lesions are primary and responsible for the other pathological changes noticed or whether they are all produced by the toxin of some bacteria. The remarkable cardiac lesions are very similar to what was described by Theiler in gousiekte—a disease of sheep in South Africa caused by the ingestion of a poisonous plant—*Vangueria pygmaea*.

TABLE 1

Observation.	Takosis.	Kikuyu Disease of Goats.	Infectious pneumonia.
Etiology ..	Gram positive micrococcus (Mohler).	? Filtrable virus. Diplococci (gram positive have been isolated in pure culture from peritoneal fluid and lungs, but their role is not known).	Bipolar organism. Considered by Wooldridge to be a form of Septicæmia hæmorrhagica affecting the goat.
Symptoms, etc.	Progressive weakness and loss of condition and later diarrhœa. At first there may be several degrees of fever but finally the temperature is sub-normal. Eyes become sunken, visible mucosa pale and there is usually a nasal discharge, cough and snuffling. Finally there is great weakness, drooping ears, difficulty in rising and paralysis. Mortality 100%. Course is 1-3 months.	In the main resemble those of Takosis. There is progressive weakness and loss of condition. Subacute diarrhœa. Abdomen and flanks hollow. Some greenish brown mucous discharge from nose. Back generally arched and coat dry and erect. Pneumonic lesions not marked. Eyes may be sunken but are generally normal. Weakness and emaciation become more pronounced. Paralysis not noticed. Mortality not known but very high. Course is very chronic. Probably 1-3 months.	<i>Acute pneumonia.</i> Towards the termination of the disease there is paralysis of the extremities. As a rule there is no enteritis. Mortality is 75-90%. Course is very acute and averages ten days.
Pathology ..	Pronounced general anæmia serous hæmorrhages, catarrhal pneumonic foci, hydro-pericardium. Finally chronic catarrh, often necrosis of intestinal mucosa.	Pronounced general anæmia. Hydrops of all three serous cavities, especially peritoneum and pericardium. Dilated and flabby heart. Serous hæmorrhages. Gastro-enteritis of a chronic catarrhal character with superficial necrosis in some cases. Lungs may contain purple granular hepatised areas while abscesses are very rare. Skin lesions not observed.	Lobular pneumonia with hepatisation and adjacent pleuro covered with a moist fibrous membrane. Affected lung lesions may become necrotic and converted into a caseous mass.

INF. PLEURO-PNEUMONIA OF GOATS.

This disease has a very widespread distribution and has been met with from time to time in the mountainous districts of Germany, Switzerland, Italy and in the Pyrenees. In Africa it has been described in the Belgian Congo, Tanganyika, Uganda and Kenya. It also occurs in India. In Algeria it is known colloquially as "boufrida".

According to Hutyra and Marck the disease occurs chiefly in hilly or mountainous countries and is rarer in lower lying lands or on sea-level. Affected animals moved from their native highlands suffered violently under their altered environment while there is a simultaneous heavy loss of animals amongst the native goats of the district.

The disease is held by Schellhase and most European observers to be absolutely specific for goats and transmission of the disease to sheep has not been proved. This emphatic declaration would appear to cast serious doubt as to whether Poulton was actually working with this disease. Poulton may be quoted as follows, *viz.*: "Goats and sheep were both infected by either contact or by subcutaneous inoculation one to the other."

The disease is said to occur extensively in Kenya. Reports of it have been received from the Rift Valley, the Laikipia district, the Ngobit and from the Kikuyu native reserve about Nyeri and Fort Hall. One case sent to the Laboratory from the Ngobit was kept under observation for some time and local bred healthy sheep and goats were herded with it to observe if the disease could be transmitted by actual contact. After two months the goat was killed and up to date no cases have yet occurred in the incontacts, both sheep and goats.

Bacteriological examination of the lungs of this goat revealed the organism of Laikipia lung disease in pure culture and further research is being conducted with it on sheep and goats. This solitary observation would appear to support the view of several farmers in the Laikipia and Ngobit districts that goats suffer from Laikipia lung disease of sheep and may even be the reservoir of infection. It is stated that the native goats in the Kikuyu reserve are heavily infected with this same disease which pathologically is not infectious pleuro-pneumonia of goats. As mentioned before much work has to be done on the transmissibility of sheep and goat lung diseases. The question is of considerable importance in view of the fact that squatter goats may be responsible for spreading respiratory diseases in the sheep of the white settlers.

In order to obtain more precise information on the exact prevalence of inf. pleuro-pneumonia in Kenya a short description of the disease is given for the information of stock breeders and others.

Cause.—Is not known but believed to be filterable virus.

Experimental Transmission.—Material from well-marked cases injected into goats and other animals is either absolutely negative or produces only a temporary reaction.

Schellhase, in Tanganyika, transmitted the disease to goats by intrapulmonary inoculation of lung fluid, but he failed to do so by subcutaneous inoculation. Cattle and sheep proved refractory to inoculation of lung fluids by all routes. He found that goats inoculated with virulent material subcutaneously were difficult to infect by the pulmonary route.

Period of inoculation is said to be between 8—10 days.

Symptoms and Course.—The symptoms are those of an acute pleuro-pneumonia, e.g., nasal catarrh, laborious blowing and painful respirations, cough, and several degrees of fever. In acute cases the dyspnoea (i.e., difficult respirations) may be very marked.

Acute cases may die in 24 hours or live for several days. In milder cases the above symptoms are noticed, but less acute. There is a progressive loss of condition while there is often an eruption on the lips and udder, which tend to heal without treatment. These subacute cases generally live for 3—4 weeks but recoveries do occur and chronic cases are sometimes found.

Pathological Anatomy.—The disease ought to be easily diagnosed in this country owing to the marked resemblance of lesions to those of contagious bovine pleuro-pneumonia. In peracute cases there is consolidation (hepatisation) of the lungs. The area of the lesion varies greatly, but there is infiltration of the pulmonary connective tissue with lymph so that the affected area has a "marbled" appearance. In most cases there is a sero-fibrous deposit on the pleura with a profuse hydrothorax, and marbling of the pulmonary parenchyma. The bronchial lymphatic glands are much enlarged while the spleen shows a varying degree of "tumor splenis".

Prevention.—When an outbreak of the disease is diagnosed strict measures must be adopted for the isolation of all sick and in-contact animals while the usual precautionary measures taken in any infectious disease should be rigidly enforced. Vaccine therapy, although practised in Congo with apparent success, is not generally employed largely because so little is known of the etiology of the disease.

It is hoped that stock breeders will send cases of this disease to the Laboratory as further investigations are urgently required into the disease as it occurs in Kenya.

Conclusion.—Infectious pleuro-pneumonia of goats is known to exist in Uganda, the Congo and Tanganyika. It is said to occur in Kenya but no positive cases have yet been seen at this Laboratory. There are no known reasons why the disease should not exist in Kenya. In fact it is most probable that it already does so, and only requires diagnosis. Farmers and others are urgently requested to send alive goats suffering from acute or chronic respiratory affections to the Laboratory for further research, as it is desired to obtain further information on these diseases at the earliest possible date.

EAST AFRICAN SWINE FEVER.

The value of extracts of spleen for the prophylactic vaccination against East African Swine Fever was investigated.

The methods of preparation of extract was as follows, *viz.* :—

Method 1.—Spleen of a domestic pig reacting to Swine Fever pulped in a Latapie, 11-8-1927, and normal saline in the proportion of 1 gramme of spleen to 9 c.c. of saline to which commercial formalin to make 1 in 1000 of the total bulk was added; extract then stored at 0° C.

Pig 1139 inoculated subcutaneously 18-8-1927, with 10 c.c. supernatant fluid of above, prepared extract centrifuged.

Result.—Temperature reaction to Swine Fever commenced on 24-8-1927. Temperature elevated till 31-8-1927. Animal died of Swine Fever on 1-9-1927.

Method 2.—Spleen of a domestic pig reacting to Swine Fever pulped in a Latapie, 7-9-1927, and normal saline in the proportion of 1 of spleen to 9 of saline to which toluol to make 1 per cent. of the total bulk was added, then incubated 48 hours, and stored at 0° C.

Pigs 1156 and 1170 inoculated subcutaneously 12-9-1927 with 20 c.c. and 15 c.c. respectively, of the extract.

Result.—1156 temperature reaction from 14-9-1927; animal died of Swine Fever on 20-9-1927.

1170 temperature reaction from 15-9-1927; animal died of Swine Fever on 18-9-1927.

Method 3.—Spleen of a pig reacting to Swine Fever pulped in a Latapie 1-9-1927. Toluol to make 1 per cent. of the total bulk added, and extract stored at 36° C. for

4 days, then normal saline and toluol to make 1 per cent. of the total bulk added and extract stored at 0° C.

Pig 1169 inoculated subcutaneously 10-9-1927, 20 c.c. of the extract.

Result.—Temperature reaction from 14-9-1927; animal died of Swine Fever on 21-9-1927.

Method 4.—Extract No. 3 to which 3 per cent. toluol was added and incubated for 48 hours, and stored at 0° C.

Pig 1160 inoculated subcutaneously on 21-9-1927, with 5 c.c. of the extract and re-inoculated on 3-10-1927 with 10 c.c. of the extract.

Result.—Irregular temperature reaction following both inoculations.

Immunity Test.—Inoculated 9-10-1927 subcutaneously 1 c.c. Swine Fever virus, ex pig 1059 of 16-11-1925.

Result.—Died of Swine Fever on 23-10-1927.

Method 5.—Spleen of a domestic pig reacting to Swine Fever pulped in a Latapie 20-9-1927, normal saline in the proportion of 1 of spleen to 9 of saline, to which toluol to make 3 per cent. of the total bulk was added, extract incubated 48 hours, and stored at 0° C.

(a).—Pig 1179 inoculated 2-11-1927 with 1 c.c. Swine Fever blood, ex 1059 of 16-11-1925, and simultaneously, subcutaneously 10 c.c. of the extract.

Result.—Temperature reaction; 1179 was bled on 12-11-1927, and 5 c.c. blood in equal parts of O.C.G., inoculated subcutaneously to pig 1183; a temperature reaction from the 6th to 10th day occurred, maximum 103.6F.

Immunity Test.—1179 inoculated subcutaneously on 28-11-1927, with 1 c.c. virus, ex pig 1184 of 26-11-1927.

Result.—Died of Swine Fever on 6-12-1927.

(b).—Pig 1182 inoculated subcutaneously on 1-12-1927 with $\frac{1}{2}$ c.c. virus, ex 1184 of 26-11-1927, and simultaneous 10 c.c. spleen extract.

Result.—Temperature reaction from 3-12-1927, and death from Swine Fever on 8-12-1927.

(c).—Pig 1159 inoculated subcutaneously on 5-10-1927 with 5 c.c. spleen extract, and re-inoculated subcutaneously 17-10-1927 with 5 c.c. of the extract

and on 27-10-1927 re-inoculated with $\frac{1}{2}$ c.c. virus 1059 of 16-11-1925, and simultaneously 8 c.c. of the extract.

Result.—No definite temperature reaction occurred.

Immunity Test.—Inoculated 28-11-1927, with $\frac{1}{2}$ c.c. virus ex pig 1184 of 26-11-1927, and 2 days later with 10 c.c. spleen extract.

Result.—Died of Swine Fever on 9-12-1927.

(d).—Pig 1167 inoculated with 1 c.c. virus ex 1059 of 16-11-1925 and simultaneously 14 c.c. of the extract.

Result.—Irregular temperature reaction.

Immunity Test.—Inoculated 28-11-1927 with $\frac{1}{2}$ c.c. virus ex 1184 of 26-11-1927.

Result.—Died of Swine Fever on 9-12-1927.

(c).—Pig 1180 inoculated subcutaneously on 1-12-1927 with 10 c.c. spleen extract.

Result.—Temperature reaction from 10-12-1927 to 13-12-1927, inclusive. Maximum 103.6°F.

Immunity Test.—Inoculated subcutaneously on 22-12-1927 with $\frac{1}{2}$ c.c. virus ex 1059 of 16-11-1925, and simultaneously subcutaneously 10 c.c. spleen extract.

Result.—Irregular temperature from 26-12-1927 to 28-12-1927, maximum 102.6°F. 27-12-1927.

Immunity Test.—Inoculated 26-1-1928, with virus ex 1184 of 26-11-1927.

Result.—Reacted and died of Swine Fever.

Method 6.—Spleen of a pig reacting, *viz.* 1184, to Swine Fever pulped in a Latapie, 26-11-1927; normal saline in the proportion of 1 of spleen to 9 of saline to which toluol to make 3 per cent. of the total bulk was added, extract then incubated for 48 hours.

Pig 1183 inoculated on the 29-11-1927 with 10 c.c. spleen extract.

Result.—Temperature irregular from the 3rd day, maximum 104°F., 3rd day; animal died of Swine Fever on 7-12-1927.

Post-mortem examination showed chronic Swine Fever bowel lesions.

Note.—Pig 1183 was originally inoculated on 12-11-1927 with blood, ex pig 1179 (*see above*); a mild temperature reaction occurred from the 6th to 10th

day; maximum 103.6°F., and temperature then returned to normal, and remained normal till the 3rd day after re-inoculation with spleen extract, ex pig 1184.

Virulency test of blood of 1059 of 16-11-1925, used in some of the experiments :—

Domestic pig 1184 was inoculated subcutaneously on 12-11-1927 with 1 c.c. blood, ex 1059 of 16-11-1925.

Result.—Temperature reaction from the 12th day; maximum 105°F., 13th day; animal died of Swine Fever on the 14th day.

Note.—Blood in O.C.G., equal parts, was collected from pig 1059 on 16-11-1925, and had since been stored at 5° C.

With a virulent virus, the reaction to Swine Fever usually commences from the 3rd to 5th day.

With an attenuated virus by storage, e.g., virus 1059 of 16-11-1925, reactions may not occur till the 12th day or later.

Summary.

(1) 1 in 1000 formalin spleen extract stored at 0° C. for 7 days; and then centrifuged, and the supernatant fluid inoculated, produced Swine Fever and death from Swine Fever.

(2) 1 in 100 toluol spleen extract incubated for 48 hours and stored for 3 days at 0° C., produced Swine Fever and death from Swine Fever.

(3) 1 in 100 toluol spleen extract incubated at 38° C. for 4 days and normal saline in the proportion of 1 of spleen to 9 of saline; a further lot of toluol added to make 1 per cent. of the total bulk, and the extract stored at 0° C. produced Swine Fever and death from Swine Fever, the same.

(4) Extract to which toluol to make 3 per cent. of the total bulk was added and the extract incubated for 48 hours at 38° C. and stored at 0° C. produced an irregular temperature reaction, but did not protect against a subsequent subcutaneous inoculation of 1 c.c. blood ex 1509 of 16-11-1925 (attenuated virus).

(5) Extracts of 20-9-1927 in normal saline, 1 per cent. spleen to 9 per cent. saline, to which toluol to make 3 per cent. of the total bulk was added, then incubated for 48 hours and stored at 0° C. produced a temperature reaction in a susceptible pig, 1180; when re-inoculated with virus, 1059 of 16-11-1925 (attenuated virus) and simultaneously 10 c.c. extract, an irregular temperature reaction occurred, maximum 102.6° F.,

when 1180 was subsequently tested on its immunity with virus, 1184 of 26-11-1927, a reaction to Swine Fever and death from Swine Fever resulted (See 5, (e)).

Inoculation of extract prepared by Method 5, and simultaneously virus 1059 of 16-11-1925, produced a temperature reaction in one susceptible animal, *viz.*, 1179 (blood collected from 1179, and inoculated to a susceptible pig, 1183 produced a mild temperature reaction, but no immunity was conferred in 1183 against virus 1184 or 26-11-1927).

The remaining pig inoculated with virus 1059 of 16-11-1925, and simultaneously extract prepared by Method 5, gave an irregular temperature reaction, but no immunity was conferred to virus 1184 of 12-11-1927.

Two inoculations with extract, prepared by Method 5, at an interval of 12 days, and a 3rd inoculation 10 days later with the extract and simultaneously attenuated virus 1059 of 16-1-1925, produced no reaction; and immunity was not conferred against virus 1184 of 26-11-1927.

Inoculation of extract prepared by Method 5, did not protect against virus 1184 of 26-11-1927, simultaneously inoculated.

(6) Inoculation of spleen extract in normal saline, 1 of spleen to 9 of saline, to which toluol to make 3 per cent. of the total bulk was added, and the extract then incubated for 48 hours at 38° C. produced a temperature reaction in 1183 from the 3rd day. Animal died of Swine Fever on the 7th day.

NOTE.—1183 was inoculated on 12-11-1927 with blood of 1179 (see above). On post-mortem examination, 1183 showed only chronic Swine Fever bowel lesions probably result of the reaction from the original inoculation.

Conclusions.

The virulency of Swine Fever is destroyed or attenuated by the addition of toluol in the proportion of 3 c.c. of toluol to 97 of spleen extract in saline (Method 5); prophylactic vaccination with this extract protected against attenuated virus 1059 of 16-11-1925, but does not protect against virus 1184 of 26-11-1927.

Animals which survive inoculation with an attenuated virus and a non-virulent or attenuated extract are not protected against a non-attenuated virus.

DISEASES OF EQUINES.

PREPARATION OF HORSE-SICKNESS ANTI-SERUM.

Through the kind assistance of Dr. Sir Arnold Theiler, Director of Veterinary Education and Research, Onderstepoort, it was possible to immunise several horses destined for serum-making purposes.

10 horses, including 9 Somali ponies and 1 country-bred horse, were inoculated with 5 c.c. virus, N. No. 18006 of 27-8-1926, and simultaneously with 400 c.c. anti-serum No. 1742, and 72 hours later, with 5 c.c. virus O. 17730 of 24-3-1927, and simultaneously 400 c.c. of anti-serum No. 1742.

Result.—All reacted to horse-sickness, 1 of which died of horse-sickness consequent on inoculation on the 20th day after the date of the original inoculation.

Total mortality ... 10 per cent.

Arrangements are now being made for the hyper-immunisation of the 9 survivors.

AVIAN DIPHTHERIA.

(CHICKEN-POX).

Outbreaks of Avian Diphtheria (Chicken-pox) are of fairly frequent occurrence in the Colony.

At the request of some owners a vaccine was prepared and issued for experimental use.

Two methods of preparing the vaccine were employed, *viz.* :—(1) Liquid vaccine and (2) A powder vaccine.

(1).—*Liquid Vaccine.*—The dry nodules on the comb and wattles of an affected bird are scraped off and collected in a mortar and rubbed up with 3 per cent. boric acid solution, in the proportion of 1 gramme to 2½ c.c. of the boric solution and stored at 5° C. until required for use; the method of vaccinating is as follows, *viz.* : 2 or 3 shallow vertical scarifications are made on the skin of the outside of the thigh just above the hock with a hypodermic syringe needle previously inserted in the vaccine. A number of susceptible birds were inoculated and kept under observation, a local reaction was visible from about the 7th day, which, at first, was of a yellowish colour, later turning black; an original inoculation conferred immunity against re-inoculation.

(2).—*Powder Vaccine.*—Dry scabs are collected in a Petri dish from the nodules of an affected bird about the 10th—14th day, and thoroughly dried in the incubator, and preserved in this rough state in stoppered bottles for two months; when required for use, an emulsion is made of the powdered crusts,

in liquid paraffin, in the proportion of 2 grammes of crusts to 98 c.c. of the liquid paraffin, which remains effective up to 14 days, the method of vaccinating is similar to that described above.

Through the kind assistance of Prof. Dr. de Blick and Dr. T. van Heelsbergen of Utrecht University, 100 doses and powder vaccine in hermetically sealed tubes was forwarded with directions for use by the N. V. Koninglijke Pharmaceutische Fabrieken, Meppel, Holland, on 15-11-1927, and reached Kabete on 30-12-1927. The 100 doses of the powder were mixed in 7 c.c. of 80 per cent. pure glycerine just prior to use on 7-1-1928; the vaccine produced distinct pox-like eruptions at seat of inoculation, *viz.*: skin of outside of thigh, in 23 out of 25 birds (susceptible), commencing on the 6th day; no constitutional effects were noted.

In view of the possibility of there being a demand for the vaccine in the future, arrangements are being made to prepare and store supplies of Avian Diphtheria Vaccine.

POISONING BY ACOKANTHERA.

(ACOKANTHOROSIS).

Plants responsible.—*A. schimperi* et *A. longiflora*.

Family: *Apocynaceae*.

Curson in South Africa has described very fully Acokantherosis and reference may suitably be made to his paper. He describes the symptoms of poisoning by *A. venenata*, but mentions *A. spectabilis* and *A. schimperi*. Both the latter as well as *A. longiflora* occur very commonly in this Colony, but in this paper by Professor R. W. M. Mettam, V.R.O., Acokantherosis due to *A. schimperi* and *A. longiflora* will only be noticed.

Plants belonging to the Apocynaceous family are mainly tropical in distribution and in Kenya are more common in the Coastal region and Nyanza basin than in the highlands. A very noticeable feature of the family is the abundant latex which in many members is very poisonous. The latex of some of the *Landelphia* is collected and used as rubber, especially of the *L. kirkii*, while the shrub—*Strophanthus verrucosus*—is of considerable medicinal value.

Description of A. schimperi and A. longiflora.—Both are small much branched trees, 15—25 feet high, with spreading crown and olive green shining ovate leaves, which vary in length in the two species. In *A. longiflora* the leaves are two to three inches long and opposite, and in *A. schimperi* two to four inches long. The flowers are small, white, heavily scented, and resemble English jasmine in appearance and

odour. The flowers are arrayed in dense clusters at the axis of the leaves and are followed by small fruits, one to three inches long which look like small plums, olives, or damsons. The fruits of both trees are edible and the Masai say that the ripe fruit of *A. schimperi* is much relished by elephants.

Both trees are common round Nairobi, in the Ngong forest, Masai Reserve and in the drier parts of the country. They are easily recognised and have the following vernacular names:—

	<i>A. schimperi.</i>	<i>A. longiflora.</i>
Masai :	Ol. morigyo.	—
Kamba :	Kibai.	Kibaichiago.
Kikuyu :	Murichu.	Mururu.

A decoction of either *A. schimperi* or *A. longiflora*, generally the former as it is more potent, but often a mixture of the two, is employed to form the basis of the famous Kamba arrow poison.

Cases of Acokantherosis in practice.—As noticed in South Africa Acokantherosis chiefly occurs in the dry season when the veldt is poor or low in condition. The attractive greenness of these trees is a sore temptation for half-starved cattle which eat the leaves without heed of their surpassing bitterness. At present it is not known how prevalent Acokantherosis is in Kenya, but recently a farmer near Nairobi suffered a serious mortality. The ubiquitous distribution of the trees may indicate that Acokantherosis is fairly common before the short rains.

Symptoms of natural cases of Acokantherosis.—Unfortunately no natural cases were seen, but the symptoms were briefly noted by the farmer, who was struck by their close analogy to strychnine poisoning. There were clonic muscular spasms, convulsions, profuse salivation, marked rolling of the eyeballs and inability to rise. At first there was constipation, but soon followed by fœtid diarrhœa. Cases lasted from one to three days according to the severity of the symptoms, but it is conjectured that there were some very acute cases which succumbed rapidly. There was no opportunity of examining the vascular system clinically. Pieces of the two Acokanthera trees described in this paper were recovered from the rumen and stomach of the dead cattle. The native herdman was positive that the cattle in question died from Acokantherosis.

Post-mortem made by the farmer showed acute gastro-enteritis. Treatment was of no avail.

Experimental Investigations.—Pieces of the suspected trees were botanically examined and found to belong to the family—Apocyanaceae. Specimens in flower and fruit were obtained and shown to the natives who unanimously declared the flowers, the young green twigs and stems to be poisonous. The fruits are non-poisonous and, though bitter, are readily eaten raw by the natives, and either boiled or in the form of jam by Europeans. As already noted the fruit of *A. schimperi* are said by the Masai to be much relished by elephants.

An infusion was made from both *A. schimperi* and *A. longiflora* and given to sheep and goats as follows: (A) subcutaneously, (B) intravenously and (C) *per os* in a drench.

Four sheep inoculated either intravenously or subcutaneously with an infusion failed to die, but were gravely ill for a period of several days.

Four sheep and one goat drenched with an infusion of *A. longiflora* or of *A. schimperi* or of a mixed infusion of the two trees died rapidly from acute poisoning in times varying from 17 minutes to 21 hours. The poison was administered by stomach tube to animals starved from one to two days. In no case could an animal be induced to eat the fresh leaves or twigs. One goat did casually eat a few raw leaves, but soon rejected them after swallowing one bolus.

It appears very remarkable that two trees regarded as producing a most deadly arrow poison should fail to kill sheep and goats after inoculation of an infusion subcutaneously and intravenously. The manufacture of the arrow poison from these Apocyanaceous trees is a native secret. Probably the poison obtained from the *Acokanthera* is a compound one, as it is known that to the *Acokanthera* decoction the juice of the leaves of the ordinary wild cactus is added. The rapidity with which the infusions killed in drenching shows that this particular vegetable alkaloid—*Acokantherin*—must be one of the most rapidly fatal poisons known.

Symptoms of Experimental Cases.—Symptoms appeared within ten minutes of dosing or inoculation. The animal was uneasy, salivated freely and chopped his jaws, and continually shifted his position. Urination and defecation were frequent.

The above symptoms were often not marked, but if the animal died within a short time of drenching they were much exaggerated and, moreover, the respirations were very hurried, often 100 or more. In cases of rapid poisoning the animals grunted and frequently moaned, then staggered and fell. In less rapidly acute cases the above symptoms were noticed, but were more mild. Salivation, chopping of the jaws, swallowing movements, increased respirations, diuresis,

great thirst and continual uneasiness and anxiety were observed. Grinding of the teeth was heard in animals that survived overnight while diarrhoea did not supervene until after the 10th or 12th hour following drenching. The diarrhoea was very foetid, olive green in colour, pultaceous, but never dysenteric. In all cases—hyper-acute and acute—the pupils were widely dilated and there was a constant expression of fear and anxiety. Death was preceded by no prolonged decubitus or agony; the animal simply staggered and became comatose. There was complete anorexia, but the animals showed a great thirst and would continually sip at water or drink large quantities if the bucket was put in the stable after being withheld for any length of time.

The symptoms of animals inoculated intravenously or subcutaneously were materially the same as those described above, but far less acute. The animal would drink freely but refuse dry food for days, only nibbling at grass in a half-hearted manner. Diarrhoea (foetid and green) and diuresis were noticed, and loss of condition was very rapid.

Those that recovered experienced a long convalescence, the diarrhoea continuing foetid for a week or ten days.

In no case were clinical observations made on the heart and pulse.

Pathological lesions in Experimental Cases.—These may be briefly summarised, viz.: (a) acute congestion, or in prolonged cases, acute gastro-enteritis, (b) anæmia and acute œdema of the lungs, and (c) systolic heart. There was a well-marked cyanosis of the visible mucosæ.

The gastro-intestinal lesions were very noticeable. The fundus of the stomach, the duodenum and small intestine generally, and the cæcum was always affected. The mucosa was very swollen, and a deep blood-claret colour. No ulceration was observed. When the inflammation was less acute the mucosa was studded with roundish pin-head hæmorrhages. In the very acute cases of poisoning the mucosa was a deep rose colour, but the best changes were found in the cases that survived for 20 hours or so.

In every case the heart was very firmly and noticeably contracted so that the cavities appeared much smaller than normally. The blood was very dark, tarry, and liquid. It stained very well.

The pulmonary changes were very characteristic. In all cases the lungs were much distended with air, pale pink in colour and very doughy in consistence. There were well-marked impressions caused by the overlying ribs and if the lungs were manipulated the fingers made deep and permanent impressions on the organs.

Sections showed the lungs to be poor in blood, very moist and doughy. A fine liquid oozed from the surface of the sliced lungs when squeezed. Emphysema was present in a few cases, but in a mild form. .

No other constant lesions were found in the remaining organs. Unfortunately there was no opportunity to autopsy a natural case, but the farmer was positive that acute enteric lesions were present. Treatment was not tried.

Discussion.—Acokantherosis may be confused with the following diseases, *viz.* : (a) anthrax, (b) heartwater, (c) redwater and (d) acute arsenical poisoning. All these conditions occur more or less commonly in this Colony and they have much in common, both as regards symptomology and pathology, with Acokantherosis.

Two of them, *i.e.*, anthrax and redwater may be diagnosed microscopically and arsenical poisoning may be proved by chemical analysis, but it may be quite possible that some of the so-called cases of heartwater, especially those that are not reproduced in experimental and susceptible cattle in the Laboratory from blood submitted by the farmer, may be due to poisoning by plants belonging to the acokantherosis species. Curson has noted in South Africa that both acokantherosis and heartwater occur in the same kind of country and it might be possible to differentiate between the two conditions by examining the stomach contents for the typical leaves of the Acokanthia. Blood inoculations into susceptible animals will allow in most cases of a definite diagnosis of heartwater, but it is well to remember that there is a very close resemblance between the two diseases.

Summary and Conclusions.

(a). *A. schimperi* and *A. longiflora* are common trees in Kenya. In times of drought they may be eaten by cattle, sheep and goats with fatal results.

(b). Experimentally drenching 4 sheep and 1 goat with an infusion of these trees resulted in a mortality of 100 per cent.

(c). The symptoms are very acute and are manifested by an acute gastro-enteritis, great prostration, cyanosis and death. Sometimes nervous symptoms are said to occur in natural cases in cattle.

(d). Pathological examination of experimental cases showed a very acute inflammation of the stomach and intestines, acute œdema of the lungs and marked systole of the heart.

(e). A differential diagnosis is necessary in order to distinguish Acokantherosis from other common Kenya diseases, *e.g.*, heartwater, anthrax, arsenical poisoning and even red-water. The ubiquitous distribution of Acokanthera in Kenya lead to the conclusion that Acokantherosis may not be an uncommon condition.

ANTHRAX.

The double vaccine was issued throughout the year with apparent benefit as no complaints were received of breakdowns of immunity or of fatalities consequent on its use. It was hoped to issue a single spore vaccine as manufactured in South Africa, Australia, and America, but some technical difficulties were encountered in the preparation of this vaccine. Those have been overcome and it is expected the new vaccine will be ready for issue by May of this current year (1928). The spore vaccine is made by cultivating an attenuated strain of the anthrax bacillus on agar until 90 per cent. of the organisms show sporulation. The growth is then removed, weighed and diluted with glycerine. Biological tests are carried out on small animals, sheep and goats, and 14—21 days after inoculation with the vaccine, each animal receives 500 M.L.D. of a virulent culture of the organism. The minimal dose of the vaccine which protects against this severe test is thus obtained, the vaccine is then further diluted with glycerinated saline and stored for one month before use. The dose is $\frac{1}{2}$ c.c. for adult cattle and $\frac{1}{4}$ c.c. for sheep. Only a single inoculation of vaccine is given. It must be emphasised that different strains of the spore vaccine will be issued for cattle and sheep, for goats, for pigs and for horses. The latter three mentioned animals are extremely susceptible to anthrax and the use in them of the cattle and sheep vaccine would cause unpleasant results and even death. The immunity resulting from use of this vaccine is 18 months.

BLACKQUARTER.

During 1927 the old powder vaccine which had not proved satisfactory for some time was discontinued and replaced by a liquid vaccine of which 1 c.c. is the dose for adult cattle. Only one inoculation is sufficient to confer a very secure immunity.

The vaccine, which is extensively used on the continent of Europe and in Great Britain, is made by cultivating the specific organism in Martin's broth containing 1 per cent. saccharose. After a few days growth the supernatant fluid is siphoned off and sterilised by the addition of .2 to .4 per cent. formalin. The vaccine is then stored in a cool place for a month, carefully tested on sheep, and, if the tests are satisfactory, issued for use in the field. It will be seen that the vaccine is quite

dead, and absolutely incapable by itself of causing any mortality after inoculation. The specific bacillus of blackquarter is killed by .2 to .4 per cent. formalin in 4 days so that the vaccine, kept for one month, is quite harmless though its immunising properties are not depreciated by storage or by formalin.

This vaccine has given excellent results and has proved to be immeasurably superior to the old powder vaccine. One farmer has complained of a mortality after its use. No explanations can be advanced for this mortality except that either the animals were already infected at the time of inoculation or else that the infection was not blackquarter at all but some similar infection due to other, but similar, anaerobes, *e.g.*, bacillus oedematis or bacillus of malignant oedema.

At the present time in Kenya every case that shows lesions of blood-stained oedema, gas gangrene and haemorrhagic degeneration of any muscle mass is designated blackquarter and if such cases occur after inoculation the efficacy of the vaccine is doubted. It has been shown in England, France, America and Australia that some cases of so-called blackquarter are simply due to infections by the anaerobes mentioned above. In South Africa malignant oedema is a well-recognised disease and a vaccine is issued for use against it in the field with good results. Only further research will show to what extent these other gas gangrenes are present in this country and their possible existence must be kept in mind when considering outbreaks of epidemics similar in their pathology to blackquarter.

In conclusion, a further remark may be made on the incidence of blackquarter in this Colony. It is generally accepted that cattle between the age of 6 months and 2 years are most susceptible and that calves are relatively immune. Recent research has shown that calves under 6 months old are not immune. Their escape from infection is due to the fact that they are rarely exposed to infection in early life. In Kenya cases of blackquarter have been diagnosed in animals of 2 months and there is no doubt that in certain districts this disease is a very serious one for very young cattle.

Where outbreaks occur in such young animals (2—6 months) early vaccination of $\frac{1}{2}$ c.c. of vaccine is recommended followed in 6 months time by a full dose of vaccine. Although the new liquid vaccine confers an immunity for 18 months in adult cattle, it is recommended that in bad districts annual inoculations of 1 c.c. vaccine be carried out, for cases of the disease have come under our observation in cattle of 8, 12 and 15 years.

CONTAGIOUS ABORTION AND STERILITY.

During the year, a pamphlet on the control and prevention of contagious abortion was printed and is available for farmers.

Numerous blood samples were received throughout the year for the agglutination test and results show that 15 per cent. to 20 per cent. of dairy cattle in Kenya are positive for contagious abortion. Dairy farmers should apply for the pamphlet mentioned above as it contains the most recent opinions on the disease. A tabular form with printed questions was also printed and this will be circulated to dairy farmers in due course. The object of this form is to collect data, etc., on sterility about which so many farmers are so anxious. Until a statistical record is made on the incidence, cause, lesions, etc., of sterility in this country, it will not be possible to undertake any thorough research into the condition. It is to be hoped, therefore, that farmers will complete this form as carefully and as fully as possible.

From time to time, demands for the contagious abortion vaccine are received. During 1927, 620 doses were issued. This amount is really very small and would seem to indicate that the majority of farmers are not much concerned with this disease. Sterility is a sequel to contagious abortion and unless the latter disease is properly and very energetically controlled, the question of sterility will loom very large in the future in the cattle industry of this country. This is all the more surprising as contagious abortion, and therefore also sterility, are both preventable diseases and their presence on a large scale in a herd reflects no great credit on the care or management of the farmer.

Inquiries have been made from time to time re contagious abortion in swine. This disease occurs and occasions heavy loss particularly in America. It is caused by an organism very similar to Bang's bacillus and/or by an organism of the paratyphoid group, but until further research is carried out in Kenya, it is not possible to name the causal organism responsible for the condition in this country.

PERSONAL.

I have much pleasure in placing on record my appreciation of the loyalty and devotion with which the Laboratory Staff have carried out their duties during the year.

J. WALKER,
Chief Veterinary Research Officer.

APPENDIX E.

Annual Report of the Division of Chemistry for the year 1927.

STAFF CHANGES.

Mr. V. A. Backley, Agricultural Chemist, proceeded on vacation leave on the 9th July.

Mr. M. H. Fox, Chemical Officer, was transferred to the Medical Department as Government Analyst on the 7th February.

Mr. D. S. Gracie, Assistant Agricultural Chemist, assumed duty on first appointment on the 23rd July.

Mr. B. A. Pickering, Junior Laboratory Assistant, returned from vacation leave on the 26th May.

Mr. F. J. Blake was appointed temporary Junior Clerk in the Division during the period January—May.

CORRESPONDENCE.

700 inward and 461 outward letters were dealt with; in addition 763 reports were issued.

TRAVELLING.

474 miles of extra departmental travelling in connection with experimental work were performed.

AGRICULTURAL SHOW.

Milk tests were carried out in connection with the milking competition.

WORK DONE.

Samples received, 1057.

SAMPLE	Outstand- ing at 31-12-26	Received	Examined	Refused	Outstand- ing at 31-12-27
Dips	3	677	646	27	7
Soils	54	28	9	17
Coffee	46	46	..	..
Cresoto	43	43	..	..
Coconuts	42	42	..	..
Maize	40	39	1	..
Toxicological	39	23	16	..
Manures and Lime	2	27	21	6	2
Limestone	22	5	..	17
Wireworm Remedy	..	19	19	..	..
Coffee Cherry	15	..	..	15
Waters	12	6	5	1
Palm Nut	1	1	..	..
Castor Bean	1	1	..	..
Sisal	1	..	1	..
Milk	1	..	1	..
Mealy Bug	1	1	..	..
Miscellaneous	16	15	..	1
	5	1,057	936	66	60

ROUTINE.

Dips.—During the year 27 samples of dipping fluid arrived in the Laboratory bearing no distinguishing mark or label. Eight samples were so dirty as to render their analysis impossible. Attention must again be drawn to the large number of samples which have been incorrectly addressed, causing delay in analysis, unnecessary correspondence and frequently the submission of a further sample by the owner of the dip concerned. Two samples were sent in bottles which had not been cleaned and had formerly contained concentrated dip or other disinfectant with the result that the figures for their analysis were absurdly high.

RESULT OF ANALYSIS OF DIP SAMPLES.

EXTENT OF ERROR.	1924		1925		1926		1927	
	No.	%	No.	%	No.	%	No.	%
Within 1%	15	3.4	27	5.8	36	6.6	38	5.88
Between 1 and 5%	77	17.4	80	17.1	89	16.3	119	18.42
" 5 and 10%	78	17.6	73	15.6	94	17.2	95	14.70
" 10 and 20%	109	24.6	112	24.0	134	24.5	170	26.31
Over 20%	164	37.0	175	37.5	191	34.9	216	33.45
Too dirty to analyse .. ..	..	..	..	..	3	0.5	8	1.24
TOTAL NO.	443	..	467	..	547	..	646	..

The number of samples dangerously incorrect again shows a slight decrease but one-third of the total number of samples represent dips which must be either quite ineffective or must affect injuriously the animals dipped in them.

SOILS.

Soil analysis, restricted to determinations of reaction, lime requirement, organic matter and total phosphoric oxide and costing Sh. 60 per sample can now be undertaken for individual farmers.

In this connection it should be remembered that the actual method of taking the soil sample in the field has a very important bearing on the significance of the analytical figures. A soil sample should be taken in the following manner:—

The area to be sampled ought to appear reasonably uniform and should be sampled at least six times by six separate holes well distributed over that uniform area. Each hole should be dug to a depth of, say, 2 feet and one side made perpendicular. A slice of earth one inch thick is then cut off from this perpendicular side to depth of 9 inches or the first colour

change. These slices are collected in a bag or clean piece of paper, thoroughly mixed, and the total bulk reduced to, say, 3 lbs. by the method of quartering and mixing opposite quarters.

Several soils have already been submitted for such routine examination and their analysis undertaken.

LIMESTONE.

As the result of advertisement by the Department in *The East African Standard* in August, 22 samples of limestone were received in the Laboratory.

These samples were received from :—

Locality.	Sender.	Result of Examination.
Songhor ..	C. W. R. Abraham ..	40% insol. in acid.
Kyambu ..	Fairfield Estate	
" ..	Turner and Kent	Not limestone.
" ..	Brinck and Anderson ..	Good sample.
Magadi Junction	R. Highton	10% insol. in acid.
Kabarnet ..	Ag. District Commissioner	Diatomite.
Kitui"	"	25% " insol. in acid.
Maragua ..	R. Lochhead	A sandstone (not calcareous).
Kisii	Senior Commissioner ..	Good sample—contains some phosphate
Koru	Gordon and Son	
Muhoroni ..	R. H. Walker	
Voi	District Commissioner ..	Not examined.
Mile 12/12		
Uganda Rly.	H. J. Taylor, A.A.O. ..	Good sample.
Mombasa and District (6six samples) ..	"	Not examined.
Lamu (Yavi) ..	Ag. District Commissioner	Not examined.
Lamu (Kibuyuni)	"	Not examined.

Good limestone has been known and worked at Kyambu (Fairfield Estate), Koru (Gordon and Son), Athi River (Churanji Lal and Co.), Mile 38 Magadi Line (Kenya Marble Quarries), Voi and Kisumu for some time, so that the only new sources of limestone are represented by samples from :—

Kyambu.—Messrs. Brinck and Anderson.

Magadi Junction.—Not a very good sample.

Kisii.

Good limestone has also been found near Muhoroni.

The one sample from the Mombasa district (Mile 12/12 on the Uganda Railway) which has been examined represents good limestone.

AGRICULTURAL LIME AND LIMING.

Some samples of agricultural lime were also examined during the year :—

Sample No.	Total Alkalinity		Price per ton.
	C _a O.		
1	...	65.6	—
2	...	55.7	—
3	...	63	—
4	...	65	56/
5	...	57	47/50

As the original limestones burned to produce these agricultural limes are in all cases good limestones which would contain at least 52 per cent. of available C_aO, the above low figures must be due to incomplete burning (or subsequent carbonation).

Now from the point of view of the organic matter content of the soil it has been shown by experiments that it does not make any difference, over a period of years, what form of lime is applied (i.e. whether burnt lime or ground limestone) to the soil. The principal factor governing the availability of limestone additions to a soil is the fineness of grinding. Ground limestone containing 52 per cent. C_aO and sufficiently finely ground (e.g. to pass a 30 mesh sieve) is going to be much more economical to use than agricultural lime containing (on the average) only 10 per cent. more available C_aO and costing somewhere about twice as much to buy.

MANURIAL EXPERIMENTS.

Scott Agricultural Laboratory Plots.

The maize on the 144 manurial plots at the Scott Agricultural Laboratories was harvested, in October. The yield of the control plots varied from 24 lbs. per plot to 58 lbs., a range of 34 lbs. The mean yield of these controls is 39.5 lbs. + 7.6 lbs. S.E. (equal to an experimental error of 19.2 per cent.). If the two extreme plots are neglected (not really justifiable) the mean yield of these control plots becomes 39.32 lbs. and the experimental error 14.8 per cent. A mean yield of 39.5 lbs. per plot means 15.8 bags of maize per acre.

A long time therefore must elapse before any significant result is to be expected from these trials.

Manurial Experiments at Kasarini, Kyambu.

The whole of the crop removed from these plots this year was, unfortunately, not weighed so that no reliable yield results will be available for this year. The experiment is being continued and manures were again applied in the short rains.

ANALYSES OF CHERRY COFFEE AND COFFEE PULP.

Analyses of samples of coffee cherry and pulp obtained from the districts of Ruiru, Thika, Kyambu, Nairobi, Nyeri, Sotik, Muhoroni, Elgon, Soy, Solai and Limuru are being carried out in order to determine the amount of fertilising material removed by a crop of coffee.

FERMENTATION OF COFFEE.

In continuation of work already done and with the idea of using yeast in coffee fermentation on a large scale, a pure culture of yeast was isolated from brewery yeast with the co-operation of the mycologist. Owing to the rapid ripening of the coffee at Kasarini during November and consequent pressure of work at the factory there, it was found impossible to try the yeast fermentation until the end of the picking season in December. A tank containing approximately 2,000 lbs. of pulped coffee inoculated with yeast on the 29th December was fully fermented in 13 hours as against 19 hours taken by similar coffee uninoculated.

DAVID S. GRACIE,
Assistant Agricultural Chemist.

APPENDIX F.

ANNUAL REPORT OF THE ENTOMOLOGIST,
1927.

STAFF.

On May 12th, a special committee was appointed to advise Government as to what immediate steps should be taken to deal with coffee mealy-bug and maize stalk-borer. The committee recommended that two additional Entomologists be appointed. This was sanctioned, and Mr. H. Wilkinson, formerly Plantation Inspector, was gazetted as Assistant Entomologist, to date from 1st October, 1927. Another Entomologist has been appointed and this officer should arrive in the Colony at the beginning of the year.

TRAVELLING.

7,281 miles were covered by car on Government service :—

T. J. Anderson : 4,000 miles.

T. W. Kirkpatrick : 3,281 miles.

The number of nights spent away from the Laboratory during visits to plantations, etc., were :—

T. W. Kirkpatrick : 72 nights.

T. J. Anderson : 152 nights.

CORRESPONDENCE.

1,734 letters were dealt with ; the subjects are summarised as follows :—

Bees and Wax	7
Blood-sucking Flies and Ectoparasites	33
Citrus	7
Coffee	477
Cotton	22
Flowers	5
Fruit and Fruit Trees	21
General	134
Identification of Insects	22
Import and Export of Plants	293
Lucerne	4
Maize	254
Sericulture	59
Staff	141
Sugar-cane	8
Tea	4
Termites	6
Upkeep of Laboratory	194
Vegetables	8
Wheat	35

Total ... 1,734

PUBLICATIONS.

“ The Common Coffee Mealybug (*Pseudococcus lilacinus*, *Ckll.*) in Kenya Colony,” by T. W. Kirkpatrick, M.A., Dipl. Agric. (Cantab.), F.E.S. Published as a bulletin of the Department of Agriculture.

ROUTINE.

Over 300 specimens of insects, damaged plants, seeds, etc., have been examined and reported on.

236 applications for permits to import plants and/or seeds have been examined, passed or amended.

Consignments of plants, bulbs and seeds, for export, have been examined and certificates given.

Consignments of plants, etc., have been examined at the General Post Office.

A small exhibit was prepared for the Nairobi Agricultural Show.

The Coffee Planters' Union meetings, the Coffee Conference and the Stock Breeders' Conference were attended by members of the staff.

During the short course of lectures on Agricultural subjects, which was held in Nairobi in March, demonstrations were given on insects which damage the principal crops of the Colony. It is to be regretted that the attendance was not larger.

INSECTS OF ECONOMIC IMPORTANCE DURING THE YEAR.

The more important pests are here recorded under the crops which they attack :—

Coffee.

Mr. T. W. Kirkpatrick reports as follows :—

Work has in the main been confined to the Mealybugs of Coffee; observations have also been made, as time and opportunity permitted, on the Fringed Scale of Coffee (*Asterolecanium coffea*) and on the White Coffee Borer (*Anthonos leuconotus*).

Pseudococcus lilacinus, *Ckll.* (the Common Coffee Mealybug).—This is still the most important coffee pest of the Colony, though the damage caused by it this year has not been so great as was anticipated. On some plantations when the drought has been exceptionally severe, it has even proved beneficial, by destroying in its early stages crop which could not possibly have matured on account of the lack of rain, and thus enabling the trees better to withstand the drought.

Bulletin No. 18 of the Department of Agriculture ("The Common Coffee Mealybug in Kenya Colony," by T. W. Kirkpatrick, M.A., Dipl. Agric. (Cantab.), F.E.S., pp. viii + 110, 15 figs., cr. 4vo.) was published towards the end of the year.

The following information may be added to this bulletin :

P. 50.—Two more species of ants (as yet identified) have been found on a plantation in Kiambu, attending *P. lilacinus*, though not in conjunction with a serious outbreak.

P. 69. Internal Parasites.—In all, eight species of Hymenopterus parasites have been bred from *P. lilacinus*. Of these, however, the small yellow Chalcid with latticed wings, previously thought to be a parasite, is almost certainly a hyperparasite; and it is probable that at least one of the other species is also a hyperparasite.

None of these parasites have as yet shown any tendency to increase naturally, and it has not yet been possible to obtain a sufficient number of individuals of any one species to attempt artificial breeding.

P. 86. Painting Materials.—It is desired to call attention to "Lypticide," a proprietary insecticide manufactured by Lyptol Ltd., Harrow, Middlesex. This preparation, which may be used safely neat or diluted to 1 in 5 parts of water, is superior to anything previously suggested for painting the affected parts of trees in cases where this operation is recommended.

P. 95.—Emphasis should be laid on the necessity for liberal use of grease-proof paper (as well as plenty of cotton lint) when banding coffee trees with either tar-oil ant repellent or crude castor oil.

It is suggested that the grease-proof paper, which is obtainable locally as Sh. 12/50 per ream of 480 sheets, each 30×20 inches, should be cut into strips 30 inches long by 4 inches wide. Such a strip will go several times round an average-sized tree, and even with this liberal use, the cost of the paper is only Sh. 3/- per acre.

Asterolecanium coffea, Newst. (Fringed Coffee Scale).—Although this scale is present on a large number of coffee plantations in most districts, it is only on a few farms between Thika and Donyo Sabuk that it has spread to any considerable extent.

Two internal hymenopterus parasites of this species have been discovered during the year, but they do not appear to be able to exercise an efficient control by themselves. The factors

which have caused it to spread rather rapidly on a few plantations, while on the majority it shows no tendency to increase, are therefore still unknown.

This species of scale, even if only present on one or two trees in a plantation, should be regarded with the utmost seriousness. It is recommended that affected trees should be cut down and burnt, and the stumps brushed with a strong contact insecticide, at least twice at intervals of a month. The suckers arising from the stumps should be carefully watched, lest in spite of the brushings they should become re-infected.

Anthores leuconotus, *Pasc.* (The White Coffee Borer).—Several small outbreaks of this potentially very serious pest have occurred in the Ithanga and Makuyu districts. A short account of this insect in Nyasaland has been published by Mr. C. Smee (First Report on Pests and Diseases in Nyasaland, Department of Agriculture, Entomological Series, Bulletin No. 2, 1927). There are, however, some indications that its life-history in this country is not exactly identical with that in Nyasaland.

The eggs are laid at the base of the tree, and the young larvæ on hatching burrow downwards and eat the bark below the level of the soil. In all cases which have been observed in this country they have completely ring-barked the tree, after which they bore into the wood and work upwards.

As many as ten larvæ have been found in one tree.

Owing to the ring-barking, the tree begins to show signs of dying before the larvæ are fully fed; the length of the larval period in Nyasaland is said to be two years or sometimes longer. In this country it is thought to be somewhat less, but in any case is likely to be at least a year.

Trees attacked by this pest should be burnt as soon as the attack is manifest; it appears that they would seldom if ever recover, on account of the ring-barking, and it is essential that they should be destroyed before the contained larvæ arrive at maturity, and the adults emerge to spread the infection.

In Nyasaland the adults are said to emerge with the rains and to eat the young shoots on the coffee trees. Should, as is probable, this also be the case in this country, hand-picking should be carried out.

Stephanoderes hampei, *Ferr.*—One of the conclusions arrived at by the Entomological section of the Agricultural Conference held in Nairobi in August, 1926, was:—

“ That the Entomologists in Kenya and Uganda should meet and discuss the question of preventing the spread of *Stephanoderes hampei* into Kenya, after visiting coffee areas to the east and west of Mount Elgon.”

This insect occurs in Uganda, but has never been recorded from Kenya. The coffee acreage on the eastern slopes of Mount Elgon is increasing year by year, and it was feared that the insect might be introduced from Uganda native-grown coffee on the N.W. slopes of Elgon.

I am indebted to Mr. J. D. Snowdon, Agricultural Officer, Uganda, for the following report, a copy of which was forwarded to me by the Entomologist, Kampala :—

“ I have just returned from a tour of Sabei and North Bugishu, and I now find that there is no coffee planted east of Kaboroni. Furthermore, the soil and climate of Bukwa is unsuitable for coffee cultivation, and it is not proposed to plant coffee east of Kyasoweri.

“ I paid special attention to the question of the presence of the coffee berry borer, but failed to find any on trees inspected except in the Siroko Valley.

“ I consider that the possibilities of the coffee berry borer spreading to Kenya from coffee cultivated in North Bugishu are very remote, as high mountainous country separates Kenya from Uganda, except at Bukwa, and in this region, both in Kenya and Uganda, there is a wide stretch of country where the soil is very poor and climatic conditions are too dry for the successful cultivation of coffee.”

Cotton.

Mr. Kirkpatrick has written the following notes on his work in connection with insect pests of cotton :—

In January, a short visit was paid to the cotton-growing districts of North and Central Kavirondo. The following pests were observed :—

Boll-worms.

Earias insulana (Spiny Boll-worms).—Generally distributed, and responsible for certain amount of loss, but not abundant enough to be considered really serious.

Argyroplote leucotreta (False Codling Moth).—Found at Sio; not common. It is said to be a serious pest in Uganda.

(The Pink Boll-worm (*Platyedra gossypiella*) was not observed.)

Stainers.

Dysdercus sp. (Red Cotton Stainer).—Common every where, though varying in abundance. It appears to be most numerous on cotton growing close to thick grassy bush, which always contains various species of wild Malvaceous plants. If

these could be destroyed, even partially, and if hand-picking of the stainers were attempted when the cotton is young—before the first bolls open—much damage would be eliminated.

Seed-bugs.

Orycaenus hyalinipennis and *O. gossypinus* were both fairly numerous. In view of the prevalence of these insects and of *Dysdercus*, it is essential that only seed from the earliest picked cotton should be used for sowing. Seed from late pickings, and that which has remained on the trees for long after the bolls have split will have a very low percentage germination.

Aphis was universal, but everywhere well controlled by lady-birds, and but little damage appeared to have been done by it.

Potential Cotton Pests.

The larva of a moth—at present unidentified—was very common in the bolls of *Abutilon* sp. Although many insects which attack *Abutilon* are also capable of attacking cotton, no single larva of this species was found in a cotton boll.

An unidentified weevil was also found destroying the bolls of the same species of *Abutilon*, but was not found in cotton bolls.

On the whole the cotton pests in the parts of Kavirondo visited were much less serious than in the Malindi-Mambrui district on the Coast. I am of the opinion that this is largely due to the fact that in Kavirondo I saw no signs of the Ordinance relating to the destruction of cotton plants after harvest having been disobeyed.

Between the 5th and 16th of February the cotton cultivation on the Coast was again inspected. No new pests not mentioned in my Annual Report for 1926 were observed, with the exception of Thrips. This was only noticed on cotton on Mombasa Island, and it was not causing appreciable damage.

There has everywhere been a great increase in the numbers of the Cotton Seed-bug (*Orycaenus hyalinipennis*) and of the Cotton Stainer (*Dysdercus* sp.). This was only to be expected in view of the numbers of these insects present earlier in the season, which was largely due to widespread neglect of the cotton regulations.

Earias sp. (Spiny Boll-worm) had increased, but not more than was to be expected.

The Pink Boll-worm (*Platyedra gossypiella*).—This pest had not only not increased four-fold, as might well have been expected, but was possibly even less numerous than it was in

the previous November. This is entirely due to the Braconid parasite mentioned in my previous report. Although a considerable amount of damage has been done by the Pink Boll-worm, it was now comparatively difficult to find a full-fed worm that was not affected by the parasite. Were it not for this parasite it is probable that scarcely a single sound boll would have matured after the end of December.

Notes on this parasite, which has been named by Mr. D. S. Wilkinson, *Microbracon kirkpatricki*, have been published in the Bulletin of Entomological Research, Vol. XVIII, Part 1, September, 1927.

In December the Coast was again visited, in company with Mr. A. Alfieri, Entomologist in the Egyptian Government, who had been sent for the purpose of introducing this parasite into Egypt. A large consignment has already been sent to Egypt, and Mr. Alfieri intends to forward further consignments before returning to Egypt. It is not yet known whether they have arrived safely.

The cotton cultivation on the Coast shows a very distinct improvement on last year, mainly owing to a better germination of the seed and to closer spacing.

No new insect pests were recorded. The Spiny Boll-worm (*Earias insulana*) appeared much scarcer than last year; the Pink Boll-worm is still abundant, but so is its Braconid parasite.

The pest doing the most serious damage is undoubtedly *Dysdercus* sp. Measures for the reduction of the loss caused by this insect were suggested in the Annual Report for 1926.

Maize.

Stalk Borer (*Busseola fusca*).—A Select Committee of the Legislative Council was appointed on May 12th to advise Government upon what immediate steps should be taken to deal with the maize stalk-borer problem.

What had already been done, and what was being done, was explained to the Committee by the Entomologist and several witnesses, competent to speak on behalf of the maize industry, gave evidence.

The following is taken from the Report of the Committee :

“ 1. The pest is becoming more widespread.

“ 2. It is causing serious losses to farmers in certain areas.

“ 3. It may become a serious menace to the industry unless steps are taken to check it, since conditions are particularly favourable to the pest in the Colony.

" 4. Present information indicates that it is not likely to be eradicated, but if its spread, and the damage caused by it, is to be confined within reasonable limits, it is necessary that every maize-grower in an infected area should adopt such cultural methods as are calculated to control the spread of the pest.

" Efforts to effect complete control would necessitate legislative action dealing with the major farming operations, and we are doubtful whether such measures could be efficiently administered. It would, for example, include the introduction of Rules compelling farmers to burn all crop residues within a defined period, and the institution of a ' close season ' for the planting of maize, and we do not consider that these steps would be practicable under existing conditions. The administration of legislation of this kind would be costly, as the appointment of a number of inspectors would be required to enforce it.

" We recommend that further propaganda be carried out by the Agricultural Department, explaining the nature of the stalk borer pest, and the method of control, and the farmers' organisations be called upon to assist in such propaganda to the limit of their powers.

" It is realised that it is not possible for the Agricultural Department, staffed as it is now, to inspect all maize, and we look to the members of the industry themselves to safeguard their own interests by bringing to the notice of the Department any case of neglect on the part of individuals endangering their neighbours."

History of the campaign since May, 1927.

On June 14th, in conjunction with the Kenya Farmers' Association a public meeting of maize-growers was held in the Railway Institute, Nakuru, for the purpose of considering the position in regard to the borer and the means to be adopted for the control of its spread.

Some 200 farmers attended the meeting. The life-history, habits, distribution, methods of control, etc., of the borer were explained by the Entomologist, and after a lengthy discussion the following resolution was carried unanimously:—

" That a committee be appointed to consider with and advise the Department of Agriculture on the Stalk Borer menace, and the further legislation needed, if any. That the committee consist of the board of directors of the Kenya Farmers' Association; the committee to have power to co-opt. That the delegates from the local farmers' associations be appointed by the 30th June if representation is desired."

The first meeting of this committee was held at Nakuru on the 2nd of July, when the whole position was again reviewed, and consideration was given to every known method by which the borer could be reduced in numbers before the next planting season. It was decided :—

- (a) That the presence of Stalk Borer be notified, *i.e.*, it be a a “notifiable pest.”
- (b) That all plantings of maize after the 30th of June, 1927, be notified to the Department’s officer stationed at Nakuru.
- (c) That the late plantings be inspected monthly, and that, if these late plantings become infected, all infested plants be destroyed, and that if the infestation be very severe, that the crop be ploughed in.
- (d) That, as soon as practicable after harvesting, all stalks and crop remnants be destroyed.
- (e) That no volunteer maize be allowed to grow.
- (f) That maize grown by natives in European areas come under similar regulations.
- (g) That no squatters be allowed to grow maize on unoccupied farms.
- (h) That squatters in forest areas, contiguous to European maize areas, should also come under similar control and inspection.
- (i) That maize planted by Railway employees on Railway land should be treated in the same manner.
- (j) That the whole of the maize-growing area be divided into districts.
- (k) That Honorary Inspectors be appointed, two, three or more, if necessary, for each district to work in conjunction with the Agricultural Department’s officers.
- (l) That these Honorary Inspectors be paid travelling allowance.

In the Official Gazette of July 12th, the following notice appeared : “ Under section. 9, Diseases of Plants Prevention Ordinance, any outbreak of plant disease or pest must be notified to the Director of Agriculture. Every occurrence of Stalk Borer (*Busseola fusca*) must immediately be notified to the Agricultural Department, Nakuru. Forms of notification of the pest may be obtained from Honorary Inspectors or from Resident Commissioners.”

The instructions issued to Honorary Inspectors were :—

1. Within the area allotted to you, you will inspect all maize crops, particularly young maize, for the presence of Stalk Borer.
2. If Stalk Borer is present, determine the percentage of infection and the area infected, report to the Agricultural Department, Nakuru, and instruct the occupier to cut off all infected tops where possible, and, where this is not possible, to pull and destroy the complete plant.
3. Make a plan of your district (map supplied herewith) and mark the approximate position and size of the maize cultivation thereon. The map should be completed before the end of the year.
4. At harvesting, report areas being pulled and issue orders for destruction of stalks as farmers are harvesting each area of maize on the farms.
5. Areas which have been burned should be disced as soon as possible, and ploughed, and each month inspection of these areas should be done for the presence of volunteers and to determine completeness of destruction of crop remnants.
6. A copy of every notice served should be sent to the Department of Agriculture, Nakuru, for record.
7. A safari diary is supplied herewith, containing a specimen page for your guidance. These should be posted weekly to the Agricultural Department, Nakuru. Mileage allowance of 75 cents per mile will be allowed, and vouchers are sent herewith, which should be rendered monthly. They will be checked against the safari diary and in other ways.

The second meeting of the Stalk Borer Committee took place at Nakuru on September 3rd, when the following was carried unanimously :—

“ This Committee recommends that the question of dates of planting be considered by the Acting Director of Agriculture and that steps should be taken to make the Native Ordinance regarding the dates of planting maize applicable to European farmers, and that everybody be warned that every effort will be made to stop late planting of maize during 1928.”

After the meeting, Mr. Wilkinson, Assistant Entomologist, took over from me the work at Nakuru.

At the third meeting of the Committee held on the 19th November, planting dates were discussed, and, though there was a certain amount of difference of opinion amongst the delegates, it was considered most suitable that the planting dates should be from the 15th February till the 10th June.

It was also requested that the Maize Rules should apply to all Sorghums.

Shelled cores may be kept for fuel, if desired, provided they are stored in a dry place, to the satisfaction of the Inspector.

As a result of further discussion at a Committee meeting held on the 15th December, a public meeting was called at which the following resolution was carried, and Government was requested to incorporate it in the Maize Rules :—

“ That the 10th June be the latest date of planting in 1928, in addition to no maize being planted before the 15th of February, 1928, and that a further meeting be held later in the year to discuss legislation for 1929.”

The stalk borer also occurs on the Plateau and in the Trans Nzoia, although the infection has been very slight this season. Meetings were held in July with the farmers at Eldoret and Kitale, when the control methods adopted in the Nakuru-Ravine area were explained.

Wheat.

The following have been reported as damaging wheat, but owing to various causes no detailed work has been done on these pests :—

1. Stem Borer, reported from Njoro and Nakuru.
2. *Gonocephalum*, destroying young wheat.
3. *Melolonthid* larvæ eating the roots.
4. Caterpillars of *Phytometra orichalcea* feeding on the developing grains in the ear.

Beans.

A commercial firm in Nairobi made inquiries as to whether beans for export could be passed through the maize-drying plant at the Coast to rid them of the bean *Bruchus*.

The Grader at Kilindini was quite willing to try the experiment, but was prevented from doing so owing to the inability of the firm in question to supply the two tons of beans asked for, before the beginning of the maize season, after which the plant could be used for maize only.

Tsetse Fly.

The following surveys were made :—

1. Jan. 11th—19th in the Rumuruti area.
2. June 3rd—6th in the Njoro area.
3. Oct. 29th—Dec. 24th in the Trans Nzoia area.

THOS. J. ANDERSON,

Entomologist.

APPENDIX G.

Department of Agriculture,
Nakuru.

**ANNUAL REPORT OF INSPECTOR OF
PLANTATIONS.**

From the 1st January until the 25th July I performed the duties of Acting Mycologist, during the absence on leave of the Mycologist. A separate report for this period is submitted.

On the 7th of August I proceeded to Nakuru as an Inspector of Plantations to take over from the Entomologist the investigational and control work on maize stalk borer.

Since that time work on stalk borer has been continued but, owing to the large area and the number of estates which it has been found necessary to inspect and advise control measures upon, it was practically impossible to do any real investigation work.

Attending to correspondence, meetings and inspecting maize shambas has at times kept one more than fully occupied. It is my opinion that, before the bionomics of the maize stalk borer can be completely investigated, the scientific officer will have to be relieved of what might be called " police duties," and, if it is only a question of seeing the present existing regulations carried out, there seems to me to be no reason why a highly-trained scientific officer should be so employed. Such duties could be equally well performed by a less specialised individual and, in the interests of economy, much money could be saved.

386 letters were dealt with and 77 interviews were held in my office.

In addition, meetings re stalk borer were attended on the 3rd September, 22nd October, 13th November and on 15th December.

It seems fitting here briefly to review the origin of and the work done by the present organisation to weaken and so defeat the attacks of stalk borer in the administrative areas of Nakuru and Ravine, which comprise the district known as Nakuru, Njoro, Elburgon, Rongai, Ravine, Lower Molo, Olobanaita, Subukia and Solai.

On the 14th June, 1927, a general meeting of maize growers was held in Nakuru and about 200 people were present. The object of this meeting was to explain what a potential danger stalk borer was to the whole of the maize industry of the Colony.

Mr. Anderson, Entomologist, described in outline the origin and life history of the borer, as then known, together with the degree of infestation in the above areas. It was pointed out how, owing to the generous weather and soil conditions existing in the Colony, it is possible to grow maize planted at almost any period of the year and that these conditions enable such a pest as stalk borer to develop and become more intense in incidence as time goes on.

In the various districts concerned it has been the custom in the past to plant maize at any time from January to August, and since the type of maize planted is a type which takes from six to nine months to mature according to the district in which it is grown, it is at once evident that maize is present on the land at any time of the year thus providing food at all times for the larvae and a suitable host for the moth to lay her eggs upon.

Also, it was shown that this pest did not confine itself to the European farms but was to be found on native grown maize and other sorghums in the contiguous farming areas. These centres of infection have, in the past, been under no control and thus have probably provided additional sources of infection to European-grown maize. No wonder then, that under these conditions, the incidence of stalk borer should have reached such serious proportion.

In the general discussion which followed at this meeting it became perfectly obvious that there was need of co-operation and simultaneous action by all farmers in the district if this pest was to be controlled.

Thus the meeting decided that each district association appoint delegates who, along with a Government officer, would consider the most effective means of combating this pest which, with the then present farming equipment and under the present development, could be applied.

Delegates were appointed and a meeting was held on July 2nd. The Acting Director of Agriculture was in the chair and the Entomologist was in attendance. The Directors of the Kenya Farmers' Association, who were chiefly interested in the maize crop, were also present to consider what should be done during the next nine months, that is, before the planting of the 1928 crop, to kill as many stalk borer as possible.

It was decided that, in the absence of a wheat which the Department of Agriculture could recommend as being suitable as a rotation crop in the areas affected and in the absence of equipment necessary on farms for the planting and harvesting of wheat, the further planting of maize during 1927 should not be interfered with, but that all maize planted after the 30th June be notified to the Department of Agriculture since it was evident that these late plantings would prove to be the host crop for practically all borers produced between then and the end of the year. Also these late plantings were to be inspected once each month and if found to be badly infected with borer strong measures were to be taken and the whole crop destroyed.

At this meeting the following rules were also drawn up :

1. The stalk borer to be notified, i.e., stalk borer to become a " notifiable pest."
2. All maize to be inspected and infested plants to be destroyed.
3. All maize stalks, after harvesting, to be dug up and burned; thereafter the cultivation of land so organised that no " volunteer " maize be permitted to grow.
4. No planting to be done on any farm until all crop remnants on that farm have been destroyed.
5. All native grown maize in European areas to come under similar rules and the responsibility for seeing these rules carried out to rest with the European occupier of the farm.
6. No natives to be allowed to plant maize on any unoccupied farm without the written permission of the Resident Commissioner.
7. Squatters and all natives growing maize in forest areas and on railway land to be under similar control.

To secure this notification and such close inspection over so large an area, it became obvious that this could not be provided by the Department of Agriculture stationing the one officer available in that area. Thus it was agreed that each district provided its own resident honorary inspectors who would regularly inspect the maize in their own particular area, see these rules carried out and report once each month to the Government officer in charge of investigations.

Where these rules were not carried out or where, in the opinion of the honorary inspector, a whole crop should be destroyed this inspector would report to the Government officer who would then deal with the situation and thus relieving the

honorary inspector of all responsibilities and avoiding any friction which might take place between settler and inspector who was also a settler. This scheme was found to work very well indeed and far better than could have been anticipated when dealing so much with the human element.

The kindly co-operation of the Railway and Forest Departments was also obtained and a very valuable assistance was rendered by the officers of these departments in seeing that all natives in their employ obeyed the rules as set forth above.

These rules were given the greatest publicity in order that every farmer would become aware of what was required of him. They were published in the Official Gazette and in the Press, displayed at Post Offices and in public buildings, circulated, read at various district association meetings and by the kind co-operation of the police they were brought to the notice of individual farmers by the police patrols.

In all, eighteen honorary inspectors were appointed who, with the Government officer as chairman and the secretary of the Kenya Farmers' Association as honorary secretary, now constituted the Stalk Borer Committee. This Committee held monthly meetings to discuss and proposed further action to be taken in the light of experience and knowledge gained.

It thus established the fact that a restricted maize planting season was necessary in the control of stalk borer and also resolved that all maize cores, in which larvae and pupae were wont to hibernate, be burned after shelling except in cases where these cores were needed for fuel purposes when they could then be retained if kept under cover and protected from the weather in such a manner that any moths which may hatch from these cores could not escape.

After referring the question of a restricted planting period to District Associations for their opinions and decisions and after re-discussing these opinions at a general meeting of all maize growers held on the 15th December, it was finally decided that all maize stalks be destroyed before the 7th February, 1928, and that no maize or sorghums be planted before the 15th February, 1928, thus establishing a close season of at least two weeks.

At this general meeting it was also resolved that no maize be planted after the 10th June, 1928, thus again attempting to establish a close season for 1929, since all maize planted before the 10th June, 1928, should be harvested and all stalks destroyed before the advent of the rains in 1929 when planting could again commence.

Out of a total of 3,728 acres of maize which was reported to this Department as having been planted after June 30th, 2,110 acres had been destroyed before the 31st December, either as a result of the drought experienced during the latter half of the year or as a result of severe infestation of borer when, after inspection, orders for its destruction were given.

Owing to the dry season experienced and the consequent early maturation of maize, most of the remaining 1618 acres will be ready for harvesting before planting commences in 1928. Thus there will be completely removed what, at one time, was thought would prove a most serious menace to the 1928 crop. This, together with the destruction by burning of all crop remnants after harvesting and the establishment of a close season, when no maize stalks are present on the lands, will, it is hoped, markedly reduce the incidence of attack of stalk borer on the 1928 crop and it will prove interesting to observe the results of the 1927 campaign against this pest.

Little more is known of the biology of stalk borer but what information has been obtained will be published separately.

I would here like to place on record the good work performed by these honorary inspectors and trust each one will find it possible again to carry out honorary and oft-times thankless duties.

These duties, properly performed, would relieve the officer of the Department of Agriculture, now stationed in Nakuru, for other important work at a time when the Department will be understaffed owing to the absence of two entomologists from the Colony, one of whom is being transferred to the Sudan.

Our thanks are also due to the Secretary of the Kenya Farmers' Association for attending to all secretarial duties in connection with the various meetings.

H. WILKINSON,

Inspector of Plantations.

APPENDIX H.

ANNUAL REPORT OF THE MYCOLOGIST FOR 1927.

STAFF CHANGES.

I returned from leave on July 21st and took over from Mr. H. Wilkinson, who had been acting for me during my absence.

TRAVELLING.

Mr. Wilkinson covered about 1,100 miles in visiting plantations. This included visits to sisal estates at Thika to investigate the cause of faulty decortication associated with blackening of the leaves after cutting, and to Songhor in connection with "black tip" of coffee.

In October I made a tour in the following districts:—

Kericho, Buret and Sotik: Chiefly in connection with tea and coffee diseases, especially berry disease of the latter host.

Songhor: Striga weed in maize, and coffee berry disease.

Muhoroni, Kibigori, Miwani and Kibos: Inspections of sugar plantations in pursuance of mosaic disease eradication campaign.

Kaimosi: Berry and pink diseases of coffee.

The total travelling done after my return was approximately 1,000 miles, during which 32 European farms were visited, as well as a considerable number of Indian sugar farms between Muhoroni and Kisumu.

CORRESPONDENCE.

Inward letters numbered 584; outward 418. Enquiries about plant diseases, covering a range of 24 host plants, were dealt with. Other matters involving correspondence were chiefly concerned with the identification of plants sent by settlers, and the administration of the Diseases of Plants Prevention Ordinance.

INVESTIGATIONAL WORK.

Mr. Wilkinson carried out investigations on black tip disease of coffee at Songhor and on a condition of sisal leaves at Thika which prevents complete separation of the fibre from the succulent tissues.

In the case of the coffee disease the apical leaves are blackened as if burned, while older leaves are malformed and have large indentations in their margins. The internodes of such branches are very short, while numerous small secondary branches arise from the nodes, resulting in the production of a matted growth which bears little crop. Mr. Wilkinson concluded "that black tip is a condition produced as a result of unfavourable climatic conditions at a time when growth is rapid, and that the chief factor is the alternate showers of rain and brilliant sunshine locally experienced." In 1924, settlers suffering from black tip were advised to shade their coffee, and it was noticeable in the present investigations that the trouble was almost entirely absent where this had been done.

Sisal leaves at Thika which appeared quite sound on cutting, quickly developed towards the apex slightly depressed areas, varying in colour from a lighter green than the healthy tissues, through yellow green to brown or black in cases where the leaves were left for a few days after cutting. When such leaves were put through the decorticating machine it was found that portions of the succulent tissue remained attached to the fibre, and could not be removed during subsequent brushing. Opinions appeared to vary as to the conditions under which the trouble was most prevalent. In one case, immediately after heavy rain was considered the most likely time, while in another, warm, dry weather was thought more conducive to its appearance. The fungus *Colletotrichum agaves* was frequently found on the blackened tissues, but was probably not primarily concerned. From past experience in Kenya and Tanganyika Territory, it seems likely that excessive heat is one of the chief factors involved. Opportunity for further investigation of the trouble has been sought, but no reports of a recurrence have been received since my return.

An attempt is being made to discover how many biologic forms of black stem rust (*Puccinia graminis*) occur in Kenya Colony. This is a matter of considerable importance in wheat breeding work. In the United States it has been shown that 37 different biologic forms of this rust occur in various parts of the country. The effect of this is that a wheat which is susceptible to a particular form cannot be grown successfully in those regions where it occurs. The different varieties of wheat vary in their resistance or susceptibility to the different rust strains, and it has been by making use of this fact that their identification has been made possible.

Experiments in Kenya so far have been chiefly concerned with the development of a suitable technique. It was found at the outset that the special conditions prevailing so near the equator presented considerable difficulties. Successful rust

inoculation experiments require correct light, heat and moisture conditions combined with protection from outside sources of infection. Several trials were necessary before means were found to satisfy all these conditions.

Preliminary trials with the black stem rust occurring at the Scott Agricultural Laboratories indicated that the wheats available locally may not prove sufficiently different from one another in their reactions to infection to be entirely suitable for the purposes of the experiments. It was decided therefore to try to get seed of the twelve varieties used as differential hosts in determining in America the 37 biologic forms mentioned above. Through the courtesy of Dr. M. N. Levine, of Minnesota, small quantities of all twelve varieties have been received. A trial already carried out with the laboratory rust shows very marked differences in susceptibility between these wheats and gives grounds for the hope that they may be successfully employed in differentiating the biologic forms in Kenya, if, indeed, more than one exist.

The Acting Chief Grader and Inspector, Mombasa, found that certain consignments of potatoes for export contained a considerable percentage of tubers, which, while to all external appearances perfectly sound, proved, on cutting open, to be black and hollow at the centre. In the laboratory a bacterium and a species of fungus belonging to the genus *Fusarium* were sometimes isolated from such blackened tissue. Artificial inoculations with these organisms were carried out, but no positive results occurred with the bacterium and only partial and somewhat doubtful success was obtained with the *Fusarium*. In two cases, slight cavity formation was produced with the latter. The symptoms of the trouble agree generally with those of the condition known as "hollow heart" in America. This is considered to be due to overheating and insufficient ventilation in transit, and in consequence other experiments have been devised and carried out in an endeavour to reproduce the same symptoms by subjecting sound potatoes to abnormally high temperatures under varying conditions of ventilation. These experiments are still being carried out, but no success has yet attended them. This, however, may merely be due to the employment of insufficiently high temperatures so far.

In August it was found on a farm at Ngong that a proportion of the coffee berries exhibiting no external sign of disease, showed discoloured spots on the beans when pulped. In artificial culture in the laboratory, a number of such beans produced no organism at all, while the rest of those tested developed a variety of fungi and bacteria, but none consistent. The spots occurred indiscriminately on any part of the convex, *i.e.*, outer, side of the beans, so that the possibility of infection either through the stalk or the floral parts seemed not to arise. The nature and variety of the fungi and

bacteria pointed to their being purely saprophytic, and the lack of any sign of disease on the pulp supported this view and led to the opinion that these organisms must have been introduced into the interior of the berries by some mechanical means, and that they grew saprophytically there on tissues already injured. A similar condition of the beans has been observed from time to time in other parts of the country, and in such cases the results of investigation have always been similar and have led to the strong suspicion that the fungi or bacteria have been introduced by some suctorial insect.

A laboratory study of the physiology of Kenya species of the genus *Colletotrichum*, important as the causes of disease in a number of crop plants, is being carried out as opportunity permits.

ROUTINE WORK.

Mr. Wilkinson attended the Annual General Meeting and field demonstrations of the Coffee Planters' Union in January and the first Coffee Conference in June, in order to give any mycological information required.

He gave a series of lectures to settlers on the diseases of the chief crops of the country in March and prepared the following articles, which were published in the local Press:—

1. Ear Rot of Maize.
2. Practical Hints on Seed Treatments against Smuts in Wheat, Barley and Oats.
3. Striga Weed: A most serious menace to farmers.

A simplified article on the last subject was also prepared for publication in *Habari*.

The usual inspections of plants or seeds imported through the post were carried out at the General Post Office, Nairobi, throughout the year. A number of inspections of plants and seeds for export were also made and certificates of health were issued.

Collections of botanical specimens were made and forwarded to the Director, Royal Botanical Gardens, Kew, for favour of determination, prior to being added to the herbarium, at these laboratories.

SPECIAL WORK.

Almost the entire period of my home leave was devoted to a post-graduate research course. In addition, ten days were spent on duty in visits to the Imperial Bureau of Mycology and the Royal Botanic Gardens, Kew, to the British Museum (Natural History), and the Royal College of Science, South Kensington, and to the laboratories of the Ministry of Agriculture and the Rothamsted Experimental Station, Harpenden.

My thanks are due to all those who assisted me at these institutions. Most of the time was spent at the Imperial Bureau of Mycology, in consulting numerous papers not available in Kenya, in examining pathological specimens, and in discussing mycological problems with the Director (Dr. Butler) and his staff, who showed the greatest willingness to assist in every way and made my visit a most valuable one.

GENERAL OBSERVATIONS AND REMARKS.

The following are new records for Kenya:—

Potatoes.—Powdery Scab, *Spongospora scabies* (Wallr.), John.

Loquat.—Pink Disease of Branches, *Corticium salmonicolor*, B. and Br.

Cupressus macrocarpa.—Pink Disease of Branches, *Corticium salmonicolor*, B. and Br.

Tea.—Root Disease, probably *Armillaria mellea*.

Acacia melanoxylon.—Root Disease; *Rhizoctonia* sp. probably *R. lamellifera* Small.

Mtama (*Sorghum*).—Loose Smut, *Sphacelotheca cruenta*, (Kuhn), Potter.

Crotalaria agatiflora.—Rust, *Accidium crotolaria*, P. Henn.

Gladiolus sp.—Rust, *Uromyces transversalis* (Thuem), Wint.

Vigna vexillata.—*Woroninella dolichi* (Cke.), Syd.

Hyparrhenia collina.—*Cerebella andropogonia*, Ces.

The Imperial Bureau of Mycology report that they have no previous record of Pink Disease on *Cupressus macrocarpa*.

The occurrence of coffee berry disease (*Colletotrichum coffeanum*) has been established during the year in Sotik, Buret and Kaimosi districts, and it is believed also to exist in Upper Songhor.

Mr. L. A. Johnson, of Turbo Valley, has continued his experiments in selection of coffee seed from bushes apparently resistant to berry disease, and is sanguine of achieving his object of obtaining resistance combined with good marketing qualities. Unfortunately, the experiments, designed to discover whether a degree of resistance could be produced by suitable manuring and from which results were hoped for in 1927, were rendered completely useless by a severe attack by caterpillar over the experimental area.

A striking feature noticed in two or three districts during my October tour was the prevalence of brown blight on unshaded coffee. This disease, while not so serious as the closely related berry disease, occurs during ripening and lowers the market value of the coffee by producing stains on the beans. The presence of the fungus was almost invariably associated with damage to the pulp due to hail or sunscorch, and where the opportunity occurred of observing contiguous shaded and unshaded plantations, the difference between the amounts of brown blight present was very marked.

During my tour in October considerable progress with the eradication of varieties of sugar cane susceptible to mosaic disease was noted. It was gratifying to find that Messrs. Nyanza Sugar Co., Miwani, the biggest growers, had set an excellent example and had their plans well in hand for the removal of the remaining small acreage of susceptible varieties before the expiration of the time limit, June 1st, 1928. Towards the end of the year small isolated patches of diseased cane were reported in South and Central Kavirondo, and at Lumbwa, and immediate action was taken to deal with these infections.

Pink Disease (*Corticium salmonicolor*), which had previously been recorded in Kenya on coffee only, was found on loquat at Kericho and on *Cupressus macrocarpa* at Kaimosi, where it was also said to attack *Sesbania*. Various planters in this district reported successful results from spraying with carbide bordeaux mixture against leaf, berry and pink diseases of coffee.

The yellow rust (*Puccinia glumarum*) of wheat, which hitherto had been considered to occur only at altitudes of 7,000 feet and above, made its appearance during the year in the wheat-breeding plots at these laboratories, *i.e.*, at an altitude of about 5,700 feet.

J. McDONALD,
Mycologist.

APPENDIX I.

Plant Breeding Station,
Njoro.

31st December, 1927.

REPORT OF PLANT BREEDER.

It is somewhat unfortunate that, as the report has been called for so early, I am unable to adopt the same procedure as last year and date it January 31st 1927, to January 31st, 1928. These dates correspond approximately to the beginning and end of the wheat year, and could I have chosen them this report on the work of the past year would have been more conclusive.

STAFF.

Sir Rowland Biffen's recommendations having been adopted by Government, Mr. R. J. Lathbury, M.A. (Cantab.), was appointed Assistant Plant Breeder and took up his duties on June 26th of this year, being stationed at Njoro.

Mr. R. N. Noble, Junior Laboratory Assistant, went on leave at the beginning of May and returned at the end of November. Mr. Noble has been trained by me in plant breeding for two and a half years, and on that account given the status of Junior Laboratory Assistant instead of Junior Clerk. It has been arranged that in future he will spend a part of his time in doing the routine work of wheat experiments at the Scott Agricultural Laboratories as, living so far away at Njoro, it is impossible for me satisfactorily to do the required work at the Scott Agricultural Laboratories without having some sort of assistant in permanent residence there.

An African clerk was appointed to the staff of the Plant Breeding Services on August 1st, and is stationed at Njoro.

The permanent staff now consists therefore of a Plant Breeder, an Assistant Plant Breeder and an African clerk, instead of, as in the past, a Plant Breeder and a Junior Laboratory Assistant.

An Assistant Agricultural officer was approved in the Supplementary Estimate for 1927, but no officer has yet been appointed and the new plant breeding station at Njoro has been developed by the Assistant Plant Breeder and myself.

ORGANISATION.

The new organisation of the Plant Breeding Services has been inaugurated this year, in accordance with the recommendation of Sir Rowland Biffen. These consisted in the main of an increase in the number of plant breeding stations and of a change and increase in the personnel of the staff to provide for continuity and for the extra work now being undertaken by the Plant Breeding Services. The main plant breeding station is now at Njoro where a farm, 200 acres in extent, has been acquired out of the Njoro township land, west of, and bounded on the east by, the Njoro River. There are two subsidiary stations, one at the Scott Agricultural Laboratories near Nairobi, and the other at the Mau Summit on land kindly lent by Major J. J. Drought. The Njoro station is at an altitude of about 7,100 feet, has a light red soil, hot days and cold nights, and a prolonged rainfall of about 9 months duration; the Scott Agricultural Laboratories Station is at an altitude of about 5,700 feet, has a chocolate loam soil, hot days and warm nights, and two short rainy seasons in the year, i.e., from the middle of March to the middle of May and again from the end of October to the middle of December; the Mau Summit Station is at an altitude of about 8,500 feet has a light red soil, comparatively cold days and very cold nights and a prolonged rainfall of about 9 months duration. The object of the Njoro Station is to breed wheats resistant both to Black Stem and Yellow Rust and also to breed maize for increase in yield. This being the most important station the staff is concentrated there. At the Scott Agricultural Laboratories wheats will be bred for resistance to Black Stem Rust and at Mau Summit for resistance to Yellow Rust. Resistance to Orange Leaf Rust is taken into consideration at all three stations. The reason for having two subsidiary stations is that it is considered easier to breed a good wheat resistant to one rust than it is to breed such a one resistant to two rusts. Stress is laid on rust because, unless wheat possesses the quality of high resistance to it, it is not possible to grow the crop in the Colony; it must not be thought, however, that all the other qualities necessary to make a wheat of economic value are not taken fully into consideration. In this connection I have had a wheat in my possession for years called Red Egyptian (a misnomer) which is practically immune to Black Stem Rust but whose other qualities seem to cause it to be unsuitable for general cultivation.

In referring to the new organisation of the Plant Breeding Services it should be realised that at least for the past seven years there have been two plant breeding stations, one at Njoro and one near Nairobi fulfilling the same purpose as they are now. The one near Nairobi seemed and was the more important of the two merely because the Plant Breeder was

stationed there and more attention could be devoted to the wheats there. It is obviously more useful to breed wheats for resistance to two rusts and for that reason and for the sake of centralisation of as much of the work as possible, and on account of an increase in its scope, the central station is now at Njoro. The staff live there and the necessary buildings are being put up. This increase in the scope of the work at Njoro has necessitated the acquisition of Crown land for the Plant Breeding Station, but the Department owes a debt of gratitude to Messrs. Sewall and Wright and later to Lord Egerton of Tatton for having allowed me for so many years the use of their land on which to conduct my experiments. My thanks are especially due to Mr. E. H. Wright for the personal help he has given me for the last seven years.

For two reasons it is, in my opinion as the one responsible for doing the work, greatly to be regretted that, contrary to my advice, the Black Stem Rust subsidiary station remains at the Scott Agricultural Laboratories under the new organisation. Firstly the Scott Agricultural Laboratories are 120 miles from the main station at Njoro. That is to say, the characters of the wheats there will never be so well known to me as they would were the station somewhere handy to Njoro where they could be visited easily at frequent intervals, and furthermore an extra assistant is required to look after a station so far away. Secondly, on account of the short rainy seasons at the Scott Agricultural Laboratories only very quick maturing wheats can be grown there; this unnecessarily limits the choice of types.

I would again urge that a station similar to that at Mau Summit be instituted near Njoro in the Rongai area, where Black Stem Rust is the danger and where both long and short maturing wheats can be grown. If for other reasons it is thought wise to keep some experiments on wheat going at the Scott Agricultural Laboratories it would be quite easy to transfer a few of the likely Rongai wheats there for multiplication and further test when they have reached a suitable stage in their evolution.

DEVELOPMENTS AND IMPROVEMENTS.

In February of this year five 2,000 gallon tanks were erected at the Scott Agricultural Laboratories for the purpose of irrigating experimental wheats when necessary. These tanks are not a great success; for a long time they leaked but the chief cause of their failure to perform the required service successfully is that the rate of supply of water to fill them is not sufficient to do so within any reasonable period.

On June 4th the Secretary of State approved of an expenditure of £2,050 for the establishment and upkeep, including labour, of the new plant breeding stations at Njoro and Mau Summit, and a further sum for the erection of a laboratory, store, office, and houses at Njoro. The foundations of the houses have been begun but no start has yet been made in the building of the laboratory, store and office. It is fortunate that we put up temporary wooden huts at Njoro and Mau Summit as otherwise there would have been nowhere to store the wheats now being harvested at Njoro and Mau Summit, nor would there have been a store for posho, small tools, etc. But it is most disappointing that it has taken so long to make a start on the laboratory as the wooden huts are most unsatisfactory places in which to store the sheaves and bags of wheat.

A breeding cage half an acre in extent and an implement shed and store have been erected at Njoro; farming implements, etc., have been acquired. The installation of a water supply consisting of a ram and reservoir has been begun. Twenty-two oxen have been bought and a cattle boma and boys' huts erected.

The ploughing and cultivation of twenty-three acres of land was put out to contract and the work is nearing completion. Mr. W. J. Dawson cleared some thirty acres of land and then most generously ploughed and cultivated some eight acres of land free of charge in order that the land might be in good heart in time for the sowing season in June, 1928. This is the land which will be devoted more particularly to experiments and which can mostly be put under irrigation. The experiments carried out on Ngata farm in the past can now be transferred to the Government Plant Breeding Station.

At Mau Summit a breeding cage a quarter of an acre in extent was erected in time to sow wheat inside it in July of this year.

CORRESPONDENCE.

A considerable quantity of correspondence was dealt with on all subjects relating to wheat in addition to the clerical work involved in administering the Plant Breeding Services.

TRAVELLING.

As in the past, a considerable amount of travelling has been undertaken. A proportion of this is due to visits being made to the subsidiary plant breeding stations and to other parts of the country where experiments are being conducted, the rest is incurred in inspecting wheat crops and cultural methods, etc., in many parts of the Colony. This work of inspection would not appear at first sight to lie within the

province of a plant breeder, but it is of great value to him in his work and enables him to advise farmers on all matters relating to wheat. This advisory work also does not normally come within the sphere of plant breeding but in this Colony circumstances are such that the plant breeder is the officer in the best position to advise, and the work has been put upon him. Much information is gained from an inspection of the wheat crops of the Colony. The incidence of the various rusts is most carefully traced and noted every year under varying conditions of climate. The suitability of various soils and climates for wheat is becoming better known as is also the best method of cultivation and harvesting and the best time of sowing, etc. The Colony is kept up to date in its knowledge as to the comparative suitability of the different varieties of wheat for each district, the behaviour of every variety to be found being most carefully noted, and after a wide experience of such matters the advice of the officer of the Department is able to be more authoritative than were this travelling not undertaken.

The following districts have been visited this year:—Kapiti Plains, Machakos, Athi Plains, Lukenia, Makuyu, West Kenya, Laikipia, Aberdares, Thomson's Falls, Upper Gilgil, Kedong Valley, Nakuru, Solai Valley, Rongai Valley, Sabukia, Njoro, Molo, Mau Summit, Londiani, Timboroa, Kipkabus, Burnt Forest, Nandi Border, Elgeyo Border, Kipkarren and all the different districts contained within the boundaries of the Uasin Gishu Plateau and the Trans Nzoia. It is expected to visit the Kinangop and Mau Narok during the first week in January, 1928. A summary of the information acquired during the travels of the plant breeding staff will be found more appropriately I think in other parts of this report.

LECTURES.

Informal addresses on wheat were given to farmers at Molo and Londiani. A report of the Londiani meeting appeared in "The East African Standard."

EXPERIMENTAL AND BREEDING WORK.

Following past custom it is not intended to relate in any great detail the experimental and breeding work of the year. It would make this report too long without increasing its utility. The detailed information is of course contained in the note-books used for the work. It is hoped to publish a bulletin in 1928 containing a considerably more detailed account of the work done during the past seven years than has ever appeared in my annual reports which are not usually read by the general public. It might however be useful now to give the method of numbering (or naming) of wheats adopted by me so that if a wheat is mentioned by its number the public can have some idea of what that number means.

The number of every wheat which comes into my hands begins with the letter "B" so that anyone who works with me or after me knows who was in control of that wheat. Every wheat I import and every local variety that comes into my hands is given a number. Thus the number of Bobs Rietti is B. 230. As Bobs Rietti is impure any selections from it would be given the numbers B. 230 A. or B. 230 B.; etc. If the plant "A" turned out to be a hybrid and its progeny were all different they would be numbered B. 230 A. 1., B. 230 A. 2., etc. If 2 was a hybrid and its progeny were all different, they would be numbered B. 230 A. 2. A., B. 230 A. 2. B., etc. If plant B. 230 A. 2. B. breeds true to type it is then numbered B. 230 A. 2. B. (L), (L) signifying a pure line.

As regards crosses an example will show the method. Thus amongst the many wheats under experiment there is one called N. B. F₆. 43. C. 12. Y. 49. D. 10. "N" stands for Njoro, the wheat having been bred there; "B" stands for my name; "F₆" means the sixth filial generation after the cross was made; "43" is the number given to the cross—say Nut Cut Florence; "C" was the third plant chosen in the first filial generation; "12" was the twelfth plant chosen from amongst the progeny of plant "C"; "Y" was the twenty-sixth plant chosen from amongst the progeny of plant "12"; "49" was the forty-ninth plant chosen from amongst the progeny of plant "Y"; "D" was the fourth plant chosen from amongst the progeny of plant "49"; "10" was the tenth plant chosen from amongst the progeny of plant "D". Thus if cross number forty-three was made in 1921, then plant N. B. F₆. 43. C. 12. Y. 49. D. 10. comes into existence in 1927. Some plants such as the above are sometimes renumbered as B. 256. A. (L), etc. When the time comes to issue a large number of new varieties it is proposed to number them B. 1000, B. 1001, etc., as there are likely to be too many to name and it is perhaps better to name them when they have been reduced to a few by the process of natural selection.

SCOTT AGRICULTURAL LABORATORIES.

A number of wheats both from Njoro and the Scott Agricultural Laboratories were sown on February 2nd under irrigation for multiplication purposes. Eleven were pure-line wheats of Njoro-hybrid origin; fifteen were pure-line wheats of Kabete-hybrid origin; one was a wheat known as "Chorlim" wheat; and there were in addition 169 cultures belonging to four families of Kabete-hybrid origin. These wheats were sown with the idea of multiplying them for issue. Neither the Njoro nor Kabete wheats had ever been attacked by rust in their respective localities. For example in 1925 the culture B. F. 3. B. 10. FF. contained some plants badly rusted and

some showing no signs of rust at all, in all other respects all the plants of the culture were identical in character. The plants were harvested separately and their progeny sown as separate cultures in 1926 under the numbers B. F.₄. 3. B. 10. FF. 1., B. F.₄. 3. B. 10. FF. 2. etc. The same phenomenon was again observed, the previous rust resistant plants giving resistant cultures and the susceptible ones susceptible cultures. Early in 1927 the ten resistant cultures were sown for multiplication under irrigation under the numbers B. F.₄. 3. B. 10. FF. 2. (L.), B. F.₄. 3. B. 10. FF. 4. (L), B. F.₄. 3. B. 10. FF. 5. (L), etc. They were all destroyed by rust. The fifteen pure-line wheats of Kabete-hybrid origin were very seriously attacked, though the pustules were all very small; all cultures of three of the families above referred to were similarly seriously attacked, the 74 cultures of the family B. F.₄. 249. B. 20. E. (which I most suspected would succumb) showed varying degrees of resistance—some being nearly destroyed and others being only lightly attacked; Chorlim wheat (sown three weeks later than the rest) was only lightly attacked; of the eleven Njoro varieties four showed slight signs of Black Stem rust and the rest none, though they took some months longer to mature than the Kabete wheats and were therefore exposed to infection for a longer period. All the wheats were seriously attacked by the disease referred to in last year's report as *Macrophoma* but now known to be *Septoria nodorum* or Glume Blotch.

The conclusions I draw from the above facts are that wheats, which may be only morphologically resistant to rust, survive when grown at the normal time of year and under normal conditions, but they are liable to succumb when grown under abnormal conditions and when they are in the flowering stage during the month of April when the moist hot weather of the long rain season is on. It is hoped that some of the cultures belonging to the family B. F.₄. 249. B. 20. E. will be of great value.

The main sowing of wheats took place at the end of March and were the results of the previous year's selections. Thirty-three wheats of hybrid origin were sown for crossing purposes but no crosses were made owing to the phenomenal behaviour towards rust this year of some of the wheats intended to be used. Twenty-four pure-line varieties of Kabete-hybrid origin which had never had Black Stem rust before were sown in conjunction with rust-test wheats for multiplication; four of them were highly resistant and two of these, numbers B. F.₄. 36. C. 1. (L) and B. 256. F. (L), have already been issued for multiplication purposes to Mr. E. H. Wright, Rongai Valley, small amounts being also given to Mr. Theunissen, Elgeyo Border, and to Mr. Leach, Mt. Elgon,

for multiplication and test—the multiplication has been exceedingly small owing to the drought; another six of these wheats showed fair resistance to Black Stem rust; the remainder either proved susceptible this year or were unsuited to the conditions at the Scott Agricultural Laboratories. Thirty-three families consisting of 428 cultures consisting of about 70,000 grains were sown singly by hand. The behaviour of these wheats has not been finally noted, but rust took a heavy toll, though none of the wheats, except the testers, had suffered from rust in previous years. It can be said now however that there were two outstanding successes—these were the twenty cultures of family B. F₂. 33. A. 3. and the four cultures of the family B. 256. C.; the former have short strong straw but are susceptible to Orange Leaf rust and the latter have long rather weak straw and heavy ears and are resistant to Orange Leaf rust. It may be stated that Kenya Governor has long, rather weak straw and is resistant to Orange Leaf rust. Owing to the original available choice of parents for crosses it has been difficult to produce a wheat combining resistance to Black Stem rust and the properties, both together, of short straw and resistance to Orange Leaf rust. Five imported wheats were sown and also two local ones. Reference will be made to these in another part of this report. Certain Njoro varieties of hybrid origin, similar to those already mentioned as having been sown earlier this year, were sown in the breeding cage; all these were slightly attacked by Black Stem rust although they were unattacked under the apparently more strenuous conditions of irrigation. On the other hand wheat No. B. F₄. 3. B. 10. FF. 13. (L) was only slightly attacked when sown under normal conditions in the cage at the end of March, whereas it was destroyed by Black Stem rust when sown under irrigation earlier in the year. Kenya Governor was only slightly attacked by Black Stem rust.

The examples given above will help to show how very difficult are the problems to be solved by a Plant Breeder in this country where wheats behave differently towards Black Stem rust every year and under different conditions the same year, where wheats have to be bred for short straw, strong straw, good milling quality, high yield, suitability to conditions, resistance to Orange Leaf rust (which proved a more serious menace this year than in previous years) as well as for resistance to Black Stem rust, the vagaries of which become more inexplicable every year. The circumstances are that every year a large number of wheats go down to Black Stem rust which have seemed immune to it for a succession of years previously. The pity is that wheats suitable for crossing purposes are very few and it is going to be extraordinarily hard to find types which when crossed will produce varieties containing even the more important characters desired in a variety.

Yellow rust occurred for the first time this year at the Scott Agricultural Laboratories at an altitude as low as 5,700 feet, but not to a sufficient extent to cause damage.

The following wheats are being multiplied during the short rains season of this year :—

The twenty cultures of family No. B. F₂. 33. A. 3.

The four cultures of family No. B. 256. C., and three types in family No. B. 256. E. (L), with Kenya Governor as the comparative tester.

NJORO EXPERIMENTAL STATION ON NGATA FARM.

Certain varieties, as well as hybrids, were sown here as rust testers. These were Equator, Marquis, Kenya Governor, Golden-Ball and Australian Florence.

The hybrid tester for Yellow Rust was attacked by it as was also the hybrid tester for Black Stem rust slightly attacked by that rust.

Equator was slightly attacked by Black Stem, but not by Yellow rust. Marquis was severely attacked by Black Stem, but not by Yellow rust. Kenya Governor was free from both rusts.

Golden Ball was slightly attacked by Black Stem rust, but not by Yellow rust.

This was not a bad rust year at the Njoro Experimental Station and should not be regarded as a severe test for the Njoro-hybrid wheats, though none of these sown this year had had rust in previous years under severe conditions. The tendency was for the latter maturers to get a little rust late in the season rather than the earlier maturers.

In general the hybrid wheats appeared to be better yielders under Njoro conditions than the afore-mentioned testers and some of them are characterised by very short straw and great strength of straw. It is extremely doubtful as to what sort of milling quality the grain will possess, but tests can be made of this when larger quantities of grain are available. Owing to the urgent need for more wheats it is not considered advisable at this stage to put aside any grain for milling tests.

Forty-seven pure-line varieties of Njoro-hybrid origin were sown for multiplication and further test. Of these twenty-four showed no signs of either Black Stem or Yellow rust, eight were slightly attacked by Black Stem rust, but not by Yellow rust, seven were slightly attacked by Yellow rust, but not by Black Stem rust, one was fairly attacked by Yellow rust, but not by Black Stem rust, three were severely

attacked by Black Stem rust, but not by Yellow rust, one was severely attacked by Black Stem rust and slightly by Yellow rust, three were slightly attacked by both rusts. Thirty-seven families consisting of 546 cultures consisting of about 40,000 grains were sown singly by hand. The behaviour of these wheats has not been finally noted. The majority of them appeared highly resistant again to both rusts and particular hopes are entertained of the economic value of some of the cultures in family No. N.B.F., 43C., 1U., 3B. Twenty imported varieties of wheat were tried, reference will be made to these later on in this report.

MAU SUMMIT PLANT BREEDING STATION.

Here some six and a half acres of land kindly prepared by Major Drought were used for the experiments.

The same test wheats were used here as at Njoro. Marquis was severely attacked by both rusts. Equator was free from both rusts. Kenya Governor was severely attacked by Yellow rust, but was free from Black Stem rust.

Australian Florence was fairly attacked by Yellow rust, but had no Black Stem rust. Golden Ball was fairly attacked by Yellow rust and slightly by Black Stem rust.

Except for imported wheats, of which there were twenty-three and which will be dealt with later, and for some transferred from Mr. Patten's farm, Gilgil, all the wheats grown at Mau Summit were the very best yielding Kabete-hybrid which there are susceptible to Black Stem rust. As Black Stem rust was not considered a danger at Mau Summit it was hoped that these wheats would be of great value at high altitudes if they proved resistant to Yellow rust. This was an exceedingly good test year for rust at Mau Summit, none of the wheats except some of the later maturers were attacked by Black Stem rust, but all, except one poor yielder, were more or less infected with Yellow rust. It is considered that the majority were too susceptible to be of any real value, that is to say that Yellow rust is likely to pull down their yields to such an extent that they could not compete with Equator wheat. To produce a wheat better than Equator and to be resistant either to Yellow rust or to both rusts, it will probably be necessary to cross Equator (the one wheat immune to Yellow rust) with some of the best of those wheats and with some of the best of the Njoro wheats. All the wheats at Mau Summit matured nearly two months earlier than Equator and most, but for Yellow rust, were capable of giving higher yields. Those varieties which were only comparatively lightly attacked by Yellow rust will be tried again at Mau Summit and also elsewhere.

Thirty-six varieties were seen in triple rod rows in quadruplicate for yield trial. Forty-five varieties were sown in small plots and thirty-one in large plots for multiplication and a few of these are considered worth going on with. Twenty-two families consisting of 421 cultures consisting of over 70,000 grains were sown singly by hand. None of these are considered sufficiently resistant to Yellow rust to be worthy of further propagation, but the best of them will make admirable parents for hybrids.

BEHAVIOUR OF IMPORTED AND LOCAL WHEATS.

The following wheats were tried this year at the Scott Agricultural Laboratories :—

Pusa 80/5, Pusa 4, Pusa 12, Pusa 52, Pusa 6. All were destroyed by Black Stem rust.

The following wheats were tried at Njoro and Mau Summit :—

AUSTRALIAN WHEATS.

Canberra.—Severely attacked by Black Stem and Yellow rust at Njoro.

Slightly attacked by Black Stem and Yellow rust at Mau Summit.

Waratah.—Severely attacked by Black Stem and Yellow rust at Njoro.

Slightly attacked by Black Stem and Yellow rust at Mau Summit.

Aussie.—Severely attacked by Black Stem and slightly by Yellow rust at Njoro.

Slightly attacked by Black Stem and Yellow rust at Mau Summit.

Bena.—Severely attacked by Black Stem and Yellow rust at Njoro.

Fairly attacked by Black Stem and Yellow rust at Mau Summit.

Gresley.—Severely attacked by Black Stem and fairly by Yellow rust at Njoro.

Slightly attacked by Black Stem and Yellow rust at Mau Summit.

Union.—Severely attacked by Black Stem and Yellow rust at Njoro.

Severely attacked by Black Stem and Yellow rust at Mau Summit.

OTHER WHEATS.

Yatung (Tibet).—Matured too slowly at Njoro for these notes.

Fairly attacked by Black Stem, but not by Yellow rust at Mau Summit.

Tibet No. 2.—Severely attacked by Black Stem, but not by Yellow rust at Njoro.

Fairly attacked by Black Stem, but not by Yellow rust at Mau Summit.

Marquille (Minn. No. 2202).—Severely attacked by Black Stem rust and slightly by Yellow rust at Njoro.

Unattacked by Black Stem rust and fairly attacked by Yellow rust at Mau Summit.

Calentane (from Columbia).—Unattacked by Black Stem rust and severely attacked by Yellow rust at Njoro.

Very slightly attacked by Black Stem rust and severely attacked by Yellow rust at Mau Summit.

Sabanero.—Slightly attacked by Black Stem and Yellow rust at Njoro.

Very slightly attacked by Black Stem and Yellow rust at Mau Summit.

C. W. Masters, Hybrid Wheats 910 B. and 911/1 take too long to mature at both stations.

A few ears of several other unnamed wheats were sent out by Professor Sir Rowland Biffen and tried at both the above stations. Two Durums, Nos. B.273 and B.277 are worth trying again on account of their resistance to both rusts and early maturity. Sabanero is probably worth another trial though its resistance to Black Stem rust is doubtful.

The following wheats were tried at Mau Summit :—

A.1.—Slightly attacked by Black Stem and Yellow rust.

Red Marvel.—Fairly attacked by Black Stem and very slightly by Yellow rust.

Sikkim.—Fairly attacked by Black Stem and Yellow rust.

Of the nine selected varieties growing on Mr. Patten's farm, Upper Gilgil, eight were free from Yellow rust, but did not appear to be better yielders than Equator. The ninth No. B.23A. (L.1), though it was fairly attacked by Yellow rust is worth going on with on account of its yielding powers and furthermore it was only very slightly attacked by Yellow rust at Mau Summit,

The following wheats were tried on Mr. Stuart's farm, Londiani :—

N.B.23.A.(L.1).—Was slightly affected by Yellow rust.

N.B.24.C.(L.1).—Was slightly affected by both rusts.

N.B.21.A.1.(L.B).—Was slightly affected by both rusts, but seemed the best yielder.

N.B.214.A.8.—Was free from both rusts and had good straw, but was the poorest yielder.

The following Australian wheats were tried by Major Pardoe at Keringet, Molo :—

Thew, Clarendon, Barwang, Florence. Thew and Clarendon were very susceptible to Yellow rust; as far as my information to date goes, Florence was fairly attacked by Yellow rust and Barwang hardly at all. Barwang is probably worthy of another trial at high altitudes.

In continuation of my last year's report, the following remarks may be of interest. In that report I stated that all varieties in Cross XI were susceptible to Black Stem rust, though certain varieties had been selected from it in 1925 in the Trans Nzoia which appeared to be resistant; I considered that these varieties had shown resistance merely because they matured earlier or later than the main varieties. The brown-chaffed beardless type known as Chorlim wheat was grown on Mt. Elgon in the early part of 1927 and was severely attacked by Black Stem rust. A particular pure-line of the type known as Chorlim Selected was grown there later in the year and was free from rust. Chorlim Selected was grown under irrigation early in the year at the Scott Agricultural Laboratories, it was slightly affected by Black Stem rust though other wheats were destroyed, when grown later in the year at the Scott Agricultural Laboratories it was free from rust. The white-chaffed bearded late-maturing type known as Sabwani wheat, was grown in 1926 in Kitale Plains and was free from rust. It was again grown there in 1927 in company with Kenya Governor and both were free from rust. In 1927 it was grown at the Scott Agricultural Laboratories in company with Kenya Governor; Sabwani was destroyed by Black Stem rust before it came into ear and Kenya Governor was only lightly attacked. In my opinion neither Sabwani nor Chorlim Selected are resistant to Black Stem rust generally, but they may prove of value in the Trans Nzoia, especially as wheat called B.21.H.(L.1-8) was by no means destroyed in the rust epidemic in the Trans Nzoia in 1925 and is indeed being grown there with success to-day although it is susceptible at the Scott Agricultural Laboratories.

Kenya Governor has done well when not sown too late in the year, and shown resistance to Black Stem rust in the following districts: Machakos, Lukenia, Mukuyu, West Kenya, North Kenya, Kedong Valley, Nakuru, Njoro, Londiani, Burnt Forest, Plateau and Trans Nzoia. Its weak straw is a drawback in some districts where conditions are such as to produce a long straw. It has proved too susceptible to Yellow rust to be grown in the high and cold altitudes.

Equator has done well and continued its immunity to Yellow rust in the following districts: Upper Gilgil, Mau Narok, Molo, Mau Summit, Londiani, Burnt Forest, Kipkabus and Nandi Border. It was not able to stand the drought in the Trans Nzoia. Kenya Governor has shown itself a good drought resister, better than Golden Ball. Equator is not too strong in the straw.

Equator, Marquis, and Kenya Governor are all three being grown in Subukia. Rust was not a great danger there this year though an unknown wheat was severely attacked by Black Stem rust. So far Equator appears to be doing well there though Kenya Governor did better on account of its greater drought resistance. Marquis was the worst as it is not sufficiently robust for the conditions obtaining there this year.

At Mau Narok one field of Marquis was destroyed by Yellow rust and another by Black Stem rust though the altitude is 10,000 ft. Equator and Marquis are both susceptible to Black Stem rust, but Equator less so than Marquis. Equator not only has the pull there, but it is also immune to Yellow rust whereas Marquis is susceptible.

On the Kinangop Plateau Marquis was seriously affected by Black Stem and Yellow rust, Kenya Governor was seriously affected by Yellow rust and some fields of Equator were fairly infected by Black Stem rust.

Von Lettow and Burbank wheats did well on the Central Plateau though both are susceptible to Black Stem rust, but Kenya Governor did much better chiefly on account of its drought resistance.

One field of Equator was seriously infected with Black Stem rust on the 9,000 ft. contour at Molo.

Golden Ball has behaved normally this year and given average yields. It is not so drought resistant as Kenya Governor. Though it is susceptible to Black Stem rust and slightly susceptible to Yellow rust these diseases do not seem to affect it to an extent of more than about 25 per cent. It is unfortunately very mixed with Equator, but Mr. W. J.

Dawson of Njoro hopes to have a little pure seed next year. Durum wheats are likely to fetch a lower price than bread wheat in the near future.

Australian Florence is a totally different type of wheat from the South African Florence which used to be grown in this country. It is very mixed and takes much longer to mature. It is likely that the South African type will prove of more value than the Australian.

Barley is gradually proving itself as a sound economic crop, though it is inclined to lodge in some parts. It does not appear to be so affected by rust as wheat and on that account is a fairly reliable crop to grow. Species of both Black Stem and Yellow rust have been seen on it, but the damage done appears to have been negligible. These rusts cannot infect wheat and *vice versa*. If it is intended to produce a malting sample the field should be even in character and the cultivation particularly good, also it is advisable to adopt different methods of harvesting from those at present in vogue. Nevertheless it will doubtless be found that a feeding sample will give a very good return to the grower, and the export trade is now organised.

It is not possible to relate in the confines of an annual report all that has been seen during the year, and the above are just a few extracts from observations made. Phosphatic manures have again improved wheat crops, though there is some doubt in the minds of growers as to what particular brand to use. On some thin soils the ploughing in of green manures, to improve texture and add nitrogen, is advocated in order to make any sort of success of wheat growing.

GENERAL REMARKS ON RUST AND THE RESISTANCE OF VARIETIES.

There is one main difference between the effects of Black Stem rust and Yellow rust on wheat. A fairly severe attack of Black Stem rust affects all parts of the plant except the roots and will destroy all the grain in all the ears. A fairly severe attack of Yellow rust will kill the leaves, infest slightly the leaf sheathes and severely attack up to about 50 per cent. of the spikelets in the ear; thus half the grain in the ear will be destroyed and the other half remain practically unaffected, so that, given a high yielding variety of wheat, it is a common occurrence to harvest quite a respectable yield and quality of grain after a fairly severe infestation of Yellow rust. But this year, in certain cold districts crops of Marquis and Kenya Governor have been as thoroughly destroyed by Yellow rust as any wheat could be by Black Stem rust and so great care should be exercised in the choice of varieties to be grown. Thoroughly enough this destruction caused by a severe attack

of Yellow rust has occurred in a year which has been rather warmer than usual and this warmth doubtless accounts for the moderately severe attacks of Black Stem rust that have been seen on crops of Equator in certain high altitude districts. There is little doubt in my mind that Black Stem rust follows heat and Yellow rust cold.

In advising farmers on what varieties to grow they should realise that, though their particular crops have not been attacked by rust, experience of results in other districts similar to their own points to the probability of their own crops being destroyed by rust if not next year then perhaps the following year. Risk of destruction by rust can only be minimised by growing the right variety, though even then no guarantee can be given. In districts where Black Stem rust is a danger and is the main danger, Kenya Governor is the only possible bread wheat to grow. In districts where Yellow rust is a danger and is the main danger, Equator is the only possible bread wheat to grow. In those districts where both rusts are equally dangerous, it is recommended that Golden Ball or a barley be grown for export. It may be said that at Njoro at 7,000 feet Kenya Governor appears to be a success as it also is in North Kenya at 7,000 feet. In other words the danger-line for both rusts together appears to be on a rather higher contour than used to be supposed at any rate during a season such as that of 1927.

Marquis should be eschewed as a general crop it is susceptible to Yellow rust and more susceptible to Black Stem rust than Equator. South African Florence is worth a trial at high altitudes. There is no objection, of course, to those now doing so continuing to grow small patches of wheats such as Marquis, Cross XI, Droop, Burbank, Von Lettow and Pusa, as there is a small market for them in the mills, but I could not possibly recommend them for general cultivation. Some of the Australian wheats already mentioned are also worth another trial at high altitudes. But, when the ravages of rust are taken into consideration, I feel sure that Kenya Governor and Equator will on an average of years yield higher than any other wheat at present known, except perhaps on the two-rusts-danger-line where Golden Ball might prove better and barley better still. Kenya Governor and Equator are both required by the millers as they contain different, but equally valuable and essential breadmaking qualities. Durum wheats are not desired by the miller of superfine flour, but there is a good market for them at Marseilles.

The Mycologist has now begun a series of inoculations of seedling wheats to determine how many biologic strains of Black Stem rust there are in the country and whether there

are different districts. This will be of great assistance in determining whether a wheat resistant to rust in one district will be so in another or not. Furthermore in 1928 by the same process of inoculation the Mycologist and myself intend to collaborate in determining whether certain of my possible parental wheats and many of my wheats of hybrid origin are morphologically or physiologically resistant to Black Stem rust, the latter kind of resistance being the more valuable.

MISCELLANEOUS.

Tentative grading rules have been drawn up in order to be prepared for a possible export of wheat. It may be that there will be a small surplus for export from the 1927 crop and both Kenya Governor and Equator are suitable for this trade.

The Wheat Growers' Association has now been merged in the Kenya Farmers' Association, which latter body has taken over the Seed Wheat Register. For their own protection growers are advised to make use of this service. I am deputed to vet. the samples of seed wheat sent in and am careful to see that only good, pure seed is sold as such.

G. H. BURTON,
Plant Breeder.

APPENDIX J.**REPORT OF SENIOR COFFEE OFFICER.****STAFF.**

No change. I proceeded on leave on the 13th May and returned to the Colony on the 25th November.

TRAVELLING.

I travelled 946 miles in my car and approximately 900 miles in other private cars. I was absent from Head Office for 43 days on Government duty.

CORRESPONDENCE.

Inward letters numbered 196; outward correspondence 134. Three notices were served to occupiers under the Diseases of Plants Regulations.

PUBLICATIONS.

Before proceeding on leave, I wrote a bulletin on "Principles of Pruning and Observations on Trials."

INTERVIEWS.

I held 156 interviews in my office.

COFFEE CONFERENCE.

During my absence from the Colony, the first Coffee Conference was held at the offices of the Department of Agriculture on the 23rd June. It was convened by the Department of Agriculture in accordance with a request by a meeting of coffee planters held on the 19th March, 1927, under the auspices of the Coffee Planters' Union of Kenya and East Africa. This meeting was specially held to discuss the matter of extra funds for additional services by means of a coffee cess. A report of the proceedings of the conference has been published.

STATISTICAL RECORDS.

From statistical information obtained as at the 31st July, 1927, there are 749 coffee planters in the Colony, representing 39 per cent. of the occupiers in the country. The total area of coffee planted was 74,562 acres. This figure shows an increase of 5,612 acres, or 8.14 per cent. over the previous year. The area of coffee in the bearing stage in 1926 was 46,000 acres, in 1927 it is recorded as being 53,800, showing an increase of 7,800 acres over last year's return.

The actual production of clean coffee of 1926-27, August-July, was 138,264 cwts., and 13,261 cwts. mbuni, making a total of 151,525 cwts. The July estimate of production of the 1927-28 crop is given at 213,043 cwts., and in spite of the drought it is considered that the actual output may be very near this estimate. The following table of market prices realised for Kenya coffee in London is given for a period of five years :—

	1926-27	1925-26	1924-25	1923-24	1922-23	Average.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
August	101 1	102 3	120 11	70 8	77 10	94 7
September ..	118 4	114 6	127 10	70 9	80 11	102 6
October	123 10	114 5	144 3	91 10	82 2	111 4
November .. .	134 1	109 5	155 3	94 11	91 8	117 1
December .. .	135 3	112 4	155 10	102 5	95 0	120 2
January	135 5	125 1	149 11	109 11	93 3	122 9
February.. ..	128 5	116 8	145 5	121 7	95 4	121 6
March	124 2	108 8	146 3	114 11	97 7	118 4
April	120 10	102 2	144 8	108 9	89 8	113 3
May	108 4	102 8	134 0	111 3	85 2	108 3
June	87 3	110 6	121 7	110 8	77 11	101 7
July	83 8	109 3	107 6	107 7	75 0	97 7
AVERAGE.. .	117 2	110 8	137 0	101 3	86 10	

Exports.—During the year ended 31st July, 1927, 160,713 cwts. of coffee were exported from the Colony, valued at £816,709. This figure represents 32.4 per cent. of the value of the total agricultural exports of the Colony.

Quality.—The first arrivals in London were reported on as being under average, while later arrivals were good, and so far prices up to last season's have been maintained. Owing to the effect of the drought, however, there are indications that the quality of the later pickings will be below the average, as during the month of December a considerable amount of coffee has been stripped and treated as mbuni.

INSPECTIONS.

The following is a summary showing the number of inspections made and meetings held in various districts :—

DISTRICT.	Meetings, Lectures and Field De- monstrations	Inspections and Visits to to make observations on Trials.	Total Number of Visits to Plantations
Kyambu	3	17	20
Ruiru ... ..	..	13	13
Limuru	1	1	2
Lumbwa ... ..	..	5	5
Kericho and Buret ..	1	3	4
Sotik	2	4	6
Kaimosi	1	5	6
TOTALS ..	8	48	56

Fifty per cent. of my visits to plantations were made mainly in connection with observations on experimental work or trials which are being carried out. Owing to the fact that there was no one to carry on my work during my absence from the Colony, some of the trials have been abandoned, besides which, some coffee planters who undertook to carry out co-operative experiments have abandoned them, as for many reasons I found it impossible to keep in close touch with all these trials, and the planter either loses interest or finds he must abandon the work as he does not know how to carry on without further advice; in other cases, the trials are abandoned as they interfere with the general routine work on the plantation and the planter may not be sufficiently interested after they have been going for some time to be bothered with them.

In April the Assistant Entomologist and myself visited several estates in the Ruiru district to investigate the damage caused to coffee trees by the use of a substance as a preventative against Mealy Bug. This substance was supposed to be "Cresoto," but was proved otherwise to be detrimental. The damage has been intensified by the fact that the alleged Cresoto, being practically useless as an ant repellent, the bands were re-painted numerous times, and the poison had soaked right through the greaseproof paper and the cotton lint, and penetrated far into the tree. A report on the treatment advised was submitted to you.

The following remarks deal with the most important diseases and pests noticed in the coffee plantations inspected during the year.

Leaf Disease.—Several coffee planters in Kaimosi sprayed with carbide mixture with beneficial results. It was most noticeable when comparing the sprayed with the unsprayed coffee that considerable "dieback" and loss of leaf had occurred on the latter. It is unfortunate that most of the coffee planters in the Nyanza Province have so persistently ridiculed the matter of spraying for Leaf Disease. It is considered that the production of coffee in Nyanza Province might be greatly increased if spraying was generally adopted, and a still greater increase if some of the older coffee plantations were systematically manured.

Pink Disease was prevalent in Kaimosi, but spraying with Carbide mixture and cutting and burning the affected branches was found very effective in keeping it under control.

Coffee Berry Disease occurred in Kericho and the area known as Buret. Berries were submitted to the Acting Mycologist, who confirmed that it was Coffee Berry Disease.

Brown Blight was much in evidence on the coffee plantations situated in Buret.

Root Disease.—A few cases were noticed on coffee and tea in Buret. The affected plants were uprooted and burnt.

Green Scale.—Many planters reported that they were dissatisfied with the result of spraying with Capex Lime Sulphur. Solar oil mixture was subsequently tried and gave better results.

A *Stem Borer* noticed on two plantations in Lumbwa district. Specimen branches of the damage were sent to the Entomologist, who replied that the cause of the damage was unknown to him. The borer attacked the green tips on the vertical branches of the Agobiada trees, which had the same effect as capping, which is not desired on coffee plants trained on this system.

Borer (Anthores).—Coffee trees damaged by this borer were brought in from Ithanga and sent to the Entomologist for his attention.

Antestia.—This pest was noticed in Kaimosi, Sotik and Lumbwa.

Asterolecanium.—This scale was noticed in Kaimosi, Lumbwa and Thika-Ithanga districts.

Mealy Bug.—Noticed on all the plantations visited in Ruira district.

SCOTT AGRICULTURAL LABORATORIES : VARIETY PLOTS.

All the varieties, with the exception of "Mocha," have shown signs of distress owing to the adverse weather conditions, but this can be accounted for by the fact that this variety has a very small crop. Kent suffered most, but the crop was considerably greater than any of the other varieties; the trees were planted out the same year as the other varieties, but they were fourteen months older in the nursery. The beginning and end of the coffee year does not coincide with the calendar year, so that the pickings for the season 1927-28 cannot be included in this report. The coffee established on the Agobiada system and planted out in April, 1926, is now three feet nine inches in height; they were twelve-months-old nursery plants.

A cover crop of Kikuyu beans (Njahi) was established through the coffee and cut down after flowering; it made an excellent mulch. Lucerne is being established in the form of an edging to prevent wash.

A nursery has been established with specially selected seed of certain local types of bronze-tipped coffee. A seed germination test was carried out with marked results. It demonstrated the importance of seed selection and careful hand-picking before sowing.

Shade.—There is no special remark to be made with regard to the shade trees which are under trial, except that *Gliricidia maculata* is showing very promising results as being a suitable shade tree for this area.

Pulping Station.—The erection of a pulping house has been commenced, and it is hoped will be completed in time to treat the 1928-29 crop.

GENERAL.

The year started with great promise of a good coffee crop, but although it turned out a particularly bad season, the industry will show a 20 per cent. increase over last year, and the export value will be over the million pounds mark. The industry has made steady advance in spite of considerable difficulties, such as labour shortage, outbreaks of disease and pests, and unfavourable weather conditions.

The coffee planters must be congratulated on the sound position of the coffee industry. There are, however, big problems to be undertaken. The questions of manuring to maintain and improve soil fertility, and improved methods of cultivation must be given closer attention if good yields are to be maintained. At the present time the crop produced is two-thirds of what it should be from the acreage in full bearing. In a measure this may be attributed to drought and

disease, but there are other factors which might be mentioned, such as wrong methods of cultivation for a particular season, wrong cultural methods carried out from year to year, lack of manuring, large acreage of coffee planted under unfavourable climatic and/or soil conditions.

The cultivation of coffee in Kenya has been largely undertaken in a haphazard and discontinuous manner that it is impossible to lay down with exactitude the most suitable cultural methods for any given district.

Various methods of cultivating coffee are advocated by different people, but without considering existing conditions some of these methods may lead to disaster. Excellent results have been noticed from subsoiling, but as to how often this work should be carried out can only be decided after careful observations on soils of various texture and under different climatic conditions.

It is unfortunate that I am unable to deal with the effects of the drought on coffee trained on the multiple system or to make a comparison with trees trained on the single stem system, as since my return from leave I have visited very few plantations, and to arrive at anything definite it is necessary to make careful observations and to study the conditions under which the crop was being grown during the period under review.

A. D. LE POER TRENCH,
Senior Coffee Officer.

APPENDIX K.

REPORT OF THE CHIEF GRADER AND INSPECTOR
FOR YEAR ENDING DECEMBER 31st, 1927.

STAFF.

The following changes occurred during the year :—

Mr. B. F. Ratcliffe, Assistant Grader and Inspector, returned from sick leave on January 5th.

Mr. F. B. L. Butler, Grader and Inspector, returned from leave on January 8th.

Mr. C. C. T. Sharp, Chief Grader and Inspector, proceeded on leave on 14th May and returned 22nd December.

Mr. L. Myers, Clerk, returned from leave on May 23rd, and relieved Mr. S. G. Sharp, Clerk, who was transferred to the office of the Town Clerk, Mombasa, on 31st May.

Mr. A. E. Taylor, Mechanic, arrived on first appointment on 2nd September.

Mr. D. F. Sargent, Foreman Mechanic, proceeded on leave on 26th November.

PLANT IMPORT INSPECTION.

A revised edition of the Diseases of Plants Prevention Ordinance was published on 6th September. This provided for the inspection of all fresh fruit instead of only apples as heretofore.

The following table shows the quantities and values of the various importations of plants :—

Description.	No. of packages.	Declared value.	
		Shs.	Cts.
Tea seed (Tree seed) ...	2044	180,300	00
Other Seeds ...	1026	44,635	66
Fresh Fruit ...	4200	112,353	62
Fruit Trees ...	232	31,265	83
Bulbs ...	107	2,468	55
Plants ...	179	10,811	94
Sugar Cane (tons) ...	500	40,000	00
		Shs. 421,835	60

In addition, 48 packages, value Shs. 791, were passed in transit to Uganda.

MAIZE GRADING AND CONDITIONING SERVICES.

I attach a table showing the quantities and different grades of the maize inspected each month. The total of 970,133 bags is 40 per cent. in excess of the previous highest total of 689,367 bags in 1924. It is estimated that of this amount only 54,000 bags, or 5.5 per cent., were native grown.

The following table shows the quantities of wet maize received from different districts together with the average moisture contents of most :—

Station of origin.	No. of bags.	Moisture contents.
Kitale	11006	15.2%
Nakuru	10635	14.0%
Hoey's Bridge	813	13.8%
Rongai	5400	14.2%
Olbaneita	4829	14.8%
Lumbwa	436	14.5%
Lake Solai	1536	14.7%
Kampi ya Moto	1299	14.2%
Turbo	2280	15.8%
Njoro	1239	13.7%
Menengai	2407	13.8%
Soy	1442	13.4%
Elburgon	224	13.3%
Leseru	1400	14.4%
Fort Ternan	145	15.8%
Sabatia	1897	13.8%
Eldama Ravine	286	13.2%
Maji Mazuri	276	13.8%
Sagana	2881	16.8%
Fort Hall	2548	19.8%
Thika	516	18.8%
Kitui	9783	18.6%
Ruiru	228	17.5%
Maragua	1506	16.0%
Nairobi	224	17.5%
Muhoroni	224	15.0%
Mañri	474	17.2%
Rain	16528	—

The native maize still remains very wet, and no steps appear to have been taken to dry it before railing it to the Coast.

SHIPMENTS OF MAIZE IN BULK.

In November, 1926, the Grading Rules relating to the use of bags were amended to allow the use of second-hand bags for conveying maize from up-country to the coast for shipment in bulk.

Considerable use was made of this convenience, 365,337 bags of Grade 2 and 47,885 bags of Grade 2 S.W. being shipped in bulk, the majority of which had been railed to the coast in second-hand bags. Shippers were thus enabled to use the bags at least twice, and on occasions more often than this.

Some difficulty was caused early in the year by shippers not giving notice, as required by the amended regulations, of their intention of using second-hand bags, with the result that some of the old bags were unavoidably mixed with the new, and shipped as new bags.

On two occasions towards the end of the season, stocks of new-bagged maize were insufficient to provide the quota required for stowage purposes, second-hand bags being used as the only practical alternative.

As permitted by No. 25 of the Grading Rules, 114,300 bags were shipped without a certificate to ports on the coast of Africa.

The Kenya and Uganda Railway rebagged 4,151 bags and resewed 3,927 bags of maize at the expense of the shippers.

MAIZE CONDITIONING PLANT.

During the year 101,631 bags of maize were sent to the Maize Conditioning Plant and conditioned. Of this quantity 8,535 were sent direct to the Plant, and charged for at the lower rate.

This total of 101,631 bags consisted of 98,764 wet maize, and 2,872 bags of weevily.

In January the boiler broke down, and the plant was closed for fourteen days. On resumption of work there was an accumulation of 18,000 bags awaiting conditioning. These arrears were cleared off by the end of February.

During July and August the plant was closed down and completely overhauled.

Apart from the trouble with the boiler already mentioned, the plant has worked satisfactorily throughout the year.

At the request of the Department of Agriculture, Zanzibar, an experiment of drying cloves at the Conditioning Plant was carried out. Mr. Barnes, Deputy Director of Agriculture, Zanzibar, was present during the tests, which were unsuccessful.

GRADING OF POTATOES.

The compulsory grading of potatoes came into force on 1st July. Although adequate notice had been given of the Government's intention to control the quality of potatoes exported from the Colony, very few shippers appeared to have taken steps to see that their potatoes conformed to the requirements of the Grading Rules. Since the result was the almost complete cessation of the export of potatoes, from the moment that the rules came into force, it was decided not to enforce the rules strictly at the beginning and gradually force up the standard of quality. No certificates were issued for these shipments, which did not comply with the rules.

The principal defect in the potatoes submitted for inspection is the high proportion of mechanical injuries, and, to a lesser extent, greenness. It is almost always necessary for the shippers to recondition their potatoes before they can be passed as fit for export.

After the Grading Rules had been in force for a few months it was decided that it was desirable to have two grades and to modify the rules relating to the packing. Notice in the Official Gazette dated 21st October, 1927, gave effect to these modifications.

Certificates for 21,740 cwts. potatoes were issued.

EXPORT OF BEANS.

At the request of shippers, beans were inspected and 51 certificates for 9,140 bags were issued.

COOL STORES.

The Cool Stores were handed over to the Department by the Public Works Department on their completion early in January.

Except for two short stoppages, due to small mechanical breakdowns, the machinery has worked satisfactorily.

The following quantities of goods were received into Cool Stores during each month of the year :—

GOODS DEPOSITED IN COOL STORES DURING 1927.

	Cases of Butter.	Cheese.	Quarters of Beef.	Carcase of Mutton or Pork.	Fruit.	Vegetables.	Fresh Fish.	Smoked or Dried Fish.	No. of Poultry.	Pieces Meat Offal, etc.
		Lbs.			Lbs.	Lbs.	Lbs.	Lbs.		
January .. ..	..	224	..	..	3,000	..	150	..	..	..
February	9	..	..	..	19,616	..	150	230	10	..
March .. ..	..	..	..	..	3,632	..	50	80	..	..
April	38	1,488	2	4	230	..	80	1,094	..	..
May	210	..	..	2½	3,550	..	1,538	216	..	..
June	269	790	53	5	16,052	130	230	141	104	180
July	281	..	29	14½	7,511	..	273	532	..	113
August	234	..	15	9½	15,255	..	2,381	546	3	13
September	143	240	6	6	1,845	450	121	168	2	33
October	265	599	20	7¼	7,265	698	668	7,690	..	..
November	95	22	28	2	6,935	836	947	2,894	..	11
December	200	60	29¼	17,338	1,865	1,995	1,587	16	122
TOTALS ..	1,544	3,541	211	80	102,229	3,979	8,583	15,178	135	472

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MONTH.	K.2.	K.2. SW.	K.3.	K.3. SW.	K.4.	K.6.	K.7.	K.8. W.	K.8. WSW	K.8. NSW	K.8. YSW	Total Graded.	Wet.	Musty.	Weevily.	Other Causes.	Total Rejected.	GRAND TOTAL.	Rebagged	Resewn.
January	141,826	10,013	4,338	51	1,270	..	930	222	63	..	91	158,804	20,476	3,913	356	3,550	28,295	187,099	616	1,152
February	178,729	8,616	6,682	900	1,470	163	..	635	19	..	..	197,214	14,897	1,882	541	469	17,699	214,913	1,055	880
March ..	185,253	14,216	8,462	228	..	..	..	329	24	..	..	208,512	12,748	106	908	26	13,788	222,300	1,817	353
April ..	119,277	24,667	5,445	1,212	..	..	..	220	291	..	..	151,112	3,666	59	972	21	4,718	155,830	599	350
May ..	40,800	10,712	292	..	7	..	..	7	5	..	..	51,823	8,622	5	647	75	93,49	61,172	297	209
June ..	7,405	5,330	1,211	..	..	..	..	..	..	..	..	13,946	562	1	151	1	715	14,661	52	20
July ..	..	10,164	..	..	..	..	..	..	..	..	..	10,164	..	..	225	37	262	10,426	37	50
August ..	..	14,935	..	277	..	..	..	..	..	..	..	15,212	..	..	42	251	293	15,505	248	260
September	..	2,130	..	..	..	..	1,889	1	..	218	..	4,238	2,043	1	10	13	2,067	6,305	13	74
October	..	112	..	..	..	..	14,799	..	..	794	..	15,705	12,473	20	527	1	13,021	28,726	4	154
November	1,929	..	..	..	..	..	6,099	..	..	1,641	..	9,669	5,109	135	2,811	244	8,369	18,038	28	105
December	20,663	3,090	264	..	..	..	1,303	..	..	909	..	26,199	5,786	1,560	1,438	175	8,959	35,158	185	120
TOTALS	695,852	103,985	26,694	2,668	2,747	163	25,020	1,414	402	3,562	91	862,598	86,381	7,682	8,608	4,863	107,535	970,133	4,151	3,927

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To avoid damage to frozen and chilled goods imported into the country, arrangements were made with H.M. Customs by which formalities could be completed in the Cool Store instead of in the wharf sheds, thereby avoiding delay in transferring goods from the Cool Chamber on board ship to the Cool Stores.

C. C. SHARP,
Chief Grader and Inspector.

APPENDIX L.

ANNUAL REPORT FOR 1927 OF THE SCOTT AGRICULTURAL LABORATORIES.

STAFF CHANGES.

Mr. A. G. Bailey, Agricultural Officer, returned from home leave and commenced duty here on July 20th.

TRAVELLING.

Mr. A. G. Bailey : 958 miles.

Mr. W. L. Watt : 1,780 miles.

CORRESPONDENCE.

Inward letters, 311 ; outward letters, 471.

SOUTH KIKUYU RESERVE.

(1) *Barazas and Demonstrations.*—129, exclusive of Native Agricultural Instructors.

(2) *Mission Schools and Out-schools* have been co-operated with. They have always appeared to be glad of our assistance and every opportunity was taken to lecture and demonstrate to the scholars. The subjects were treated as practical as possible in the hope of improving the home influence.

Jeanes School, Kabete.—A series of lectures and demonstration, were given to the pupils of this institution in May.

(3) *Location Demonstration Shambas of Native Agricultural Instructors.*—At the end of the year we had 15.

There are seven instructors and eight shamba labourers in the district. These instructors have made their demonstration shambas their first consideration, and all spare time has been spent in advising and assisting the natives in the surrounding areas. This latter part of the work was almost entirely devoted to co-operation with educated natives. It is our belief that the methods now adopted are about the most suitable for promoting agricultural interest. Many natives have visited these shambas throughout the year, and their interest appears to be growing. It is not enough, however, to work spasmodically, and this present policy will have to be continued. This has been most noticeable where work in any particular location has ceased for a time.

(4) *Mission School Gardens*.—Many of the Missionary Societies have laid down gardens for their pupils at the schools and out-schools. These are usually small on account of their difficulty in procuring land.

(5) *Stock*.—The dry weather from June till September reduced the grazing considerably, and had its effect on the cattle in the over-stocked areas. This was particularly the case in the Uplands district and grade cattle got into very poor condition. The people in this part of the reserve have almost wholly gone over to "grade" in spite of warnings made in the past. They now see the folly of copying the Europeans too closely in this respect, and are again trying to increase the proportion of native stock. Some radical change will have to take place here in reducing numbers, if their cattle are to be kept healthy.

Other areas throughout South Kikuyu remained healthy and forage was plentiful enough. Very little stock is to be seen in the Mukinyi area, and as far as can be gathered considerable numbers are kept on the European farms. It is most difficult to get any reliable information about their stock, and the writer hesitates to give details which have been collected from time to time.

(6) *Grazing Areas*.—The part around the south side of the reserve in the Limuru district is chiefly *Setaria aurea*. This year it formed a very fine dense growth of most palatable feeding for the cattle.

The water supply has not yet been introduced to Ndeiya, and conditions remain as in former years.

(7) *Ghee and Milk*.—Very small quantities of ghee are being made. A certain amount of milk is being taken to Nairobi from the surrounding district on push-cycles by the traders, but is of little consequence.

(8) *Trees*.—The supply is sufficient for the demand in most of the lower areas. Other parts are not so well off, and the natives usually procure all they want from the European farms in exchange for their labour.

The higher elevations are distinctly short, and have to depend largely on the Forest Reserve. More trees are badly required in these colder parts for shelter purposes.

An extra effort was made throughout the year to promote silviculture, but this is one of the untouchable subjects which the natives prefer us to keep clear of. As far as can be gathered, the sole difficulty lies in the power of the landowners. They do not wish the poor to plant permanent crops on their "Githakas" and until this present custom can be got rid of slow progress will be made.

Wattle bark is being sold at Limuru to a small extent.

Charcoal burning is on the increase, especially in the Dagoretti district. Some natives are doing it on a fairly large scale from timber bought from the Forest Department.

(9) *Maize*.—The big rains were suitable for this crop, and even though the amount was limited during the cobbing stage, the crop could be safely estimated as the record for any single season.

The higher elevations were mostly planted in October this year, instead of July and August, on account of the small rainfall.

The short-rains crops will be a light one in most places, and in the south side especially there will be a real shortage of food.

The quality of maize improves slowly. Where good seed was issued for the big rains, many of the natives have failed to keep a supply of reliable seed for the following spring. In the meantime, the old-fashioned small yielder was planted in October and seed from that used in the spring again. Their habit of encouraging self-sown maize is also largely responsible for the poor mixed quality.

(10) *Wheat*.—Some good plots were seen. Kenya Governor is the most suitable.

(11) *Beans*.—Very few pure samples are being sold. They complain that the Indian storekeepers give them the same price as is offered for mixed samples, and they also say that the pure is bagged with the mixed at the stores. There is usually a demand in Nairobi for good seed and many of the more enterprising natives have been advised to tap the market at its source. The best beans are produced in the locality of Chief Muhoho, and growers could profit by selling pure seed.

Individual growers around Kabete are bulking Dutch Runner and Madagascar seed.

(12) *Field Peas*.—This crop is gaining popularity, and is a real asset in the colder parts.

(13) *English Potatoes*.—A considerable amount of time has been devoted to instruction on the cultivation of this crop. It grows so readily that it will become a real weed if not cultivated properly. Very large consignments are leaving the reserve, chiefly from the Kikuyu, Limuru and Escarpment area, where the conditions are most suitable. The slovenly native methods of cultivation are spoiling their market samples. Large numbers of green, damaged and unripe tubers get mixed

with the good. They have many difficulties when selling their produce, and only continued instruction will relieve the situation.

The more energetic natives are planting good potato shambas, and benefiting from their labour.

A very large proportion of this crop is self-sown.

(14) *Seed issued in the South Kikuyu Reserve* :—

Maize, Flat White	8,095 lbs.
Maize, White Pearl	51 „
Wheat	79 „
English Potatoes (mainly “ Majestic ”)	4,051 „
Field Peas	357 „
Beans	7 samples.

Odd samples of Sugar Cane and Fruit Trees.

(15) *Insect Pests*.—The mealy-bug in the Chania district has abated very considerably. No fresh attacks have been observed in any other parts of the district.

Stalk Borer.—This insect was responsible for about 5 per cent. of loss to maize and mtama crops. The old methods of cultivation still in practice are very largely responsible for the spread of this insect. Some of our suggestions to mitigate the loss have been adopted; one being the introduction of grass borders between shambas, in the place of mtama.

(16) *Waggons, Carts and Implements*.—The increase in this direction is faster than was anticipated at one time by the writer. Progress was slow to start with and considerable argument had to be used in support of time-saving devices. Example is now sufficient, and further advertisement has to be carefully proceeded with.

The Administrative Officers have opened up more roads, which are being taken advantage of, and are a great asset to the whole community.

(17) *Land*.—The present system of “ Githaka ” ownership as understood by the average native in this reserve is a great hindrance to progress. There is an abundance of land for all the people, except perhaps in the location of Chief Philip of Dagoretti as an exception.

Time and again natives miss the rains with their plantings and this is in a large measure due to the time taken by the landlords in releasing small patches to the poor. It would appear that the time wasted on such a simple transaction is entirely due to the landowners' desire to get the best rental by delay.

(18) *General*.—This year the rains were peculiar, and failed for the usual July-August plantings in the areas above 6,500 feet. Practically all that section of the reserve had to be planted at the usual short-rains time.

The potato and peas crops could be planted with success in April in the higher parts, but the people are too conservative to give the method a trial. It has been pointed out, and demonstrated in our own shambas with the object of enabling them to get a better distribution of their food supplies.

Planting old shambas without first digging them over is a common practice. Evidence of the weakness of this lazy method has been demonstrated time and again with little success. The natives see their crops failing during partial drought, but fail to appreciate one of the reasons for it.

Surface cultivation between the growing crops during dry weather requires still further encouragement. It is their fixed belief that the soil must not be disturbed in any way during the dry sunny weather, and weeds are allowed to claim an illegitimate share of the soil moisture.

Surplus and old crop plants are not being removed during cultivation to a sufficient extent. This is chiefly the case in English and Sweet Potatoes, Maize and Mtama. Time and more energetic spread of the agricultural teaching will overcome this to a large extent.

Native agricultural work is spasmodic and half-hearted throughout. They rarely carry out a regular scheme of work, and often very good shambas are allowed to revert to weeds.

Suspicion appears to be one of our greatest hindrances to the work. They rarely accept our intentions as clean and free from ulterior motives. They fear their land being taken from them, and it has often been evident that our "shamba-to-shamba" visits have been looked upon as land-prospecting. It was even found in making an issue of maize, that the natives hesitated to take it, in case of being fined in some way later on. Such a condition has delayed progress considerably, and the whole scheme of reserve agricultural assistance will be slow and not too encouraging at times.

SCOTT AGRICULTURAL LABORATORIES.

(1) *Instructional*.—At the end of the year there were 42 apprentices in residence. During the year no boys completed their training. This is due to the time of apprenticeship being changed from two years to three years :—

Number on 1st January	34
Number engaged during the year	14
Number discharged as unsuitable	2
Number died	2
Number transferred	2

The year has been uneventful and work has been carried out without any unusual happenings.

Practically the whole of the labour operations on the land have been performed by the apprentices, with the exception of a driver, ox-herd and bird-scarers. The boys have adapted themselves to the great variety of work and could always be relied upon much better than monthly labour. They have always been keen on their training and have been a pleasure to deal with.

It has not yet been possible to get many entrants with a high standard of education, and regular elementary school teaching had to be continued.

Our original time-table of teaching was to have each of the four classes in school for two hours every day. About the middle of the year, the system was changed as detailed below. This new method has facilitated work considerably, but is not favoured by the boys themselves :—

Monday : 3rd Class	... 7—12.	2—4 p.m.
Tuesday : 2nd Class	... 7—12.	2—4 p.m.
Wednesday : 1st Class	... 7—12.	2—4 p.m.
Thursday : Senior Class	... 7—12.	2—4 p.m.
Friday : 3rd Class	... 7—12.	—
Friday : 2nd Class	... —	2—4 p.m.

Government Vernacular Examination : 7 boys gained this certificate during the year.

Total number now holding the certificate : 11.

Agricultural Lectures.—There are two main classes for the technical lectures and demonstrations.

The juniors have had elementary instruction in such subjects as botany, names of tools and implements, and their uses, and other primary subjects.

Demonstrations in bees-wax extraction, pruning of trees and fruit trees, care of plantations, labour-saving devices, etc.

The Senior Class : Botany, soil composition, measurements, of crop yields, selection of seed and crops, crops, stock, silk culture, rotation of crops, etc.

Demonstrations : Making, care and stocking of nursery beds, planting out seedlings, establishing plantations, measurement of land other performances necessary on a " mixed " farm.

They always appear to have considerable difficulty in grasping the substance of lectures, and in consequence the progress is extremely slow. While a few of the boys show aptitude, there are others who are unusually slow.

School Gardens.—This side of the training has continued with added success. There was a certain amount of follow-the-leader and similarity in lay-out, but frequent ingenuity was evident. There was a universal increase in the proportion of English potatoes planted during the second season, and such crops as millet have been almost excluded. This was also very noticeable in parts of the reserve, and is one of the natural tendencies which is working in the selection of native crops.

(2) *Experimental.*

(a) *Kenya Hybrid Flat White Maize.*—There was some reference made in last year's report to the selection work being carried out on this variety.

The breeding plot was 2.58 acres. The seed was specially cob-selected from selected stems out of the 1926 breeding plot. Single seeds were placed 18 inches apart, in rows 3 feet apart. Rains were unusually heavy during the planting season, and germination was poor. Later on, a considerable proportion of the crop had to be removed on account of stalk borer, and a few more affected with "streak" and also eliminated.

Immediately before flowering the poorer stems were de-tasselled and some time before maturity the perfect stems were selected and marked.

The yield was 15.8 bags to the acre.

Improvement and stability of type is very far from complete, and work will have to be continued in 1928. The unusually dry period from June till the maturity of the crop in September undoubtedly caused inferior development, and it is hoped with normal conditions that a marked improvement will result next season.

(b) *Manuring Plots.*—These were planted with a second selection of Kenya Hybrid Flat White Maize.

(c) *Maize Plot in Native Demonstration Shamba.*—Planted with a third selection of the above-stated maize and was treated similar to the breeding plot.

(d) *White Pearl Maize.*—A two-acre plot was laid out to compare the yields by the usual row system and the check-row system. The results are unreliable, due to the drought.

Green Manure.—The third series of trial plots was planted with only 26 varieties of plants. Previous trials indicated the more suitable plants, and a considerable number were eliminated for this season's work. None attained their normal

growth, and in addition the leguminous crops were affected with a root mite which caused cankered growths and further reduced development. Weighings were thought inadvisable. The series of Njahi selections had the flowers removed by the beetle *Coryna apicornis*, and set no seed. Other varieties were left on the ground for seed.

During the short rains a number of samples were planted out for bulking purposes for issue and further experiment.

Indigenous and Exotic Grass Trials.—Early in 1924, grasses were collected which were thought to be worth consideration economically. Any specimens which, after identification by the Mycologist or by Kew Gardens, were thought to be useless were discarded, and never got past the nursery beds stage. The total number which have been tried amounts to 104, and of these 30 were originally selected and planted out in the 1/40th acre beds. There are a few more seed samples to be tried and which are not yet recorded; those provided by the American Forage Plants Expedition, 1927. These latter will be sown in the seed beds in 1928, and if worth consideration will be identified and planted out in the usual manner.

Little success was attained with the imported grasses with the exception of Molasses Grass and *Paspalum notatum*. Mention might be made of trials with Sheep Fescue, Hard Fescue, Crested Dogstail, Timothy and Short Perennial Rye Grass. All germinated and grew well in the shaded seed beds, but when planted in small exposed beds they died out during the first dry season. No further trials were conducted with them.

The 1/40th acre beds were not laid down till April, 1925, when sufficient seed or roots had been bulked from the original specimens collected. Some of these then were limited, and a few of the beds were slow to form a sufficiently natural density of growth to warrant reliable weighings. Five of the original plantings have had to be removed on account of their unsuitability, and others more promising have taken their places. They are:—

Eragrostis braunii : Unable to stand dry conditions.

Eragrostis tenuifolia : A poor annual-like grass; produces sparse growth.

Brachiaria distichophylla : Annual and not suitable for our needs.

Phalaris aruninacea : A river type of grass and not eaten by stock.

Eleusine indica : Hard "bent"-like grass, difficult to establish and not relished by stock.

From the experience of these trials it is proven that we have a large number of native grasses which are not only most suitable for permanent pastures, but are eaten readily by the stock. The remarks on Chart No. 1 are all from first-hand observation, and are not based on hearsay. Though an effort has been made to get reliable data, the writer is unable to guarantee that the findings regarding suitability for stock are absolute. This to a certain extent will vary with environment.

The half-yearly weighing results could be improved on by having monthly or quarterly weighings. Many of the grasses form very strong stems, and only the leafage could be eaten. A prominent example is that of *Cymbopogon afronardus*.

The varieties are given in the order of the plots and are not systematic.

There are several grasses in the beds now which already appear to be most promising.

Lawn Grasses.—A lawn has been planted with nine different grasses. Not yet established.

Cattle Boma.—A 2½ acre cattle boma was planted with fifteen varieties of grasses. Not yet established.

Clover Trials, 1925-1927.—Several local and imported clovers have been tried over a number of half-yearly seasons in the experimental land. The object has been to ascertain their value and suitability to places with similar conditions in Kenya. At all times when these trial plots were planted, the most common indigenous variety, Kenya Clover (*Trifolium Johnstoni*), was used as a control. At the same time, it was thought advisable not to lose sight of lucerne, on account of its similarity for establishment and feeding value. Three varieties have been under observation: (1) Cape Province, (2) Hunter River, and (3) a Chinese lucerne. All three behaved in a very similar fashion, bore repeated cuttings each season, and may be considered as one control.

For green fodder or hay there is no question about the superiority of the lucerne over all clovers tried.

The trials included a number of red clovers (*Trifolium pratense*). These were collected from a number of places by the Director of the Craibstone Experimental Farm in Scotland and seed samples were obtained from him. None of the red clovers tried appeared to be happy under our conditions of soil, rainfall and climate. A peculiar circumstance in the fertilisation of the flowers almost bears out this finding that the growth of the plants was stunted. It is the universal belief that the red clover can only be pollinated by bumble bees. When this variety was imported into New Zealand the growth was equal to that produced in England, but no seed

was formed until bumble bees were introduced. Even though we have no bumble bees in Kenya the plots, with only one exception, produced an abundance of seed, and it is thought that, due to the poor nature of the growth, the corollas had been shorter than should be the case in normal growth, and that the local bees or other insects were able to effect pollination.

It might be mentioned here that there is every possibility of red clover proving to be a valuable variety in places where the rainfall is about 50 inches per annum, and the climate colder than it is in the Nairobi district.

Lotus major and *Lotus augustissimus* : Seed was procured from Auckland in New Zealand. Three separate trials were made of each variety. On all occasions they germinated fairly well and soon covered the land with a mat of creeping growth. It was found that in all cases they died out soon after the dry season set in. They are of no practical use unless as wash-stops in the wetter parts of Kenya.

Only three indigenous varieties appear in the chart. The white one, No. 8, is a doubtful native in the opinion of the writer. Three selections of *Trifolium Johnstoni* are indicated under one heading as they appear to be very similar in character.

A few more indigenous clovers have been collected, but are still in the nurseries and have not yet been identified.

Throughout all the trials, the Upland Red and Kenya Clover are likely to be best suited to our tropical needs. It is generally found in establishing large areas with a small seeded plant that the chances of success are small, either due to heavy rain-wash, or successive hot days after germination. The local clovers are easily established by roots and will cover the whole surface in a very short time.

Potatoes imported for trial and bulking.—Ten varieties of potatoes, immune to wart disease, were imported from Scotland in the Spring, just in time for the big rains.

They arrived in excellent condition, with only a very few decayed tubers. Sprouts had developed about 1½ inches, which facilitated early planting.

All ten varieties made an early start and continued to appear robust throughout growth. After the stems had attained a height of about 12 inches, the rains ceased, and dry conditions prevailed until after harvest. In spite of the abnormally dry environment, when the soil hardened like brick, and forking was almost impossible, Chart No. 3 will indicate how well they produced in their new and peculiar conditions.

Throughout growth, observations were made from time to time. No Mosaic, Leaf Roll, nor any other leaf disease was seen. A few flower buds formed, but dropped off before opening.

A small variety plot was laid down within the main potato plot. British Queen was used as a control, but we failed to procure seed in a similar sprouted condition to that of the imported varieties, and the comparative results with local seed were valueless.

The greatest yielder was that of "Arran Victory," with "Rhoderic Dhu" as a close second. Though "Ally" yielded lightest with only 3.7 tons per acre, it was thought the "Golden Wonder" was the most unsuitable for our conditions. The latter formed no large tubers, and a great proportion of the crop were culls; while "Ally" was more useful, having few culls and a large percentage of ware.

The period taken by each variety to ripen made interesting observation, in comparing them with results usually found in Scotland. On the whole, results were fairly regular with the outstanding exception of "Golden Wonder," which behaved as an early in the field trials here, while at home it is classed as a late. It may be too much to expect stable results with the first season's trials, and it is hoped to get more reliable information from the variety trials which were planted for the short rains. These trials consist of three drills of each new variety, and three drills of British Queen between each variety and on the flanks.

Crops from seed of these original plots were examined during December in Limuru and Uplands farms. In most cases all appeared to be enjoying the cold moist conditions and were growing vigorously. The one outstanding exception might be mentioned in "Majestic," and as far as could be ascertained it was entirely due to the farmers having cut the tubers. It is an unfortunate character in this variety that it will not tolerate cutting.

Seed issued from the original crop was as follows:—

Sold	...	...	...	...	487½ loads.
Issued free	...	...	...	...	145 "
Issued for bulking	...	...	...	...	310 "
				Total	...	942½ loads.

Or approximately 25.25 tons.

Coffee Variety Plots.—Work was carried out in these under the instructions of the Senior Coffee Officer, and is reported by him.

Wild Silk Plantation.—A large number of silk nests were formed and the moths commenced to emerge from these early in December.

Yerba Maté (Ilex paraguayensis).—The original trees are now growing vigorously and appear to enjoy our climate. Average height at 2 years 9 months from seed is $4\frac{1}{2}$ feet.

Sweet Potato.—Planting trials were laid down in the big rains with two local varieties. Experiment not yet completed.

Mtamas (Sorghum vulgare).—22 varieties from Potchefstroom, and one local variety as a control, and eight varieties from Nyasaland were planted in the big rains. The trials were all very badly attacked by stalk borer, but none of them proved so suitable as the local one. It was hoped that some suitable early variety might have been procured.

Finger Millet (Wimbi).—Three Nyasaland varieties were tried without much success.

Lima Bean.—Seven new varieties planted in March. They grew well, but all yielded very mixed samples.

Ground Nuts.—Eleven new varieties and one local variety were tried. Not yet harvested.

MISCELLANEOUS.

Imports.

- (1) Patchouli (*Pogostemon patchouli*): Cuttings from Seychelles. Are established.
- (2) Beans: 28 varieties. The samples were multiplied for further trial.
- (3) Sweet Potatoes: Jersey Yellow, Nancy Hall and Costa Rica.
- (4) Salt Bush Plant: *Atriplex* sp.; quarter acre planted.
- (5) Amadumbi (*Colocasia esculenta*): A plot established and with the local variety as a control.
- (6) *Indigofera endecaphylla*: In the seed beds meantime.
- (7) Algarobilla (*Cassalpinia brevifolia*): Not yet established.
- (8) *Erythroxylon coca*: Not yet established.

PESTS.

Army Worm visited the land in April and destroyed five acres of White Pearl Maize. They also entered the Wheat plots, and had to be sprayed.

Stalk Borer.—Considerable damage done to the Mtamas, and to the Maize in a lesser degree.

Root Mite.—Upset the comparative values of the Green Manure trials.

DISEASES.

Maize Ear Rot.—About 1 per cent. of the Maize was affected with this disease.

WEEDS.

The land was very easily kept clean on account of the long dry period.

WORK OXEN.

There are nineteen and all are in very good condition.

RAINFALL.

	Inches.
1st Quarter	12.75
2nd Quarter	9.86
3rd Quarter	0.62
4th Quarter	9.25
Total for the 12 months ...	<u>32.48</u>

SEED ISSUES

(Other than South Kikuyu Reserve).

	Lbs.
Buckwheat	4,860
Maize	2,627
Beans	130
Peas	300
Wheat	125

Potatoes : 25.25 tons.

New Zealand Flax : 9 samples (6 varieties).

Mulberry plants and cuttings : 900.

Kikuyu Grass : 4,050 seeds.

Green Manures : 34 samples.

W. LYNE WATT,
Assistant Agricultural Officer.

CHART No. 1-

Plot No.	NAME.	Origin.	Distribution in Kenya.	Half-yearly weighing green fodder per acre.	REMARKS.
1.	<i>Melinus minutiflora</i> —Molasses grass	South Africa	Very little	46,500 lbs. 20.8 tons	It is eaten readily by cattle in spite of its unpleasant aroma. Propagated by seed, roots or cuttings. One of the best drought resisters.
2.	<i>Astrebala pectinata</i> —Mitchell grass	Australia	Nil	..	This grass was tried on account of its drought resisting qualities in its homeland. It is a hard "Benty" type and has not adapted itself to Kenya.
3.	<i>Cymbopogon afronardus</i> ..	South Kikuyu District	Very general	48,000 lbs. 21.4 tons	A very tall growing grass which can reach 7 feet under ordinary conditions. The young leafage is greedily eaten by stock and horses. Propagated by seed or roots. Very drought resisting.
4.	<i>Themeda triandra</i> —Oat grass..	"	All over Highlands	14,813 lbs. 6.12 tons	About 3 to 4 feet high. Stock and horses thrive and work well on it. Very difficult to propagate. Dies down during dry seasons and immediately commences growth when rains start. One of the best grasses in the grazing areas of Kenya.
5.	<i>Andropogon trichopus</i>	"	Sparsely	33,000 lbs. 14.73 tons	Usually found in swampy patches in forest land. Height 5 feet. Propagated by seeds or roots. It is a good drought resister, but not readily eaten by stock.
6.	<i>Hyparrhenia hirta</i>	"	Plentiful	20,125 lbs. 9 tons	About 6 feet high. Forms fairly strong stems but the leafage is relished by stock and would make a very useful hay. Propagated by seed or roots. Very good drought resister.

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CHART No. 1.—Contd.

Plot No.	NAME.	Origin.	Distribution in Kenya.	Half-yearly weighing green fodder per acre.	REMARKS.
7.	Hyparrhenia rufa	South Kikuyu District	..	..	Identification is uncertain.
8.	Setaria aurea	"	Very plentiful	24,454 lbs. 10.91 tons	Height 4 feet. Horses and cattle thrive on it. Propagated by seeds or roots. Very good drought resister. One of our best grasses in the grazing areas.
9.	Brachiaria brizantha	"	Well distributed	35,625 lbs. 15.90 tons	Height 3 feet. Spreading growth. Stock relish it most when leaves are young. Very easily propagated by seed or roots, and very soon covers the ground with its vigorous growth. One of the best drought resisters, and keeps green throughout.
10.	Panicum maximum—Guinea grass	"	"	21,500 lbs. 9.60 tons	Height 5 feet. Cattle and horses thrive on it. Easily propagated by seed or roots. It is a fairly good drought resister.
11.	Paspalum Kora... ..	Kikuyu South	Patchy	17,375 lbs. 7.75 tons	A low growing grass of only a few inches. Propagated easily by seeds or roots and very soon forms a sole of soft growth. Liked by stock. High drought resister.
12.	Pennisetum sp. near P. Giganteum	"	Fairly Common	30,687 lbs. 13.7 tons	An erect growing grass of a "Benty" nature. Very tough foliage and can only be eaten by stock when young. Propagated most easily by roots. High drought resister and keeps green.

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CHART No. 1.—Contd.

Plot No.	NAME.	Origin.	Distribution in Kenya.	Half-yearly weighing green fodder per acre.	REMARKS.
13.	<i>Paspalum dilatatum</i>	Kikuyu South	Fairly Common	22,875 lbs. 10.21 tons	Very similar to <i>P. Kora</i> in some ways. Eaten readily by cattle. Is a high drought resister, keeps green during dry weather. Forms very little seed and is best propagated by roots.
14.	<i>Pennisetum cenchroides</i>	Athi River Station	Very common	20,875 lbs. 9.32 tons	Spreading type $1\frac{1}{2}$ to 2 feet high. Stock thrive on it. Good drought resister but dries up during dry season. Easily established by seed or roots
15.	<i>Panicum meyerianum</i>	"	Uncommon	Not yet established	Spreading growth 2 feet high. Stock are thought to like it. Easily propagated by roots or seed, and soon forms a dense growth. Not yet known whether it stands drought.
16.	<i>Panicum coloratum</i>	"	"	"	Very similar to <i>P. meyerianum</i> but not such a good spreading growth. Stock are thought to like it. Not yet known whether it stands drought.
17.	<i>Pennisetum</i> sp.	Uplands	"	16,188 lbs. 7.23 tons	Low spreading growth about 1 foot high. Stock eat it. Forms very little seed, but can be very easily propagated by roots, and soon covers the ground. Fairly good drought resister.
18.	<i>Leptochloa obtusiflora</i>	Voi	"	10,200 lbs. 4.55 tons	Stands about $2\frac{1}{2}$ feet high. Forms large quantities of seed and is best established by that means. Readily eaten by stock. Fairly good drought resister.

CHART No. 1.—*Contd.*

Plot No.	NAME.	Origin.	Distribution in Kenya.	Half-yearly weighing green fodder per acre.	REMARKS.
19.	Cynodon dactylon—Egoka-Kik. Trifolium johnstoni—(Kenya Clover)	South Kikuyu	Both common	38,062 lbs. 16.99 tons	Both have a very spreading habit and soon cover land with dense growth. A good mixture for stock if regularly grazed. The grass is inclined to smother out the clover. Makes a very fine hay for horses. Stands drought very well.
20.	Andropogon pertusus	Athi Plains	Very common	15,625 lbs. 7 tons	Three feet high. Stock thrive on it. Forms much seed and fairly easily established. Makes excellent hay. Dies down during dry season. Roots resist drought.
21.	Enteropogon macrostachyum..	Voi	Uncommon	Not yet established	Thought to be relished by stock. Propagated by seed or roots, and soon covers ground surface. Not yet determined whether resistant to drought.
22.	Digitaria sp.	Uplands	Scattered	Not taken	About 1 foot high. Forms sparse succulent growth. Difficult to establish. Poor drought resister.
23.	Setaria sulcata	South Kikuyu	„	35,000 lbs. 15.62 tons	Grows to about 4 to 5 feet high. Leaves are rather hard, but cattle like it. Propagated by seed or roots. Very good drought resister.
24.	Echinochloa pyramidalis ..	„	Common in wet places	21,225 lbs. 9.47 tons	Grows to about 6 feet high. Though a river type it resists drought well. Propagate by seed or roots. Cattle will not readily eat it.
25.	Pennisetum sp. near P. schimperi	Chania	Occasional in wet places	37,675 lbs. 16.82 tons	Grows to about 7 feet high. Though a grass of wet places it stands drought well. Propagate by seed or roots. Stock do not care for it.

CHART No. 1.—*Contd.*

Plot No.	NAME.	Origin.	Distribution in Kenya.	Half-yearly weighing green fodder per acre.	REMARKS.
26.	<i>Paspalum notatum</i>	Paraguaya	Only being tried	19,000 lbs. 8.48 tons	Introduced during recent years by Mr. A. D. Le Poer Trench. It is a low creeping grass with large succulent under ground rhizomes. Cattle are fond of it. It is a very fine drought resister. Forms very little seed and is best reproduced by roots.
27.	<i>Sporobolus indicus</i>	Nairobi	Fairly common in poor grazing	3,500 lbs. 1.56 tons	Grows to a height of about 1½ feet. Difficult to establish a good stand of it. Sparse weedy appearance and not much value for grazing.
28.	<i>Eragrostis paniciformis</i> ..	„	Uncommon	13,750 lbs. 6.14 tons	Grows to a height of about 2 to 3 feet. Forms large quantities of seed and can be propagated by that means. Sparse succulent growth and liked by stock. Fairly good drought resister.
29.	<i>Cynodon dactylon</i> —Egoka-Kik, <i>Trifolium johnstoni</i> —K e n y a Clover <i>Pennisetum clandestinum</i> —Kikuyu grass	Nairobi District	Common	21,675 lbs. 9.66 tons	A most palatable mixture. Liked by stock. Does well if kept grazed down, but if not the <i>C. dactylon</i> will smother out the clover and then the Kikuyu grass. Very good drought resister.
30.	<i>Panicum sp.</i>	„	Fairly common	26,750 lbs. 11.5 tons	Stands about 4 to 5 feet high. Forms an abundance of seed. Propagated by roots or seed. Slightly coarser than Guinea Grass (No. 10), but also liked by stock. Very good drought resister.

CHART No. 2.
CLOVER TRIALS AT SCOTT AGRICULTURAL LABORATORIES, 1925-1927.

No.	NAME OF CROP.	Origin.	Date of Planting.	Method.	Observation Concluded.	REMARKS.
1.	Alsike Clover (<i>Trifolium hybridum</i>)	England	11-11-25 29- 3-26 3-11-26	Seed broadcasted	25-11-27	Germinated well, grew to a height of 9 inches sparse cover, large proportion died out in dry season.
2.	White Clover (<i>Trifolium repens</i>)	"	11-11-25 29- 3-26 3-11-26	"	25- 3-27	Germinated well, grew to a height of 5 inches, straggly appearance. Died with drought. Useless.
3.	Sweet Clover (<i>Melilotus officinalis</i>)	New Zealand Cape Town	29- 3-26 11-11-25	"	25-11-27 "	Germination inferior. (Nursery germination was good under shade on two separate trials). Individual plants were sturdy till affected with mildew on the leaves, and odd plants died at times. This variety was the best drought resister and kept a healthy green growth throughout all dry seasons.
4.	Hubam Clover (<i>Melilotus alba</i>)	Aberdeen University and New Zealand	Nov. 1923 29- 3-26 9- 3-26	"	6- 2-27	Germination is always most difficult and slow. Liable to be washed out before roots are fixed in soil. Grew to a height of 5 feet with very sparse leafage. Very good drought resister. Not sufficiently attractive to warrant further trial and should not be recommended.
5.	Subterranean Clover (<i>Trifolium subterranea</i>)	New Zealand	11-11-25 29- 3-26 3-11-26	"	16-10-27	Germination good, grew to 10 inches high. Produced good cover during first season, but almost died out during first dry season and failed to recover on commencement of following rains. Not recommended.

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CHART No. 2.—*Contd.*
CLOVER TRIALS AT SCOTT AGRICULTURAL LABORATORIES, 1925-1927.

No.	NAME OF CROP.	Origin.	Date of Planting.	Method.	Observation Concluded.	REMARKS.
6.	Crimson Clover.. ..	New Zealand	29- 3-26 3-11-26	Seed broad-casted	30 -8-27	Very similar to above subterranean. Better drought resister.
7.	Kent Wild White Clover ..	England	3-11-26		30- 8-27	Germinated well. Very low creeper. Formed a very poor sole. Ninety per cent died out during first dry season. Not recommended.
8.	— Clover (Not yet identified)..	Mr. W. E. D. Knight, Limuru	3-11-26	"	"	Germinated well. Growth very similar to <i>Melilotus officinalis</i> . May be indigenous. Height 2 feet. Sparce growth. Seeded profusely Died out early. Not recommended.
9.	Montgomery Late Flowering Clover (<i>Trifolium pratense</i>)	Craibstone Expt. Farm	"	"	30-11-27	Germinated well. Nearly all died out during first dry season.
10.	Natural South of France Red Clover	France per Craibstone Expt. Farm	"	"	"	Germinated well. Twenty-five per cent died out first dry season.
11.	New Zealand Red Clover ..	New Zealand per C. E. F.	"	"	"	Germinated very well. Height 18 inches. No deaths and one of the best red clovers.
12.	Italian Red Clover	Italy	"	"	"	Germinated well. Produced best growth of all red clovers. Height 18 inches.
13.	French Red Clover	France	"	"	"	Germinated well. Did well. Height 18 inches. Not so good as average red clover
14.	English Broad-leaved Red Clover	England	"	"	"	Germinated well. Twenty per cent died out. Height 18 inches.
15.	Dauphine Red Clover ..	France	"	"	"	Germinated well. Ten per cent died out. Height 18 inches. Not so good as average red clover.

CHART No. 2.—*Contd.*
CLOVER TRIALS AT SCOTT AGRICULTURAL LABORATORIES, 1925-1927.

No.	NAME OF CROP.	Origin.	Date of Planting.	Method.	Observation Concluded.	REMARKS.
16.	Chilian Red Clover	Chili	3-11-26	Seed broadcasted	30-11-27	Germinated well. Ten per cent died out. Height 18 inches. Remaining plants produced a very good growth.
17.	Roumanian Red Clover ..	Roumania	"	"	"	Germinated well. Produced poor growth 12 inches in height.
18.	Uplands Red (Not yet identified)	Uplands, Kenya	4-11-26	Roots 2' x 2' apart	Going on	The whole soil surface was covered in less than three months. Very vigorous grower. Appears to give better results than Kenya Clover No. 20. Very few flowers produced. Stock relish it.
19.	Uplands White (Not yet identified)	"	"	"	"	Somewhat similar to Kenya Clover in habit and density of growth, Profusion of flower, set seed. It is liked by stock.
20.	Kenya Clover (Trifolium johnstoni)	Scott Agric. Labs. district	11-11-25 29- 3-26 4-11-26 4- 4-27	"	"	It may be planted 3 feet by 3 feet apart with success. It will completely cover the ground surface in three months. This best known variety of indigenous clover is very suitable for our needs in Kenya. It may be propagated by seed if desired and procurable. The stock relish it.
21.	Kenya Clover Selections (Trifolium johnstoni)	"	4- 4-27	"	"	These varieties are very similar in habit and differ only in appearance of leaves. Habit is similar to that of No. 20. Stock like it.

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CHART No. 3.

IMPORTED POTATOES FROM SCOTLAND GROWN AT SCOTT AGRICULTURAL LABORATORIES, 1927.

No.	NAME.	Appearance of Foliage.	Appearance of Tubers.	Period.	Yield per Acre.	
					Lbs.	Tons.
1.	ARRAN COMRADE	Light green	White, smooth, oval, flattened	99 days	9,440	4.21
2.	GREAT SCOT	Dark, high growth	White, rough, round	116 ..	14,240	6.35
3.	ALLY	Dark medium growth	White, oval, flat	98 ..	8,300	3.70
4.	MAJESTIC	Light green, medium growth	White, smooth, kidney shape	115 ..	11,680	5.21
5.	ABUNDANCE	Medium green and medium growth	White oval	115 ..	13,280	5.97
6.	RHODERIC DHU	Medium green and large growth	White, smooth, round flattened	119 ..	16,000	7.14
7.	KERR'S PINK	Medium green and medium growth	Pale red, round	117 ..	14,080	6.28
8.	ARRAN VICTORY	Medium green and medium growth	Dilute purple, smooth, oval	110 ..	16,480	7.36
9.	ARRAN CONSUL	Medium green erect growth	White, round	113 ..	13,600	6.07
10.	GOLDEN WONDER	Dark erect growth	Brown, rough, cylindrical long	108 ..	9,580	4.28

APPENDIX M.

REPORT OF THE AGRICULTURAL OFFICER, NYANZA.

STAFF.

I arrived in Nyanza Province on April 7th for special work in connection with cotton. On June 25th, I took over the Bukura Experimental Farm from Mr. R. J. Lathbury on his appointment as Assistant Plant Breeder.

Mr. N. Spranger returned from leave on August 13th and Mr. A. S. Hartley proceeded on leave on September 14th.

Mr. R. G. Bentall arrived on first appointment on December 4th.

NATIVE RESERVE WORK.

Staff: Native instructors 8.

COTTON.

Cotton buying commenced on January 10th, and buying posts were established as follows:—

Small & Co.—Lukolis, Nikolas, Busia, Adamgusis and Sio ginnery.

British Cotton Growing Association.—Lukolis, Lwakakas, Kaleit and Malikisi ginnery.

Folkes & Co.—Lukolis, Busia, Adamgusis, Unysatas, Matayos and Nambare ginnery.

The 1926-27 season was a very wet one and in consequence the cotton was later than usual. The market started low, 10 to 12 cents per lb. being paid for first quality seed cotton, but those prices subsequently rose several cents. The natives were very dissatisfied at receiving such low prices. As was expected the crop was a small one, the following amounts being purchased:—

B.C.G.A., Malikisi	...	255,000 lbs. seed cotton.
Folkes & Co., Nambare	...	210,373 lbs. seed cotton.
Small & Co., Sio	...	580,115 lbs. seed cotton.
Total	...	<u>1,045,488 lbs. seed cotton.</u>

This amount compares unfavourably with last season's total which was 2,484,357 lbs. seed cotton. About three lakhs of the Sio cotton came from across the Uganda border and one lakh from Lukolis.

Buying in the Lukolis area was not satisfactory and irregularities at all the buying posts were discovered. As a result fines to the total of Shs. 1,600 were inflicted.

1927 COTTON CROP.

An intensive cotton encouragement campaign was started in April, an Agricultural Officer being detailed for the work by the Department and an assistant District Commissioner by the Administration. Owing to the poor prices received in the previous season, the natives were very unwilling to plant up an increased acreage of cotton, but by continuous propaganda through the chiefs and mlangos and by holding barazas throughout the cotton area, the natives were eventually persuaded to prepare much larger shambas than they had ever done before. To assist in this work 12 senior pupils from Bukura were sent out to the cotton area and were distributed as follows:—

- 4 in the Malikisi area.
- 4 in the Lukolis-Nambare area.
- 4 in Samia.

Supplies of cotton seed were arranged for as follows:—

At Sio ginnery	30 tons.
Asembo	5 „
Nikolas	4 „
Luambwa	3 „
Mgandas	2 „
Oduyas	4 „
Matayos	4 „
Nambare ginnery	35 „
Lukolis	10 „
Malikisi ginnery	50 „
Total	147 „

About 20,000 acres were planted by the end of July, and this is very encouraging as last season's acreage was estimated at about 4,000. Owing to the lack of rain a large number of shambas which had been prepared for cotton were eventually planted with simsim.

On the whole the growing crop was well looked after, but it was found necessary to send two senior pupils to certain areas to see that the shambas were properly cultivated and weeded.

The season has not been a good one owing chiefly to the drought with the result that in many parts the young cotton plants have been stunted and have produced bolls prematurely. In November when rain fell over the greater part of the cotton area, hail did considerable damage at Malikisi, Lukolis and Nambare. In spite of the adverse season it is expected that the production of seed cotton will be very much greater than that of last year.

MAIZE.

In March a large seed distribution in the Maragoli area where there was a shortage of food and a danger of famine. The issue was made in conjunction with the administration and 994 bags of maize were distributed as follows :—

Odengas	...	...	287 bags.
Amiana	...	...	180 bags.
Mnubis	...	...	232 bags.
Bunyori	...	...	295 bags.

A second issue was made in North Kitosh in the area served by the new railway. Two hundred bags were distributed, 115 bags at Kugale station and 85 bags at Kitosh station.

The maize crop for the year has been a fair one, but the natives were advised to store as much as possible as the rains were well below normal.

SIMSIM AND CHIROKO.

Fair crops were reaped early in the year and high prices were obtained, simsim fetching up to Shs. 6 and chiroko Shs. 4/50 per frasila.

The short rain crops of this year are looking very poor. A few good stands of simsim are to be seen, but the crop will be below that of last year, due principally to the drought.

GROUNDNUTS.

An issue of 40 bags of groundnuts was made from Bukura, to give the natives of Maramma, and West Kakamega a profitable rotation crop after their maize and mtama. The groundnut season has been a good one, but the quality of the local groundnuts is very poor, the chief reason being lack of care during harvesting and shelling. Premature harvesting is often due to the necessity of getting money early in the season to pay hut tax.

FOOD CROPS.

Owing to a food shortage the Native Foodstuffs Ordinance was applied to the North Kavirondo District in January. Eleven bags of buckwheat were distributed from Bukura to assist the natives in the worst famine areas. The yields obtained were poor, but it is hoped that the natives will take to this crop as a quick-maturing food crop particularly suitable where rains are short and in times of famine.

Normal rains generally were experienced during the early part of the year and fair crops were reaped. The short rains, however, have not been good and a very small harvest is expected.

Demonstration Plots.—The eight demonstration plots in North and Central Kavirondo gave satisfactory results in the long rain season, but the short rain crops suffered badly from drought and hail. These plots are worked entirely by native instructors.

Average yields obtained at the demonstration plots were :—

Maize	...	...	11 bags of 200 lbs. per acre.
Matama	...	...	6 bags of 180 lbs. per acre.
Groundnuts	...	...	10 bags of 70 lbs. per acre.
Wheat	...	...	4 bags of 200 lbs. per acre.

Issues of maize and groundnuts were made from these plots during the year.

General.—A campaign against Striga weed was commenced in September and the natives showed great enthusiasm in its eradication.

Progress throughout the reserve has been satisfactory and much improvement was noticed in the general care and cultivation of shambas.

BUKURA EXPERIMENTAL FARM.

Staff.—Native instructors 3, pupils 45, labour 18.

RAINFALL.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
ins. 0.92	ins. 0.44	ins. 2.74	ins. 7.01	ins. 7.77	ins. 6.30	ins. 2.94	ins. 5.68	ins. 2.82	ins. 0.59	ins. 1.16	ins. 1.31.

Total for the year, 39.68 ins.

FIELD CROPS.

CROP AND VARIETY.	Acres.	Planted.	Harvested.	Yield per Acre.
				Bags.
MAIZE :				
Flat White	6	18-3-27	3-10-27	9
"	4	25-3-27	6-10-27	18
"	11	30-3-27	20-10-27	10
"	12	6-4-27	6-11-27	6
"	4	10-4-27	10-11-27	7
"	15	26-4-27	20-10-27	10
"	4	5-5-27	3-11-27	2
GROUNDNUTS :				
Shitati	6	24-5-27	Crop not	
"	2	2-6-27	harvested	
<i>Experimental Plots.</i>				
MTAMA :				Lbs.
Black Hull	1/40	18-3-27	7-9-27	240
Freeda Sorgo	"	"	"	120
Short Feterita	"	"	"	600
White Tolo	"	"	"	280
Standard Sumac	"	"	"	80
Dwarf Hegari	"	"	"	80
Red Amber	"	"	"	360
Kansas Orange	"	"	"	640
Early White Milo	"	"	"	320
Dawn	"	"	"	160
Red Mild	"	"	"	100
Short White Bothaville	"	"	"	640
Sunrise	"	"	"	460
Dwarf White Kaffir	"	"	"	740
Short Red Kaffir	"	"	"	540
Honey	"	"	"	260
Dwarf Yellow Mild	"	"	"	440
Foterita	"	"	"	320
Early Samac	"	"	"	120
Reids Kaffir	"	"	"	760
Black Hull	"	"	"	480
<i>Field Crops.</i>				
MTAMA :				
Kakamega	1	17-3-27	7-9-27	7 bags
BUCKWHEAT	1	16-3-27	18-5-27	300 lbs.
BEANS :				
Canadian Wonder	1	4-5-27	Failure	
WHEAT :				
Kenya Govrenor	2/3	14-6-27	3-10-27	2 bags

Groundnuts.—The following varieties of groundnuts were planted in one-eighth acre plots on 4-5-27, but are not yet harvested :—

Java White, Natal, Virginia Bunch, Improved Spanish, Jumbo, Spanish Bunch, Virginia Creeper.

Potatoes.—The following varieties of potatoes were planted in one-thirtieth acre plots on 13-9-27, but are not yet harvested :—

Kerr's Pink, Arran Consul, Arran Victory, Arran Comrade, Golden Wonder, Allay, Rhoderic Dhu, Majestic.

They have all suffered badly from drought, but the germination was good.

School.—The average number of pupils attending school throughout the year was 45. An examination was held in July for those who had completed their three years and the results were very satisfactory. Four of the best boys remained for a further year's course, and are receiving advanced training, particularly in field work where they are given responsibility by taking charge of the work of junior pupils. Nine boys completed their course in August and will be employed as native instructors under the local native council early in 1928.

Each pupil had to work and look after a school garden of 1/20 acre in his own spare time.

The school was divided into three classes A, B and C. Class A, boys in their fourth year, were in school one day per week. The remainder of their time was spent in supervising the work of junior pupils, the care of crops in experimental plots, selection of maize plants in the field, laying out of nursery beds, etc. They were also called upon to go into the reserve to assist the native instructors during busy seasons. Class B were in school 2 days per week and received elementary lectures in agriculture as well as arithmetic, reading and writing. Class C spent one day a week in school, but received no lectures in agricultural subjects. All teaching was done in Swahili. The practical work included ploughing, harrowing and cultivating; planting and harvesting of crops; nursery work and the growing of vegetables; school gardens; the care of cattle and poultry.

Stock.

Poultry : Rhode Island Reds	...	4
Half-breds	...	45
Natives	...	7
		Total
		56
Working oxen	...	44

During the year 20 oxen were purchased locally at an average price of Shs. 112/50. Two oxen died from old age. Nineteen oxen belonging to natives were trained on the farm.

Buildings.—A two-roomed house and verandah of brick has been built between the existing guest huts. An Indian fundi and extra labour were employed for this purpose.

Three new mud huts for boys have been built.

The following figures show the amount of the chief agricultural products which passed through Kisumu Pier and station during 1927 :—

<i>Product.</i>	<i>Station.</i>	<i>Pier.</i>	<i>Total.</i>
Maize	2,943 tons	67 tons	3,010 tons
Maize meal	278 tons	9 tons	287 tons
Simsim	758 tons	1,192 tons	1,950 tons
Rice	152 tons	—	152 tons
Groundnuts	110 tons	684 tons	794 tons
Chillies	7 tons	—	7 tons
Hides	903 tons	129 tons	1,032 tons
Beans	80 tons	—	80 tons
Chiroko	—	25 tons	25 tons

The following figures show the amount of the chief agricultural products which passed through the Customs from Gulf Ports of Nyanza during 1927:—

PRODUCT.	Kendu Bay.		Homa Bay.		Karungu.		Sio.		Kadimu.		Asembo.		Total.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Ghee	1	..	2	4	13	4	..	2	2	4	14	14	33	8
Simsim	68	3	846	15	208	19	332	11	84	15	165	16	1,706	19
Chiroko.. .. .	..	15	32	12	..	9	1	11	14	12	740	19	780	18
Hides	111	5	49	11	17	10	88	..	18	15	32	4	317	5
Groundnuts	181	2	395	14	1	9	1	6	2	18	241	..	823	7
Maize Meal	5	12	3	5	..	..	63	11	..	10	..	4	73	2
Maize	2	3	7	13	12	2	2	15	98	5	122	18
Beans	35	16	5	3	3	6	44	5

P. BOOTH,
Agricultural Officer.

A. G. B.

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APPENDIX N.

ANNUAL REPORT OF THE ASSISTANT AGRICULTURAL OFFICER, COAST AREA, FOR THE YEAR ENDING 31st DECEMBER, 1927.

CORRESPONDENCE.

Inward, 423; outward, 458.

A considerable amount of the above correspondence was advisory, exclusive of letters to Government Departments and Native Agriculture.

STAFF.

I was in charge throughout the year, assisted by :—

Mombasa : 1 instructor, 1 apprentice.

Malindi : 3 apprentices.

Kilifi : 2 instructors, 5 apprentices.

Digo : 1 apprentice.

Augmented from time to time by casual labourers. No increase of staff has been made this year, but an increase is desirable in the future owing to increased activities. The work of the staff has been generally satisfactory.

Progress has been made but the need of a training centre has been felt.

WEATHER AND RAINFALL.

Short Rains, 1926-27.—Rain commenced to fall on the 22nd Septemeber, some 8.7 inches being recorded at Sokoke in 22 hours, showers continuing until January, during which month rainfall was not heavy. Where the people planted early, good crops were obtained, but owing to the habit of the Giriama people in waiting for heavy rains, before cultivating and preparing their shambas for planting, average yields were not high.

There was little rain in the Digo hinterland.

Long Rains, 1927.—Showers started during March. These may be described as the "Warning Rains," followed by light showers in April. During May heavy winds prevailed but damage to crops was negligible. Heavy rain fell during June and these showers undoubtedly saved the crops, which were beginning to suffer from the dry spell in April. July and August gave fair rains, though rainfall was very local.

Short Rains, 1927.—Light showers fell throughout September and commenced on September 22nd. They can in no way be compared with the heavy rain which fell during the same period in 1926.

The Vitengeni, Manges, Sokoke districts have been very short of rain, but showers fell during December and planting has commenced. Good yields cannot be expected, however. The short rains in the Digo District were good.

See rainfall Appendix I.

CROPS.

Maize.

Long Rains.—Good yields were obtained in most districts. Yields were heavy along the Sabaki River, Chonyi, Jimba, etc. Along the Coast strip yields were good. Bamba, Vitengeni and Sokoke obtained fair crops.

Short Rains.—Owing to the local rains, good crops cannot be expected from all locations. Where rains have been good and early planting obtained, good crops have been reaped. Harvesting will be late this year owing to late planting. A considerable number of shambas were only planted during December.

General.—Considerable attention has been devoted to this crop, the chief food crop of the people.

Issues of Chester County and Natal Eight Row, two quick-growing yellow varieties, have been made, and a considerable amount of yellow maize has been bought by Local Native Councils for issue. Results have been encouraging, and Chester County appears to be the best, ripening in about 3½ months from time of planting. It appears to withstand weevil attack considerably more than Natal Eight Row. Outside experience tallies with this. An attempt was made to obtain a hybrid maize. A cross between Chester County and Hickory King and was partially successful. Further experiments will be made.

PESTS AND DISEASES.

Stalk Borer was reported in all districts. Specimens were collected and forwarded for identification. I am informed by the Entomologist, Scott Agricultural Laboratories, that the two moths are not yet identified, being totally different from up-country moths.

Striga Weed (*B. Hermonthica*) was reported from Kwale.

Streak Disease has been noticed in all districts and at all altitudes, but appears to do little damage.

EXPERIMENTAL.

Several varieties of white maize were tried, but proved to take too long to ripen.

Prices ruled from 12 pichies for 2/- to 6 pichies for 2/-.

COTTON.

Owing to the price and bad germination of the seed the previous year, prospects for this crop did not look well at the commencement of the season. Seed had, however, been carefully saved from the first pickings, 1926 A quality. A germination test was made, the germination being 60 per cent. as against 5 per cent. for the 1925-26 crop. Seed germinated well and was planted under supervision, shambas being planted much closer—3 ft. × 2 ft.—than had obtained before, and an increased acreage was planted. Picking started in early November, and seed cotton purchased up to November 30th amounted to :—

					Lbs.
First	...	...	...	...	89,940
Second	...	...	...	...	797
Third	...	...	...	...	3,962
				Total	94,699

Some 115,482 lbs. had been purchased up to Christmas. The price had been fixed at :—

A.	...	...	...	20 cents per lb.
B.	...	...	...	12 cents per lb.
C.	...	...	...	8 cents per lb.

Ginning has already commenced.

Yields per acre vary considerably, but the six best shambas should yield 1,200 lbs. seed cotton per acre; some 800 lbs. per acre has already been picked.

Natives express satisfaction with the price, and an increase in acreage is expected next season. This is especially gratifying in view of the adverse feeling expressed at the commencement of the season. I received considerable help from the District Commissioner, Malindi, G. M. Castle-Smith, Esq., during the time of planting. I wish to record my appreciation of his help in materially increasing the acreage of this crop. The crop is eminently suited to most Coast districts, and grows well.

PESTS AND DISEASES.

During the year the Assistant Entomologist visited the Coast. The following pests were identified :—

Celechia Gossypiella—Pink Boll Worm.—First record for the Colony.

Dysdercus sp.—Cotton Stainer.

Oxycarenus hyalinipennis—Cotton Seed Bug.

Earias sp.—Spiny Boll Worm.

Chlorodae obseleta.—Spiny Boll Worm.

Psuedococcus virgatus—Mealy Bug.

Psuedococcus sp.—Mealy Bug.

Aphis sp.

A Braconid is exercising a very efficient control of the Pink Boll Worm.

During December, a representative of the Egyptian Government visited the Malindi and Mambrui areas in company with the Assistant Entomologist and myself to collect this parasite and endeavour to introduce it into Egypt. A considerable amount of material has been successfully collected and despatched to Suez.

COCONUTS.

Native holdings continue to increase, but the manufacture of copra does not increase, and remains of poor quality. Trees continue to be abused by tembo tappers. The yield of copra continues to increase from European estates, owing to fresh areas coming into bearing.

Native copra : 6/- per frasila (36 lbs.).

Nuts : 5/- to 8/- per 100.

Copra : £30-15-0 per ton.

Coconut Beetle is still prevalent.

A considerable industry has sprung up in *makuti*, especially at Sokoke, where a superior *makuti* is made. Price, 15/- per 100; though this is considerably dearer than most native *makuti* it is considerable cheaper to use in the long run.

SIMSIM.

Free issues of Simsim were made by this Department to all districts. The crop is popular, grows well, and areas sown to this crop increase each year. It provides a ready source of revenue to the natives, and owing to its drought-resisting powers good crops have been reaped in all districts, especially along the Coast strip and the Sabaki River.

Prices ranged from 45/- to 50/- per jisila (185 lbs. approximately).

RICE.

Both swamps and uplands varieties are cultivated. The former at Vanga, Boma Upende, Goshi and Sabaka River. The latter along the Choyni Ridge and at Sokoke. Small issues were made to Lamu and Tana Districts.

The varieties of Philippine Rice were reported a failure from Kipini.

Price : 4 to 3 pichies for 2/-.

CANADIAN WONDER BEANS.

Small issues of this crop have been made, and the crop is fast receiving the popularity it deserves. Good crops have been obtained from all demonstration shambas, and an increase in area is to be expected.

Price : 5 pichies for 2/-.

TOBACCO.

Good crops have been obtained. Demonstrations of drying have been given.

Price : 1 to 1½ lbs. for 1/-.

KUNDE AND POJO.

Fair yields have been obtained.

Price : Kunde, 6 to 8 pichies for 2/-; Pojo, 2 to 4 pichies for 2/-.

COFFEE.

A free issue of the following varieties has been made :—

C. Liberica.

C. Robusta.

C. Bukobensis.

C. Quilloa.

Plants look healthy and are growing well, and there is every possibility of this crop proving successful.

C. Robusta appears to be the most suitable.

Green Scale and Mealy Bug have been noticed at Sokoke; infection was not heavy.

CHILLIES.

This crop grows well in most districts. An endeavour is being made to popularise the crop. Price : £100 per ton, Mombasa.

CASSAVA.

Good yields of this crop have been obtained.

MANGOES, ETC.

The mango harvest is in full swing, and yields are good. Good crops of bananas, oranges, etc., have been reaped.

HIDES AND SKINS.

A considerable amount of hides and skins are still sun-dried without shade. Arrangements for demonstrations in drying have been made.

GHEE.

The ghee industry continues to progress. Prices for Rabai ghee range from 72/- to 52/- per frasila.

TRAVELLING.

2,990 miles were travelled by motor car. A considerable amount of foot safari was done; work in the reserves occupied 157 days.

INSTRUCTIONAL WORK IN NATIVE RESERVES.

Instruction has been given to natives on their own shambas by instructors and apprentices. Instruction was also given by officers on safari both in baraza and in the field. Barazas have been well attended, and the instruction given verbally at these meetings has been afterwards demonstrated in the shambas; in order to emphasise this teaching considerable help has been given to promising natives during the planting season. Twenty-two demonstration shambas have been established, the work in this connection being entirely done by instructors and apprentices under supervision; crops reaped have been used as a supplementary seed issue. These plots have proved most successful as trial plots where new crops and varieties of seed may be tried out before issue to a location. Assistance has been rendered to schools and missions at all times. There are definite signs that natives are adopting new methods, though progress is slow, owing to the conservatism of the people.

EXPERIMENTAL.

Ground nuts have been tried in several districts, and good crops have been obtained.

This crop might be introduced to the Sabaki River locations with success.

At Ganda, distance in planting of cotton trials are in progress. It would appear that 3 ft. × 1 ft. 6 in. is the best distance. Results will not be to hand till March or April.

POULTRY.

An issue of 80 Rhode Island Red cockerels was made at Mariakani in the Kilifi District. All native cocks and cockerels were removed before issue; the birds are doing well, and only one death has occurred.

GENERAL.

On February 23rd the office near the Fort was vacated, being moved into the old Customs Building, Mombasa; suitable store accommodation has been provided.

Each month a circular of native agricultural work for the coming month is issued to Administrative Officers in order that some instruction or advice may be brought to their barazas, and to assist natives by making them realise that Government is interested in their work, etc.

Location reports have been instituted, and an enquiry into native agriculture has been commenced. A collection of limestone samples from various localities has been made and forwarded to the Assistant Agricultural Chemist for analysis; the collection will be increased from time to time.

Specimens of grasses and parasitic plants are in process of collection the year round, and are forwarded to the Mycologist as occasion arises.

Specimens of insect pests have been sent to the Entomologist.

Various samples of seeds have been received and forwarded to Agricultural Departments of other countries for trial, including such various products as Paw Paws, Chillies, and nuts.

Articles have been forwarded to "Habari."

SHOWS.

I attended the Agricultural Show at Nairobi during July and August. An exhibit of Coast products was staged.

Only one show was held in the Coast Province this year. On September 24th a show was held at Kakoneni in the Malindi district. This was attended by His Excellency the Governor, who spoke to headmen and natives. His Excellency expressed satisfaction at the quality of the exhibits and of the show as a whole. 1,116 exhibits were staged. The following classes were worthy of note :—

Maize, Gourds and Pumpkins, Chillies, Rice, Sugar Cane, Simsim.

The results of this show were encouraging.

COMMUNICATIONS.

A scheme for increased communications has been sanctioned. With the bridging of the River Sabaki production should be stimulated, and a large surplus of rice, maize and simsim become available for export, bringing in revenue to natives, alleviating high prices, and lack of food in other districts. The roads in other districts are being improved, but many are bad, and during the rains travelling is both arduous and slow.

CONCLUSION.

Progress is being made, though slowly owing to the conservatism of the natives, which is being gradually broken down. Anything in the nature of *dasturi* is hard to change.

The Coast area is rich in land in most districts, and is capable of growing a variety of profitable and economic crops. Owing to the idleness and conservatism of the people it is producing but a small part of what it could be made to produce. With the tighter control of the tembo traffic and the efforts of the medical officers in eradicating hook-worm, yaws, etc., it is hoped to improve the health of the natives, and consequent production should increase.

I wish to express my thanks to all Administrative Officers, with whom relations have been good, for their assistance and co-operation, by which means some progress has been obtained.

SEED ISSUES—COAST—FREE ISSUES.

	Maize.	Cotton.	Rice.	Simsim.	Beans.	Ground nuts.
Malindi	2 bags	200 bags	60 lbs.	15 bags	1 bag	1 bag
Kilifi	„	Nil.	Nil.	10 „	120 lbs.	120 lbs.
Digo .. ..	..	„	35 lbs.	„	..	..
Lamu .. ..	..	800 lbs.	..	..	..	..
Kipiaf .. ..	..	..	1½ bags	..	..	..

SEED PURCHASED BY LOCAL NATIVE COUNCIL FUNDS.

Malindi 20 bags of Maize.

Digo 40 „ „

RAINFALL, 1927.

DISTRICT.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
MOMBASA . . .	0.15	0.00	5.19	2.94	12.53	5.16	2.14	1.33	2.36	2.78	3.46	4.26	42.30
KILIFI (Sekoke) . .	0.35	0.00	4.30	1.54	8.76	7.27	2.77	0.38	1.80	1.95	0.89	2.25	32.26
MALINDI . . .	0.00	0.00	7.82	2.80	17.96	13.55	3.96	1.20	0.80	2.80	0.60	0.85	52.34
KILIFI . . .	0.00	0.01	3.57	2.16	8.57	5.09	1.18	0.16	0.58	1.06	0.79	3.73	26.90
GAZE (Kinondo)..	0.20	7.00	5.38	1.10	10.60	9.35	5.73	1.20	3.80	1.85	3.30	8.47	57.98

H. TAYLOR,
Assistant Agricultural Officer.

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APPENDIX O.

ANNUAL REPORT, 1927,

OF

ASSISTANT AGRICULTURAL OFFICER EMBU, FORT HALL, MERU
AND SOUTH NYERI DISTRICTS.

1. STAFF.

Mr. Booth was stationed in the Province, arranging seed issues, from the beginning of the year till the end of March.

Work was started during the year in the Fort Hall, Meru and South Nyeri districts.

The native staff under my control for the greater part of the year consisted of :—

Embu : 6 instructors ; 3 labourers. —

Fort Hall : 4 instructors.

Meru : 3 instructors. 1 rice instructor.

South Nyeri : 4 instructors.

It is considered that this native staff will have to be increased if the large amount of work proposed, in the Fort Hall and Meru Districts, is to be carried out efficiently.

2. WEATHER AND RAINFALL.

Long Rains, 1927.—These started earlier than usual breaking on the 10th of March and stopping again about the 24th. A dry spell followed which did not break until the middle of April. A number of natives missed planting in the first rains, and at the high elevations their crops were therefore late in maturing.

Short Rains, 1927.—Commenced on the 11th of October and continued satisfactorily till the middle of December assuring good crops in all locations.

Appendix I.—Rainfall.

3. TRAVELLING.

3,077 miles were travelled by motor-car on duty during the year.

4. CROPS.

Issue of seeds Appendix 2.

(a). *Maize.*—Exceptionally good crops of maize were harvested throughout the greater part of the area under review. The quality of the seed is improving, especially in

the Embu and Kerguya districts where the amount produced for sale has increased very considerably this year. In the Fort Hall and Meru districts the quality is inferior with comparatively poorer yields.

This being the main economic crop in the area most attention has been given it. The issues of Flat White seed made in March have been most beneficial in their effect, a very marked demonstration of this being seen in the Fort Hall district, where the contrast between the area of the Flat White maize and that of native maize was very patent.

A suitable maize for short rains has been found in White Congo, but this has not been grown in sufficient quantities to dispose of the coloured varieties.

Maize is bought by Indian traders in petrol tins which can be made to hold anything from 36 to 44 lbs.

Prices have ranged from Sh. 1 to Shs. 1.40 per 40 lbs. according to the proximity of the Railway.

(b). *Beans*.—Canadian Wonder on account of their high yielding qualities are gradually taking the place of old varieties. Quantities are exported from the South Nyeri and Fort Hall Districts.

(c). *Wheat*.—This crop is becoming more and more popular and increased areas are being sown to it. As a short rain crop it does well at elevations over 4,400 feet, and on account of the millet crop is not attacked by birds at this season.

A few native-owned wheat mills are in use for the preparation of whole wheat flour, surplus being sold to Indians at a good price.

Messrs. Young and Ayre, of Meru, are installing a wheat mill which ought to help to increase production there.

(d). *Millets*.—This crop is still the principle one in the short rains and natives from the high elevations come in large numbers to buy it.

(e). *Rice*.—Mwanza swamp rice has been experimented with in the plots set aside for this purpose at Meru, but has not proved a success. The land, without terracing, is not sufficiently level for flooding, and it is considered that with the Meru native in his present unadvanced state it is impossible to expect him to terrace. It was suggested that this rice might be tried in the swamps which dry out about September, and experiments will be made next year.

In the meantime Upland rice has been issued to natives which has made good yields in the past.

A rice huller and winnower have been supplied to Messrs. Young and Ayre, by the Department, so that a ready market is open for the crop.

(f). *English Potatoes*.—These have been tried at various altitudes but, in native hands, have only been found suitable at elevations of 5,600 feet or over. Very good quality are grown in the Karatina area and large quantities sold. Owing to the exhaustive nature of this crop it is doubtful if it should be encouraged in thickly populated parts until the native knows something of manuring and rotations.

(g). *Simsim and Groundnuts*.—Natives are slow to take up these crops though good yields have been obtained in demonstration plots at the lower elevations.

(h). *Castor seed*.—A large potential source of trade especially in the Embu district is gradually opening up by continuous persuasion.

Experiments will be made with the different varieties to be found locally with the object of ascertaining yields, quality, etc.

4A. BEESWAX.

With the exception of Embu and Meru, little has been done, since 1918, in this line.

Efforts have been made to increase production.

5. GRAZING.

In the closer populated areas such as Karatina and Fort Hall grazing is very short and the stock is either sent down to the plains or up to the forest line.

In other areas grazing is plentiful.

A survey of grasses has been commenced.

6. STOCK.

A lot of disease has been reported. East Coast Fever, Rinderpest and Anthrax causing a high mortality.

6A. HIDES AND SKINS.

Instruction has been given in curing at all barazas, with the result that a number of natives are now shade-drying and sending their hides and skins direct to Mombasa for grading.

7. GHEE.

With the exception of Meru, little is done in the ghee industry though there are good opportunities for its development on the plains below the Fort Hall-Embu road.

The plant owned by the Meru Local Native Council, when running, turns out approximately 1,000 lbs. of ghee per month which is sold for Shs. 1.30 per lb.

8. POULTRY.

Disease is prevalent which depletes stock continuously and the type of bird is very poor.

The issue of Rhode Island Red Cocks at South Nyeri and Embu should do much to improve the latter condition.

In all 105 cocks were issued which were much prized by natives.

9. TREES.

The area is now on the whole well wooded, Fort Hall and South Nyeri artificially, and Embu and Meru naturally.

Some seed has been issued and small plantations for home consumption encouraged.

10. INSECT PESTS.

In the Kandara region of the Fort Hall District mealy bug is spreading and has already effected considerable damage to the yam crop, which is the staple famine food.

Stalk borer is to be found, though so far to no very great extent.

Attacks by cutworm and army caterpillar have been reported.

11. INSTRUCTIONAL WORK.

In addition to instruction given by native instructors at all times, 59 barazas were held, exclusive of practical demonstrations.

12. EXPERIMENTAL.

Embu Boma Plot Elevation 4,500 feet.

Long rainfall, 21.72 inches.

CROP.	Variety.	Date of Planting.	Date of Harvesting.	Yield per Acre.
WHEAT ..	Equator	24-3-27	6-8-27	lbs. 1,385
" ..	Kenya Governor ..	26-3-27	16-8-27	1,748
BEANS ..	Canadian Wonder ..	22-3-27	11-7-27	2,226
GROUNDNUTS ..	.. .. .	2-4-26	3-2-27	1,228

13. DEMONSTRATION AND SEED ISSUE PLOTS.

In addition to the small plots situated in the different locations, endeavours have been made to open large plots in each district for the purpose of making quantities of seed available for issue locally, at a comparatively small cost. This is of greater importance in such districts as Embu and Meru which are far from railways making the cost of transporting seed in quantity prohibitive. In both these districts large plots have been made. The 20 acre plot opened in March at Embu has been a success and further two are to be opened at Chuka and Mwimbi, funds for their upkeep to be provided by the Local Native Council.

In all districts with the exception of Meru funds are to be voted by the Local Native Council for the provision of paid labour to keep up the plots. This will be an advantage as without the presence of an Administrative Officer it was, in some cases, difficult to obtain labour from chiefs.

The following funds have been voted by Local Native Councils for agricultural work:—

Embu	...	Shs. 1,800	...	Labour.
(Re-voted)	...	Shs. 10,440	...	Agricultural School.
Meru	...	Shs. 3,000	...	Seeds and implements.
S. Nyeri	...	Shs. 2,000	...	Labour.
Fort Hall	...	Shs. 500	...	Vegetable seed.

14. IMPLEMENTS, MILLS, ETC.

Purchased by natives during the year: Appendix III.

15. EXPORTS: APPENDIX IV.

No comparative figures are available as the railway was not opened till 1926-1927.

16. CONCLUSION.

Throughout the area it is generally conceded that this has been an outstanding year for native production.

Over and above the amounts exported by rail large quantities of produce are taken out of the districts by motor lorry and by natives from the surrounding area where a shortage of food has been reported.

In view of the rapid increase in production, and in the amount of land under cultivation, with the resultant necessity for improved methods of agriculture; it is considered that an Agricultural School in the area is urgently required. Relations with Administrative Officers have been satisfactory and their assistance appreciated.

W. G. LECKIE,
Assistant Agricultural Officer.

SEED ISSUES, 1927.

DISTRICT.	Maize, F.W.	Wheat.	Beans.	Simsim.	Potatoes.	Rice.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Embu	5,000	360	..	800	600	60
South Nyeri ..	55,000	660	..	..	600	..
Fort Hall ..	30,000	1,200	900	..	..	..
Meru	1,300	1,900	50	..	600	33,600

In addition to the above issues were made from the Embu and Keruguya demonstration and seed issue plots amounting to :—

EMBU.

Maize	...	...	27,000 lbs.
Wheat	...	...	3,900 lbs.
Beans	...	...	8,000 lbs.
Groundnuts	...	...	600 lbs.

KERUGUYA.

Maize	...	...	8,000 lbs.
Beans	...	...	1,000 lbs.
Wheat	...	...	600 lbs.

IMPLEMENTS AND MILLS BOUGHT BY NATIVES
DURING THE YEAR, 1927.

District.	Water Mills.	Hand Mills.	Ox Carts.
Embu	3	2	4
Keruguya	3	23	3
South Nyeri	22	29	4
Total	<u>28</u>	<u>54</u>	<u>11</u>

Figures for the Fort Hall District are not available.

EXPORTS, 1926-1927

STATION.	Maize.		Maize Meal.		Beans.		Potatoes.		Hides and Skins.	
	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Punda Milia	122	47	106	1	10	40	1	..	2	$\frac{1}{2}$
Maragua ..	1,365	2,685	126	262	560	1,021	3	1	2	4
Fort Hall ..	1,269	1,464	1,774	3,442	76	60	2	..	15	46
Sagana ..	1,237	3,917	1,069	3,610	18	25	7	..	5	12
Karatina ..	..	3,137	..	565	..	178	..	23	..	34
Nyeri ..	..	165	..	26	..	4	..	..	..	31

RAINFALL, 1927.

STATION.	Jan.	Feb.	March	Apri'	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
EMBU	0.7	.14	9.81	6.18	2.73	2.08	.43	.49	.42	5.65	3.70	1.28	32.97
MERU .. ..	.20	1.56	16.95	6.74	4.44	.48	1.12	.13	1.00	12.62	10.40	5.87	60.51
FORT HALL ..	1.78	1.38	9.28	2.53	3.07	2.59	0.14	.30	1.13	5.37	3.68	1.40	30.65
NYERI ..	1.21	.27	3.28	4.50	4.65	.69	3.50	.61	.99	4.74	4.36	2.61	31.50

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JUDICIAL DEPARTMENT

ANNUAL REPORT,

1927.

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Judicial Department Annual Report for the Year 1927.

1. Changes in Staff.

Mr. Justice Pickering came back from leave on 19th March. The Chief Justice went to Europe on leave on the 30th April and came back on 25th November. Mr. Crean came back from leave on 19th January. Mr. Gamble went on leave to Europe on 11th March and came back on 1st October. Mr. Underwood, on his first appointment as Deputy Registrar, arrived on 10th July. Mr. Price, the Process Server, went on leave on 21st February and came back on 9th September.

2. Health.

The health of the staff has not been so good as in the preceding year. Among the European staff a total of 59 days was lost by absences due to sickness; that total does not include 21 days during which the temporary Process Server was absent from duty before his services were dispensed with. In 1926 a total of 45½ days was lost through sickness by the European Staff. Among the non-European staff a total of 194 days was lost by absences due to sickness. This figure compares with 137 days in 1926 and 168 days in 1925.

3. Supreme Court Cases.

CIVIL CASES.

The total number of civil cases filed in the Supreme Court during 1927 was 645. This figure shows an increase of 58 over 1926 and indicates in my view a normal increase due to the development of settlement and trade.

DISTRICT REGISTRIES.

Of the total of 645 cases 374 were filed in Nairobi the balance being filed in the District Registries of Mombasa, Nakuru, Kisumu and Eldoret. At Mombasa 138 cases were filed, at Nakuru 63, at Kisumu 13, and at Eldoret 57.

The number of civil cases filed at Mombasa, *i.e.*, 138, compares with 231 in 1926. The figures for the District Registries of Nakuru, Kisumu and Eldoret compare with

37, 6 and 28, respectively, for 1926. That is, a total of 133 cases for 1927 compared with a total of 71 for 1926. These figures appear to show that an increasing advantage is being taken of the facilities afforded by District Registries in the Colony.

PROBATE AND ADMINISTRATION CASES.

The number of Probate and Administration cases filed in 1927 was 175. That figure compares with 211 in 1926, 162 in 1925 and 167 in 1924.

INSOLVENCY CAUSES.

In 1927 a total of 41 Insolvency Causes was filed, of these, 31 were filed in Nairobi, 9 in Mombasa and 1 in Kisumu. The total number compares with 48 in 1926, 42 in 1925 and 30 in 1924 and shows that there was no abnormal trade depression during 1927.

TRUST CAUSES.

There were five Trust Causes opened in 1927. This figure compares with one Trust Cause opened in 1926.

CIVIL APPEALS.

There were 40 civil appeals from Subordinate Courts filed in 1927. This figure compares with 49 in 1926, 43 in 1925 and 44 in 1924, and presents no abnormal features. At the beginning of the year there were 16 appeals pending or remitted for trial and 18 were pending or remitted for trial at the end of the year, 38 appeals being finally decided during the year.

ORIGINAL CRIMINAL CASES.

There was during 1927 a total of 156 criminal cases committed for trial to the Supreme Court compared with 140 in 1926, 120 in 1925 and 118 in 1924. In considering these figures it is necessary to remember that since July, 1926, rape has been triable by the Supreme Court only. In 1927 there were 43 persons tried by the Supreme Court for rape.

CRIMINAL APPEALS AND REVISION.

There were 46 Criminal Appeals from Subordinate Courts entered in 1927. This is comparable with 80 in 1926, 50 in 1925 and 72 in 1924, and shows a considerable reduction from the preceding year. At the beginning of the year there were 13 Criminal Appeals pending and three were pending at the

end of the year leaving a total of 56 appeals dealt with during the year. There were, however, 152 Criminal Revision cases. This figure compares with 65 in 1926, 119 in 1925 and 133 in 1924.

CONFIRMATION CASES.

The number of cases in which sentences imposed by Subordinate Courts required confirmation by the Supreme Court was during the year 884. That figure compares with 740 in 1926, 718 in 1925 and 726 in 1924. The deduction from the increase in such cases is that crime requiring a sentence of over six months has increased or that its detection has improved during 1927.

EUROPEANS.

There were 28 Europeans committed for trial in 1927 and two committed for trial in 1926 but tried in 1927; of this total of 30 there were 15 acquitted, 13 convicted and 2 not yet tried at the end of the year. The total number of Europeans committed for trial in 1926 was 21.

SCHEDULE OF SUPREME COURT CASES.

The details of the cases filed in the Supreme Court in 1927 compared with the four previous years are as follows:—

	1923	1924	1925	1926	1927
ORIGINAL CIVIL CASES.					
Filed at Nairobi ..	315	296	228	285	374
„ Mombasa ..	213	142	216	231	138
„ other District Registries ..	47	60	70	71	133
P. and A. Causes ..	166	167	162	211	175
Insolvency Causes ..	54	30	42	48	41
Trust Causes ..	4	8	3	1	5
Civil Appeals from Subordinate Courts ..	45	44	43	49	40
ORIGINAL CRIMINAL CASES ..					
	138	118	120	140	156
Criminal Appeals from Subordinate Courts ..	51	72	50	80	46
Criminal Confirmation Cases ..	614	726	718	740	884
Criminal Revision Cases ..	128	133	119	65	152
TOTAL CASES ..	1,775	1,796	1,771	1,921	2,144

The above figures show an increase of over 21 per cent. in the number of cases filed in 1927 compared with the number filed in 1925.

4. Other work of the Supreme Court.

RETURNS.

Monthly returns of all civil and criminal cases were received and scrutinised from 100 Subordinate Courts, including Native Subordinate Courts, and from 13 Native Tribunals.

RULES.

During the year the following Rules of Court were published :—

- (1) Rules of Court (Maintenance Enforcement Amendment) No. 1 of 1927.
- (2) Bankruptcy, Fees of Court and Allowances.
- (3) Rules of Court (Legal Practitioners Amendment) No. 3 of 1927.

CIRCULARS.

A circular was issued to Magistrates on the subject of Detention Camps.

5. Travelling.

The time spent on circuit aggregated 190 days during which a total of 9,296 miles was traversed 5,264 by road, 3,732 by rail and 300 by sea.

The following places were visited :—

Mombasa	Four times.	Eldoret	Four times.
Malindi	Twice.	Kakamega	Twice.
Nairobi	Once.	Kisumu	Four times.
Fort Hall	Four times.	Kisii	Once.
Nyeri	" "	Nakuru	Four times.
Meru	Three times.	Eldama Ravine	Twice.
Embu	Twice.	Naivasha	Four times.
Kwale	Once.	Kitale	Three times.
Voi	" "	Kacheliba	Once.
Kilifi	" "	Zanzibar	" "
Kampala	" "		

6. Resident Magistrates' Courts.

During the year Resident Magistrates were posted at Nairobi and Mombasa. The work done by Resident Magistrates' Courts together with that for the preceding four years is shown in the following table :—

	1923	1924	1925	1926	1927
NAIROBI :					
Civil	2,951	3,082	2,480	3,086	3,816
Criminal	3,658	3,666	3,438	5,843	5,451
MOMBASA :					
Civil	1,237	1,042	1,004	1,182	1,487
Criminal	848	1,127	1,001	1,411	2,576
TOTAL ..	8,694	8,917	7,923	11,522	13,330

The above total shows that compared with 1925 there has been an increase of cases of over 68 per cent.

The Resident Magistrates' Courts at Nairobi and Mombasa are the only Subordinate Courts which for all purposes have been directly under the control of the Supreme Court during 1927.

7. Confirmation Cases.

During 1927 there were 884 Criminal Cases which required confirmation by the Supreme Court of the sentences imposed. These cases involved 1,101 persons and 1,164 convictions and sentences. Of the sentences 1,017 were confirmed without alteration and 75 were reduced. In 19 convictions a retrial was ordered and in 51 convictions the accused were acquitted. In 5 cases where a retrial was ordered the findings and sentences were reversed and the accused persons committed for trial to the Supreme Court and in two cases the sentence was enhanced by the Supreme Court.

The proportion of convictions confirmed without alteration is 87.371 per cent. This compares with 95.13 per cent. in 1926; 94.80 per cent. in 1925 and 88.37 per cent. for 1924. The percentage shows a considerable falling off in the efficiency of Subordinate Criminal Courts. The particulars are contained in Schedule VIII.

8. Native Subordinate Courts.

The Native Subordinate Courts in the Coast Districts have performed their duties with apparent satisfaction under the supervision of the Liwali for the Coast.

9. Native Tribunals.

Native Tribunals have during 1927 imposed sentences of imprisonment in 327 cases. This figure compares with 225 in 1926.

The following table shows the figures for the past 5 years for the existing Provinces :—

PROVINCE.	1923	1924	1925	1926	1927
Nyanza	155	151	176	113	167
Kikuyu	38	20	8	43	56
Ukamba	51	47	63	66	97
Coast	1	10	5	3	5
Kerio .. .. .	..	33	..	..	2
TOTAL..	245	261	252	225	327

10. General Civil Work.

Schedule VII contains the statistics relating to the civil work of the Courts of the territory. The total number of civil cases—10,898—shows an increase of 2,049 over the preceding year.

11. General Criminal Work.

A total of 30,367 persons were brought before the Criminal Courts during 1927; of these, 25,375 were convicted by the Subordinate Criminal Courts and of 264 tried by the Supreme Court 167 were convicted. The Criminal statistics in Schedule I (3) show an increase of 6,547 persons convicted over 1926, *i.e.*, 34.46 per cent. This very considerable total increase is not, however, caused by a large increase in serious crime. Convictions for petty offences under Revenue, Municipal, road and other laws relating to the social economy of the territory account for an increase of 5,578 over the figures for such offences for 1926 and convictions under laws relating to the employment of natives (*i.e.*, the Employment of Natives and the Resident Native Labourers Ordinances) account for an increase of 502 over the figures for such offences in 1926. Convictions under the Native Registration Ordinance show an increase of 1,034 over the figures for 1926. Convictions for

serious crime show a diminution in the cases of offences against the person of 34 and in the cases of theft of stock and produce of 11. There is an increase of 23 convictions for malicious injury to property and increase of 302 convictions for other offences against property. This figure includes theft, other than of stock or produce and housebreaking.

12. Employment of Natives Ordinance.

During the year under review 2,036 persons were charged under the Employment of Natives Ordinance; of these 1,620 were convicted. These figures compare with 2,023 and 1,417, respectively, for 1926.

The following table shows the number of persons convicted under the law relating to Master and Servant (native) for the last five years :—

1923	1924	1925	1926	1927
1,839	1,387	1,533	1,417	1,620

13. Resident Native Labourers Ordinance.

In 1927 the number of persons charged under the Resident Native Labourers Ordinance was 1,261 and the number convicted 1,050.

The annual figures of convictions since the Ordinance was enacted in 1925 are as follows :—

1925.	1926.	1927.
79.	751.	1050.

14. Theft of Stock and Produce.

The number of persons tried in 1927 for theft of stock or produce was 948 of whom 712 were convicted. This compares with 723 convictions in 1926 and 732 in 1925.

15. Native Registration Ordinance.

4,648 persons were charged with offences against the Native Registration Ordinance; of these, 4,280 were convicted. The corresponding figures for 1926 were 3,988 and 3,246, respectively, and for 1925 the figures were 2,894 and 2,530, respectively. The number of offences under this Ordinance seems to show a progressive annual increase.

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16. Native Hut and Poll Tax Ordinance.

In the year 1927 there were 2,480 persons charged with non-payment of Native Hut and Poll Tax; of these 2,098 were convicted. These figures compare, respectively, with 1,391 and 1,275 for 1926, and with 1,070 and 917 for 1925. The figures for 1924 are 2,932 and 2,408, respectively.

17. Township Rules.

The total number of persons charged in 1927 with offences under Municipal By-laws or Township Rules is 6,027, of whom 5,397 were convicted. The corresponding figures for 1926 are 3,379 and 2,703 and for 1925 the figures are 1,896 and 1,592, respectively. The large increase appears to show much increased activity in enforcing these Rules during the year 1927.

18. Trials in the Supreme Court.

Of the 264 persons tried by the Supreme Court 167 were convicted, 80 were acquitted, in 12 cases a *nolle prosequi* was entered and in 5 cases the accused was found to be insane before trial. During the year 43 cases of rape were tried and 49 cases of murder.

19. Capital Sentences.

In 1927 the capital sentence was imposed on 13 persons by the Supreme Court; of these 4 were hanged during the year. In three cases the sentence was commuted to imprisonment by His Excellency the Governor. In three cases the confirmation of the sentence by His Excellency the Governor had not been received before the end of the year. In two cases an appeal was pending at the end of the year and in one case the conviction was reversed by the Court of Appeal. There were three convicts hanged in 1927 who had been convicted in 1926 making the total number of executions in 1927 seven. The total number of capital sentences imposed by the Supreme Court in 1926 was 10.

road and other laws
 e territory account for all of Offenders.
 such offences for 1926 as

Of the employment of natives persons tried in 1927 by all Courts 1,386 were Native Labourers Asiatics and 27,061 were natives; of these, however the figures, 1,393 Asiatics and 23,112 natives were convicted. Native figures compare with 24,300 persons tried in 1926 of whom 1,594 were Europeans, 1,976

were Asiatics and 20,730 were natives; of these, 1,026 Europeans, 1,311 Asiatics and 16,658 natives were convicted. The details are contained in Schedule III.

21. Sex of Offenders.

During 1927 a total of 886 females was brought before the Criminal Courts for trial of whom 95 were Europeans, 15 were Asiatics and 776 were natives. Of these, 780 were convicted. This figure includes 66 Europeans, 7 Asiatics and 707 natives. The above figures compare with a total of 821 females prosecuted in 1926 of whom 99 were Europeans, 11 were Asiatics and 711 were natives; of these, 61 Europeans, 3 Asiatics and 593 natives were convicted.

22. Punishments.

Schedule I, table I gives the figures relating to sentences imposed in 1927 by Magistrates and table II gives the figures relating to sentences imposed by the Supreme Court. Of the 25,375 persons convicted by Magistrates 13,930 were fined, 4,317 were imprisoned, 1,750 were bound over or otherwise disposed of, 1,349 were both imprisoned and fined, 646 were sent to detention camps, 24 were fined and sentenced to detention in a detention camp.

23. Whipping.

435 persons were sentenced to whipping by Magistrates the majority of these convicts were juveniles, and 13 by the Supreme Court. In 1926 there were 360 sentences of whipping given by Magistrates and 9 by the Supreme Court. The statistics for the last 5 years relating to whipping are as follows :—

	Natives Convicted.	Whipping.	Per Cent.
1923	14,206	346	2.44
1924	15,121	391	2.58
1925	13,165	385	2.92
1926	16,658	369	2.21
1927	23,112	448	1.93

24. Court of Appeal for Eastern Africa.

His Majesty's Court of Appeal for Eastern Africa held 4 ordinary sessions during 1927. The total number of appeals filed in the year was 63; of these, 29 were Civil Appeals and 34 Criminal Appeals. 8 appeals were pending at the end of 1926.

The Appeal Court heard during 1927 a total of 54 appeals; of the appeals heard 32 were from the Supreme Court of Kenya comprising 18 civil appeals and 14 criminal appeals. At the end of 1927 there were 17 appeals pending; 11 Criminal and 6 Civil. Further details of the work of the Appeal Court are set out in Schedule IX.

25. Advocates.

The number of advocates who have taken out their certificates during 1927 is 63. This figure compares with 60 in 1926 and 55 for 1925 and 1924.

The figures are as follows:—

Government Law Officers	...	...	8*
Barristers	...	...	24
Solicitors	...	...	28
Pleaders	...	...	1
Licensed Advocates	...	...	1
Advocate	...	...	1

* Including one legal adviser to the Kenya and Uganda Railway.

Five native Vakils were licensed to practise in native Subordinate Courts.

There were 10 Commissioners for Oaths and 22 Notaries Public practising in 1927.

26. The Law Examination for Administrative Officers.

Two Law Examinations were held in 1927; of 9 candidates 4 passed, 4 failed and 1 was ordered to submit himself for re-examination in one subject.

27. Revenue.

The total revenue collected by the Supreme Court and Resident Magistrates' Courts at Mombasa and Nairobi during 1927 was Shs. 363,880/11. The figure is comparable with Shs. 327,120/43 for 1926 and Shs. 289,076/98 for 1925.

28. Conduct of the Staff.

The conduct of the staff has been throughout the year generally satisfactory.

Nairobi,
13th August, 1928.

J. W. BARTH,
Chief Justice.

SCHEDULE I.—(Contd.)

2.—PERSONS FOR TRIAL IN THE SUPREME COURT.

Crime or Offence.	Total.	Sex.		Not tried (<i>Nolle Prosequi</i>).	Found insane before trial.	Ac- quitted.	Convicted.							
		M.	F.				Total number of persons convicted.	Death.	Imprison- ment.	Whipping with or without imprison- ment or fine or both	Imprisonment in lieu fine.	Bound over or other- wise disposed of.	Fine and peremp- tory imprisonment	Impris- onment for life.
Murder of wife or concubine ...	1	1	..	..	..	..	1	1	..	..	..	..	..	..
Murder other than wife or con- cubine or child	48	46	2	3	1	20*	24	12	..	..	..	1†	..	11
Manlaughter (sec 304A I.P.C.)	3	3	..	..	..	1	2	..	1	..	1	..	..	..
Culpable Homicide not amount- ing to murder (sec. 304 I.P.C.)	20	19	1	4	..	5	11	..	11	..	..	..	..	..
Attempted murder	20	20	..	..	..	14	6	..	5	..	..	..	1	..
Rape	43	43	..	3	..	21	19	..	7	11	..	..	1	..
Other offences against the person (other than stock and produce offences) ..	58	57	1	..	..	8	50	..	42	2	5	..	1	..
Offences against property ..	28	28	..	2	..	9	17	..	13	..	1	1	2	..
Other offences	43	43	..	..	4	2	37	..	20	..	16	1‡	..	..
TOTAL ..	264	260	4	12	5	80	167	13	99	13	23	3	5	11

* One accused person was ordered to be detained in Jail pending the order of the Governor owing to the accused's mental condition at the time the offence was committed.

† Recommended that the accused person be detained during His Majesty's Pleasure as not being of sound mind.

‡ Recommended for deportation.

SCHEDULE I.—(Contd.)

3.—COMPARATIVE TABLE.

COMPARATIVE TABLE showing the number of persons convicted for various crimes and offences for the last four years.

	1927.	1926.	1925.	1924.
The number of persons convicted (including Supreme Court):— ..	25,542	18,995	14,850	16,560
Offences against the person	938	972	963	977
Stock and produce offences	712	723	732	775
Malicious injury to property	220	197	144	156
Offences against property (other than malicious injury to property and theft of stock and produce)	2,385	2,083	1,915	1,973
Other offences	534	347	367	232
Offences against the Employment of Natives Ordinance ..	1,620	1,417	1,533	1,387
Offences against Revenue Laws, Municipal, Road and other Laws relating to the social economy of the Colony	18,083	12,505	9,117	11,060
Offences under Resident Native Labourers Ordinance	1,050	751	79	..
<hr/>				
The number of persons convicted in the Supreme Court	167	104	90	134
Murder of wife or concubine	1	..	2	..
Murder other than wife, concubine or child	24	20	25	28
Culpable homicide not amounting to murder (Section 304 I.P.C.)	11	23	6	41
Manslaughter (Sect on 304 A. I.P.C.)	2	1	..	2
Attempted murder	6	5	6	12
Rape	19	9	2	2
Other offences against the person	50	30	20	26
Dacoity with murder .. .. .	..	..	..	9
Offences against property with violence to the person ..	..	1	..	..
Other offences against property	17	13	21	7
Other offences	37	2	8	7

SCHEDULE II.

CRIMINAL APPEALS TO THE SUPREME COURT FROM THE SUBORDINATE COURTS.

Dismissed or withdrawn.	Retrial ordered or otherwise varied.	Allowed.	Pending.	Total.
32	11	13	3	59

CIVIL APPEALS TO THE SUPREME COURT FROM THE SUBORDINATE COURTS.

Dismissed or withdrawn.	Allowed in whole or part.	Pending or remitted for trial.	Total.
24	14	18	56

CRIMINAL REVISION CASES BY THE SUPREME COURT.

Sentence maintained.	Retrial ordered or otherwise varied.	Reversed.	Total.
6	59	87	152

CRIMINAL APPEALS FROM THE SUPREME COURT TO THE COURT OF APPEAL FOR EASTERN AFRICA.

Dismissed or withdrawn.	Retrial ordered or otherwise varied.	Allowed.	Pending.	Total.
12	..	1	1	14

CIVIL APPEALS FROM THE SUPREME COURT TO THE COURT OF APPEAL FOR EASTERN AFRICA.

Dismissed or withdrawn.	Retrial ordered or otherwise varied.	Allowed.	Pending.	Total.
8	..	4	6	18

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SCHEDULE V.

JUDICIAL REVENUE LEVIED IN THE COURTS OF THE COLONY AND PROTECTORATE OF KENYA DURING THE YEAR 1927.

	<i>S/.</i>	<i>cts.</i>
Court Fees	244,779	09*
Fees of Court of Appeal for Eastern Africa..	12,065	50
Fines, Unclaimed and Confiscated Goods ..	96,629	52*
Legal Practitioners' Rules Fees	5,030	00
Legal Library Subscription	1,330	00
Locker Fees	180	00
Miscellaneous Receipts, Sale of Law Reports, etc.	286	00
Cost of Crown prosecutions	200	00
Notaries Public Fees	3,320	00
Commissioners for Oaths	60	00
Total	363,880	11

* These figures represent the revenue collected by Judicial Department only. Further figures are to be supplied by the Treasury.

SCHEDULE VI.

COMPARATIVE ANALYSIS OF FEES AND FINES LEVIED IN THE COURTS OF THE COLONY AND PROTECTORATE OF KENYA FOR THE LAST FIVE YEARS.

	1923.		1924.		1925.		1926.		1927.		
	<i>Sh.</i>	<i>cts.</i>	<i>Sh.</i>	<i>cts.</i>	<i>Sh.</i>	<i>cts.</i>	<i>Shs</i>	<i>cts.</i>	<i>Sh.</i>	<i>cts.</i>	
Court Fees	382,203	61	200,300	41*	329,101	63	360,190	03	244,779	09*	
Court of Appeal for Eastern Africa Fees	10,404	50	19,704	15	14,409	90	9,211	80	12,065	50	
Fines	292,733	52	354,816	68	512,211	79	665,817	43	96,293	59*	
Interest	4,173	29	4,873	00	892	50	..	..	..	..
Legal Practitioners' Fees	5,034	00	3,340	00	4,200	00	5,020	00	5,030	00	
Miscellaneous Receipts, Sale of Law Reports, etc.	322	50	323	20	1,256	00	233	30	296	00	
Cost of Crown prosecutions .. .. .	..	..	..	..	..	..	..	..	200	00
Unclaimed and Confiscated Goods	1,323	81	401	34	987	47	603	39	330	93	
Unclaimed Deposits .. .. .	..	..	7,238	62	7,121	04	..	..	..	..
Legal Library Subscription	1,510	00	1,300	00	1,020	00	1,152	00	1,330	00	
Locker Fees .. .. .	..	..	..	..	170	00	175	00	180	00
Commissioner for Oaths .. .. .	..	..	..	..	30	00	..	..	60	00
Notaries Public Fees	660	00	860	00	1,120	00	1,440	00	3,320	00	
Bills of Sale	2,780	00	1,715	00	..	..	..	..	..	..
Estate Duty Fees	1,158	27	5,725	00	300	00	240	00	..	..
Total	<i>Sh.</i>	702,303	50	600,597	40	872,820	33	1,044,083	00	363,880	11

* These figures represent the revenue collected by Judicial Department only. Further figures are to be supplied by the Treasury.

SCHEDULE VII.

**RETURN OF CIVIL CASES TRIED IN THE COLONY AND PROTECTORATE OF KENYA DURING THE YEAR 1927,
AS COMPARED WITH THE LAST FIVE YEARS.**

PROVINCES AND DISTRICTS.	Under Sh. 200/-.	Over Sh. 200 to Sh. 2,000/-.	Over Sh. 2,000/-.	Other Cases.	TOTAL.
N.F.P. and Turkana	19	2	..	..	21
Masai Province	30	41	..	..	71
Coast Province	2,070	631	74	114	2,889
Kikuyu Province	546	244	..	..	790
Kerio Province	45	15	..	..	60
Ukamba Province	2,175	1,534	166	95	3,970
Nyanza Province	607	345	8	2	962
Naivasha District	141	113	..	..	254
Nakuru District	322	238	11	34	605
Trans-Nzoia District	209	173	..	..	382
Laikipia District	58	32	..	..	90
Uasin Gishu District	409	327	23	23	782
Kacheliba District	8	4	..	..	12
Moyale District	8	2	..	..	10
TOTAL 1927	6,647	3,701	282	268	10,898
1926	5,383	2,792	414	260	8,849
1925	5,764	2,408	300	216	8,688
1924	7,372	1,953	288	207	9,820
1923	5,876	2,332	491	283	8,982
1922	6,799	3,401	520	205	10,925

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SCHEDULE IX.**HIS MAJESTY'S COURT OF APPEAL FOR EASTERN AFRICA.**

1. At Kampala on 1st March, 1927—Appeals heard .. 9	} 54
2. At Mombasa on 13th June, 1927—Appeals heard .. 19	
3. At Zanzibar on 12th September, 1927—Appeals heard .. 13	
4. At Nairobi on 5th December, 1927—Appeals heard .. 13	
<i>Appeals pending at end of 1927.</i> .. 17	
Total .. 71	

APPEALS FROM THE COLONY AND PROTECTORATE OF KENYA.

Civil	18
Criminal	14
Total ..	32

APPEALS FROM UGANDA PROTECTORATE.

Civil	6
Criminal	17
Total ..	23

APPEALS FROM ZANZIBAR PROTECTORATE.

Civil	6
Criminal	0
Total ..	6

APPEALS FROM TANGANYIKA TERRITORY.

Civil	5
Criminal	5
Total ..	10

APPEALS FROM NYASALAND PROTECTORATE.

Civil	—
Criminal	—
Total ..	—

THE ABOVE 71 APPEALS WERE DISPOSED AS UNDER:—

Dismiss d or withdrawn.	Reduced or otherwise varied.	Reversed.	Pending or retrial ordered.	Total.
CIVIL.				
20	..	7	8	35
CRIMINAL				
18	2	5	11	36
38	2	12	19	71

PUBLIC WORKS DEPARTMENT

ANNUAL REPORT, 1927.

1. The work of the year was chiefly characterised by the progress made with the construction of some of the principal buildings and waterworks provided for out of Loan; by the investigation and preparation of designs for many works to be constructed out of Loan and otherwise; by the inauguration in the latter half of the year of a sub-branch of the Hydraulic Branch of the Department for boring for water and the start of that activity; by the commencement towards the close of the year of the artificial seasoning of timber; and by the use of machinery to a much greater degree than heretofore for the construction and maintenance of earth roads. The year was one of low rainfall throughout the Colony and Protectorate, and less inconvenience to road traffic was caused by washaways and mud than in most years. With the notable exceptions of the Kedong Valley Road and the Nairobi—Thika Road, and some other roads during rain, the road system generally was passable with greater facility throughout the year than in 1926, partly on account of improvement and better maintenance and partly on account of the rainfall being below normal.

I.—STAFF.

2. (1) Staff changes during the year are set forth in Appendix I.

(2) The total number of European man-days chargeable to Personal Emoluments of the Public Works Department Schedule of the Estimates for 1927 was 32,158, and of this quantity 2,181, or 6.78 per cent., were ineffective on account of leave and sickness. The corresponding figures for the non-European staff were 32,546, 2,488 and 7.64 per cent.

(3) The diagram in Appendix II shows the organisation of the Department and the distribution of effectives towards the close of the year. The appointment of specialists in three branches of engineering, namely: road engineering, hydraulics and buildings, rendered possible a greater measure of devolution of the Director's responsibilities to Heads of Branches than was previously possible.

II.—ACCOUNTS BRANCH.

3. *Expenditure.*

(1) The total expenditure cleared by the Accounts Branch (not including the Advances and Deposits Account) amounted to £656,007, made up as follows :—

	£
Public Works Schedules ...	339,549
Loan	296,602
Extra - Departmental Ex- penditure	19,856
Total	<u>£656,007</u>

as compared with £494,416 in 1926.

(2) The total provision for Public Works Services in the sanctioned Estimates for 1927 amounted to £353,553, and the expenditure to £339,549, as shown below and compared with the figures for 1926 :—

Expendi- ture, 1926.	1927.			Remarks.
	Classification.	Original Estimate.	Actual Expendi- ture.	
£ 44,050	General Staff ..	£ 50,090	£ 50,671	Provision in Supplementary Estimates for Excess.
13,002	Other Charges ..	14,233	12,677	
6,665	Mombasa Water Supply	7,104	7,241	
668	Nakuru Water Sup- ply	905	782	
4,053	Government Trans- port	4,005	3,896	
..	Water Boring Branch	8,350	2,368	
..	Timber Seasoning Branch	2,500	601	
68,438		87,187	78,236	Ditto.
196,638	Public Works Re- current	169,190	179,013	
82,039	Public Works Extra- ordinary	97,176	82,300	
£347,115	£	353,553	339,549	

The above statement does not include Government Coast Agency (£3,926) which, although provided for under the Public Works Department Schedule, was, on 1st March, 1927, separated from the Public Works Department.

(3) The Public Works Extraordinary Schedule was, as usual, modified during the year. In Supplementary Estimates, sums amounting to £20,311 were provided for further works, and the sum of £1,262 was earmarked as savings on works sanctioned in the original Estimates, the construction of which was postponed or abandoned.

(4) Details of the expenditure incurred on the three Public Works Schedules are set forth in Appendix III.

(5) Details of the expenditure incurred out of Loan are shown in Appendix IV.

(6) The extra-departmental expenditure consisted chiefly of workshop jobbing for other Departments and work charged to Native Council Funds.

4. Revenue.

The revenue collected by the Department (except for small items credited to Miscellaneous Receipts) was derived from three waterworks, as shown below and compared with the figures for 1926 :—

	1927		1926
	£		£
Mombasa Water Works ...	27,676	...	23,939
Nakuru Water Works ...	2,253	...	2,237
Kisumu Water Works ...	1,267	...	—
<i>Totals ...</i>	£31,196		£26,176

Kisumu Water Works were taken over late in the year.

5. Accounting.

The numbers of vouchers cleared by the Chief Accountant in 1927, compared with those dealt with in 1926, were as follows :—

	1927		1926
	£		£
Cash vouchers and Railway warrants ...	21,779	...	20,008
Stores Issue Notes ...	16,897	...	11,421
Rents and House Allowances	13,533	...	12,025
<i>Totals ...</i>	£52,209		£43,454

The total turnover in cash and stores during the year amounted to £2,343,149.

III.—STORES BRANCH.

6. (1) Stores activities have increased greatly in recent years. The turnover in 1923 was £42,000; in 1926 it had increased to £262,000, and in 1927 it was £409,000.

(2) Unallocated Stores Account.

DEPOT.	Balance brought forward on 1-1-27.	Receipts during 1927.	Issues during 1927.	Balance on 31-12-27.
	£	£	£	£
Chief Store	17,592	120,541	103,153	34,980
Mombasa	23,688	44,470	49,805	23,353
Nyeri	1,544	5,283	5,380	1,447
Kisumu	3,628	12,066	11,877	3,817
Nakuru	3,595	15,314	14,033	4,876
Eldoret	3,409	13,513	14,345	2,577
£	58,456	211,187	198,593	71,050

The receipts included £39,974 imports from overseas through Crown Agents and Agents in India. The issues were made up as follows:—

	£
Issues to Public Works in progress ...	140,239
Issues to other Departments	3,193
Stores sold	6,031
Stores written off to Loss and Depreciation Account	95
Transfers between Divisions	49,035
	<u>£198,593</u>

IV.—HYDRAULIC BRANCH.

7. This Branch was under the Hydraulic Engineer, Mr. S. H. Noaks. A sub-branch to bore for water was inaugurated late in the year under a Superintendent. The duties of the hydraulic branch are comprehensive, important and highly technical in character. They include the following activities:—(a) Head Office administration of water law, acting chiefly through the Executive Engineers except in the most important cases; (b) Investigation for and preparation of schemes for new water supply, drainage and irrigation projects;

(c) Head Office administration and control of existing water-works; (d) Water supply and drainage designs for new buildings of importance; (e) Administration and technical control of the Boring Sub-branch.

8. *Water Law (section 145 of Cap. 140 of the Laws of Kenya and Water Permit Rules, 1919).*

Forty-seven ordinary and twenty yearly permits were issued during the year. These permits covered 91 separate users of water as follows :—

ORDINARY PERMITS.

Farm uses...	30 for a total diversion of	.66 cusecs
Irrigation ...	2 for a total diversion of	.026 ,,
Power ...	26 for a total diversion of	182.5 ,,
	and providing 592	horse power.
Industry ...	8 for a total diversion of	.77 ,,

YEARLY PERMITS.

Farm uses...	9 for a total diversion of	.29 ,,
Irrigation ...	3 for a total diversion of	.85 ,,
Power ...	10 for a total diversion of	126.5 ,,
	and providing 172	horse power.
Industry ...	3 for a total diversion of	.07 ,,

9. *Investigation of New Schemes.*

(1) *Mombasa Water Works.*—The demand for water was increasing so rapidly, and was likely to be intensified in the future, that it was clear that the scheme to replace the existing main between the intake works at Mreri and the service reservoir at Changamwe by a main and appurtenant works for the supply of 1,100,000 gallons per day would not suffice for a sufficient number of years to justify its execution. During the year extensive reconnaissances were made of all possible sources of supply in the vicinity of Mombasa, and two projects to provide 2,000,000 gallons per day were surveyed more intensively. One of these involved the construction of a storage reservoir north of Mazeras and Mariakani. The data provided by gauging during a portion of the year were insufficient to prove that storage over one year would be likely to be adequate, and the rainfall and run-off statistics appeared to indicate that storage over two or possibly three years would be essential to provide against the contingency of two consecutive exceptionally dry years. This scheme,

although it offers attractions as a future source of supply for Mombasa, was abandoned as it did not compare economically with the second alternative, in view of the probable necessity—which could only be determined with certainty by gaugings over a number of years—of storage over a considerable period. The second project, which provides for the utilisation of all suitable perennial sources of supply in the Shimba Hills, which are economically available by gravitation, was still the subject of detailed investigation at the close of the year.

(2) *Eldoret Water Works*.—Investigation was completed early in the year and material put on order. The scheme provides for the conveyance by gravity of 190,000 gallons per day from the Elligirini River, at a point in Forest Reserve, through a five-inch pipe to a reinforced concrete service reservoir of 100,000 gallons capacity situated on the bluff above the railway station. From the reservoir water will be distributed through six-inch, five-inch, four-inch and three-inch pipes through the Government township and the private townships of Kapsoya, Elgonview and Ortleppville. The scheme also provides for the delivery of water by gravity to an elevated tank for distribution to the higher levels of the Government township above the bluff, but this portion of the scheme will not be proceeded with until such time as the demand warrants it.

(3) *Kitale Water Works*.—Two schemes have been investigated. One is to pump water up to 60,000 gallons per day from a point on the Koitobbus River about $1\frac{1}{2}$ miles from the township boundary to an elevated service reservoir of 60,000 gallons capacity in the Water Works Reserve of the township, through four-inch and five-inch pipes. This scheme is estimated to cost £13,000. An alternative scheme provides for the supply by gravity from a point on the Koitobbus River on Mount Elgon of 70,000 gallons per day through a four-inch pipe 18 miles long to the elevated service reservoir. This scheme is estimated to cost £23,000. A proposal has been made to increase the capacity of the scheme so as to provide for supplies to proposed small holdings adjacent to the township.

(4) *Nyeri and Fort Hall Water Supplies*.—Surveys were carried out for the supply of these townships and projects worked out.

(5) *Thika Water Supply*.—A reconnaissance for the supply of this township was made, and funds have been provided in the Estimates for 1928 for construction.

(6) *Machakos Water Supply*.—A project for the supply of this township from small streams in the Iveti Hills has been under consideration for some years but was held up chiefly on account of rights to the water. The scheme was fully investigated during the year, and funds were provided in the Estimates for 1928 for construction.

(7) *Gilgil Water Supply*.—A survey for the supply of this township from the Gilgil River was made and the scheme prepared. Funds have been provided for its construction in the Estimates for 1928.

(8) *Kisumu Drainage and Sewerage*.—Surveys were carried out and a report submitted for a sewerage and drainage scheme for Kisumu.

(9) *Nakuru Drainage*.—A scheme for the surface drainage of Nakuru was worked out, and funds have been provided in the Estimates for 1928 for the commencement of the scheme in the portion of the township requiring immediate attention on lines which will fit in with the project for the whole township.

(10) *Pesi Swamp Drainage*.—Proposals for draining this large papyrus swamp in Laikipia had been under consideration for years owing to the loss of the entire flow of the Pesi River in it during drought. Further investigation was made towards the end of the year, and funds were provided for its drainage. Owing to the unpopularity of the work with the natives, it was not possible to obtain labour for it before the close of the year. Proposals have also been made at intervals for draining the much larger papyrus swamp known as the Lugungu on the Narok River north of Rumuruti, which is about sixteen miles long, but investigation was held in abeyance until the success of the work to drain the Pesi Swamp and its cost was established.

(11) *Minor Investigations*.—Various investigations of a minor character for the supply of water to Kakamega Station, Ngong Station and the Ngong Veterinary Station, Ndeiya Grazing Grounds in the Kikuyu Reserve, Kilifi Station, etc., were carried out during the year. A reconnaissance of the possibilities of irrigation in the Njemps region of the Kamasia Reserve was also made and reported on. It was shown that much might be done at small expense.

10. *Construction of new Water Works and extensions of existing ones.*

The capital expenditure on water works during the year was £40,445 out of Loan and £10,926 out of Revenue.

(1) *Kisumu Water Works*.—Estimate £27,500, Expenditure to the end of 1927 £24,004.—The works were sufficiently completed to enable unfiltered water to be supplied on May 25th. Meters had not been installed, and the consumption was found to be much in excess of the estimated demand. This was mostly due to excessive wastage, which has been curtailed. The sedimentation tanks and filtration plant as designed would not deal with the large consumption. Additional sedimentation tanks and filtration plant are being installed.

(2) *Eldoret Water Works*.—Estimate £30,000, Expenditure to end of 1927 £21,534.—The installation of the main and distribution pipes was let by contract in July, when the first consignment of pipes arrived from England, but it was not until November that the contractor could make a proper start, owing to subsequent consignments of material being delayed. Some progress was made before the close of the year.

(3) *Nakuru Water Works*.—Estimate £10,050 (plus £950 Establishment), Expenditure to end of 1927 £8,773.—The pipes for this work were delayed for over a year and only started arriving in June, 1927. The installation of the new main was finished by the end of the year. Further work in connection with filtration and the provision of a service road will be necessary.

(4) *Mombasa Water Works*.—Extensions of the distribution system on Mombasa Island were made to comply with increasing demands for water. The principal work consisted of laying total lengths of 370 feet of five-inch main and 4,230 feet of four-inch main, the installation of 26 fire hydrants, 3 new kiosks and 118 new connections. A boosting plant consisting of an 18/20 h.p. Petters engine driving a Ruston pump was installed at the head-works to increase the head and so give a greater supply. It was subsequently replaced by a 24/28 h.p. twin cylinder engine. A 35 h.p. Ruston engine driving a Mather and Platt pump was also installed and is working satisfactorily.

11. *Administration, Operation and Maintenance of Water Works.*

(1) *Mombasa Water Works*.—The Trading Account for 1927 and Summary of Balance Sheets to 31st December, 1927, are set forth in Appendix V. £10,000 out of gross profits was credited to the Renewals Fund and invested by the Crown Agents. The expenditure on operation and maintenance

directly chargeable to the appropriation was £7,241, as compared with £6,666 in 1926. The revenue was £27,676, as compared with £23,940 in 1926. The gross profit was £11,069, as compared with £7,666 in 1926. The total amount of water sold during the year was 207,139,000 gallons, showing an increase of 11,479,000 over the sales of the previous year. The supply to shipping was 17,580,500 gallons, compared with 15,239,730 gallons in 1926. The average daily consumption was 567,792 gallons, as compared with 534,475 gallons in 1926. The maximum consumption in one day was 870,000 gallons and the minimum 406,000 gallons. The average inflow per day was 568,000 gallons. The number of leaks in the gravitation main which were repaired was 125, as compared with 83 in 1926, the increase being largely due to the enhanced pressure caused by the boosting plant when it was brought into operation. There were, however, distinct indications of more rapid corrosion and the main should be replaced in the near future. General repairs and replacements were carried out to various parts of the water works. 1,065 meters were repaired during the year.

(2) *Nakuru Water Works*.—The Trading Account for 1927 and Summary of Balance Sheets to 31st December, 1927, are set forth in Appendix VI. The expenditure on operation and maintenance directly chargeable to the appropriation for Nakuru Water Works was £782, as compared with £668 in 1926. The revenue was £2,338 as against £2,183 in 1926. The profit for the year's working was £458, but no Renewals Fund has yet been established. During the year 44 new service connections were made, and 6 new meters installed. 291 repairs were carried out. There was a considerable shortage of supply until the new main was brought into operation during December.

(3) *Kisumu Water Works*.—The works were under construction throughout the year, and had not been completed in respect of filtration and sedimentation by the end of the year, but water was supplied to consumers for the latter portion of the year. The Trading Account is set forth in Appendix VI. The revenue for the year was £1,206.

12.—*Water Boring Sub-Branch*.

(1) This Sub-Branch is under the control of the Boring Superintendent, Mr. F. Turner, who reported for duty on the 29th July. Four No. 23 Star Percussion Drills and accessories had just arrived, and their assembly was finished on September 19th. There was great difficulty in obtaining

experienced and reliable boring foremen. It was only with the generous help of the Director of Irrigation of the Union of South Africa that three were secured and reported for duty on August 27th. Three of the machines were brought into operation at the end of September and early October. The fourth machine was delayed until November 14th, when an assistant foreman was appointed and given charge of the machine.

(2) The work of this sub-branch up to the end of the year may be summarised as follows :—

Bore-holes completed :	5
Bore-holes in progress :	3
Footage drilled, aggregate :	1,791½ ft.
Water struck, aggregate estimated yield :	8,250 gals. per day.
Number of days actually drilling :	175½
Number of days other work :	87½
Cost of bore-holes, worked out at boring rates :	£905
Cost per foot, worked out at boring rates :	Sh. 10/10.
Revenue, actual cash received on account of boring during 1927 :	£100
Number of drills in commission :	4

The individual bore-holes dealt with are detailed in Appendix VII. Boring was started so late in the year that the results obtained by the end of the year are of little value in determining the availability of sub-surface supplies. Of the 5 bore-holes stated in Appendix VII as having been completed, it is to be noted that three were of no use for ascertaining the presence of sub-surface supplies because the farmer who hired the machine was unwilling to carry on boring to a sufficient depth. Moreover, the sites selected were not ones which indicated a high prospect of success. It is to be observed, however, that the likelihood of successful bores (that is, providing water in excess of 1 gallon per minute) at sites selected by persons competent to do so, both in the volcanic and metamorphic series, is fairly high and probably not lower than in the Union of South Africa. A schedule of charges for boring for farmers, based on those of the Union of South Africa and Southern Rhodesia, was published in the Official Gazette of October 4th, 1927 (Government Notice No. 501). The rates are approximately the same as those in the Union of South Africa and in South West Africa.

V.—BUILDINGS BRANCH.

13. The Superintending Engineer, Mr. J. C. Stronach, was in control of this Branch throughout the year, the Architectural and Quantity Surveying sub-branches being under his direction. The Branch exercised control through the Executive Engineers over a total expenditure of £166,915 on new works during the year, of which £27,746 was on account of Revenue Works and £139,169 on account of Loan Works. There was much work performed in connection with the preliminary investigation, survey, preparation of sketch designs, and estimates for projects which were not carried out, but for which more or less full information was required to enable the merits of the projects to be studied.

14. *Architectural Sub-Branch and Drawing Office.*

Mr. Dangerfield, Government Architect, was in control of this sub-branch during the year. In respect of the structural design of those loan buildings which were designed in respect of architecture by Sir Herbert Baker's staff, it was found more convenient that the Structural Engineer should be in independent charge and responsible direct to the Superintending Engineer, who exercised direct control over construction through the Executive Engineers and Assistant Architects. In respect of purely engineering design, either for water works, drainage schemes or bridges, it was found best that the Hydraulic and Road Engineers should deal direct with the draughtsmen and surveyors concerned. The total number of completed drawings registered during the year was 830, as follows:—

Architectural	...	...	...	...	274
Structural, etc.	...	...	...	...	137
Roads, Bridges, etc.	...	...	...	...	110
Water Supplies, etc.	...	...	...	...	55
					<hr/>
Total Drawings made during the year	...				576
Drawings from external sources, principally from Sir Herbert Baker's staff					254
					<hr/>
Total number of drawings registered	...				830
					<hr/>

In addition, a large number of sketch drawings, diagrams, maps, etc., were prepared by Executive and Assistant Engineers, Surveyors, etc.

15. *Quantity Surveying Sub-Branch.*

Mr. Allison, Chief Quantity Surveyor, was in charge of this branch. The number of contracts registered during the year was 206. Of these, 14 were for new buildings, 4 for the maintenance and repair of existing buildings, 10 for new bridges, 18 for new roads, 108 for the maintenance and improvement of existing roads, and 29 for transport and supply of materials. The principal priced bills of quantities which were prepared were those for Government House, Nairobi, and Nakuru School. Twelve other bills of quantities or departmental detailed estimates for structures of importance were completed, and a number of others were in course of preparation at the close of the year. The work of this sub-branch includes many duties connected with the preparation of specifications for buildings, joinery, furniture, etc., preliminary estimates, indenting for material, scrutinising working drawings, costing and administration of contracts. The importance of the work of this sub-branch cannot be too strongly emphasised, for it is only by checking the expenditure as a work progresses against the estimates for the sub-divisions of the structure that a check can be kept on the cost of the work and the cause of any expenditure greater than that estimated or determined. The expenditure on buildings constructed out of Loan in 1927, excluding establishment charges, was £139,169.

16. *Testing of materials.*

The testing of materials to determine their strength and suitability and to arrive at factors of safety for their use is an important activity in view of the variety of material being used in many important structures at widely separated localities. In respect of cement for reinforced concrete work, the necessity for testing each consignment is great. It was found that imported cement deteriorates greatly in transit, and in most cases does not come up to British Standard Specification on arrival here. This is partly due to packing in wooden casks, and sealed iron drums are to be used in future. No. 277 tensile tests were carried out on various mixtures of cement, lime, sand and burnt clays. The chief defect of lime, as prepared in the Colony, is underburning and the presence of other substances, there being usually from 50 to 60 per cent. of unburnt limestone and inert matter. It is also lacking in hydraulic properties. Mixtures of lime with certain burnt clays gave promising results in regard to hydraulic properties. It was found that the sands available in the country were generally of poorish quality, and in most

cases it was found necessary for reinforced concrete work to specify concrete richer in cement than is usual in general practice. Compression tests were carried out on concretes, bricks and stone and absorption tests on concretes and roofing tiles.

17. *New Buildings constructed out of Loan.*

The chief new buildings carried out, or in progress, during the year will now be briefly referred to. The principal structures of magnitude constructed out of Loan Funds, namely, Government House, Nairobi; Nairobi School, Nakuru School, Eldoret School, and the Indian School, Nairobi, were designed by Sir Herbert Baker or his staff in respect of layout, architectural features and finish, both in outline and full detail. The Department was responsible for all details of engineering design, such as foundations, reinforced concrete floors, steelwork in trusses, etc., arches, domes and, in general, the stability of the whole and component parts of the structures. All estimating and quantity surveying was done departmentally, and their construction, whether by contract or by departmental execution, was controlled by the Department through Assistant Architects and Clerks of Works.

(1) *Government House, Nairobi (Loan Work).*

Architect : Sir Herbert Baker.

Expenditure : £51,574, of which £46,491 was incurred in 1927.

This building was started at the end of 1926 and was nearly finished at the end of 1927. The work was carried out departmentally, and petty contracts were let for such items as plumbing, drainage, joinery, electric light installation, etc. The walls of the building were constructed of concrete blocks, 1-3-6 mixture, made in Winget machines. The first floors were constructed in reinforced concrete, using B.R.C. fabric in some cases and M.S. rods in others. The whole building, with the exception of the kitchen wing, where Bell's asbestos sheeting is used, is roofed with Mangalore tiles. A large amount of work was entailed in the connecting corridors between the old and new building, and to bring the old building architecturally into line with the new portion. A part of the conference wing was completed and occupied towards the end of August, and by the end of the year the whole of this wing, which includes the kitchens and dining room, was ready for occupation. The construction of the ballroom was postponed.

(2) *Nairobi School (Loan Work).*

Architect : Sir Herbert Baker.

Expenditure : £30,813, of which £28,847 was incurred in 1927.

A contract was let for this building to Mr. George Blowers towards the end of 1926, and the contract was completed by the end of 1927, the only work remaining being the front steps and balustrade, sanitary, plumbing, and road work in front of the building, which were to be carried out departmentally or under separate contracts. Accommodation is provided for 300 pupils in 10 classrooms. The assembly hall on the first floor is designed for 350 persons. A covered playground is provided on the ground floor. Lavatories are situated on the ground and first floors. Water-borne sewerage is provided for, the drains being connected to the municipal sewers. The building was constructed with concrete block walls, with poured concrete in filling, the external walls being finished in Atlas white cement plaster. The first floor and flat roofs are carried on R.S.J's with concrete slabs reinforced with B.R.C. fabric. The floor finishings of the classrooms and assembly hall were carried out in cedar blocks, and the corridors and covered playground were finished in cement with an admixture of ironite. Crittalls' standard school windows were used throughout the building, and the roof is finished with Mangalore tiles.

(3) *Nakuru School.*

Architect : Sir Herbert Baker.

Expenditure : £17,247, of which £17,197 was incurred in 1927.

This work is being carried out departmentally. Preliminary work was started in March, 1927, and by the end of the year a number of the classrooms in the centre block were almost ready for occupation and the junior and senior boys' blocks were finished to first floor level. Accommodation is provided in the centre block for 240 pupils in eight classrooms with cloak-rooms, lavatories, staff-rooms, and stores. The junior boys' block provides for 22 boarders, with accommodation for staff, day room, lavatories, etc. The senior boys' block provides for 44 boarders, with dining-room, day-room and staff quarters. The kitchen is connected to this block, with the necessary stores, pantry, sculleries, etc. The walls are being constructed in concrete blocks with poured concrete in filling, the external walls being finished in cement plaster

distempered. The roofs are finished in Mangalore tiles. Cedar block flooring is used in the classrooms and assembly hall, and cedar board flooring in the junior and senior boys' boarding blocks. The first floors are carried on R.S.J's with concrete slabs reinforced with B.R.C. fabric in some cases, and mild steel rods in others. Asbestos sheets are being used for the first floor ceilings, and the flat ceiling of the assembly hall is being constructed in expanded metal with plaster finish. Crittalls' steel windows are being used throughout. The lavatories are to be joined to a water-borne system of sewerage connected to a septic tank, and all the buildings are being wired for electric light, the power for which will be supplied from a lighting set.

(4) *Eldoret School.*

Architect : Sir Herbert Baker.

Expenditure : £5,263.

The work is being carried out departmentally. Preliminary work was started in July, but owing to various matters connected with the school and land being still under discussion, construction was not started until November. Accommodation is provided in the classroom block for 300 pupils in eight classrooms, with provision for manual training and domestic science. The assembly hall will accommodate 500 persons, and the headmaster, clerk, staff, library and stores are provided for. Lavatories will be connected to a water-borne system of sewerage delivering to a septic tank. The boarding block provides for 48 boarders, with day-room, dining-room, kitchen, stores, lavatories, and two sets of staff quarters. Bricks are being used for the walls, and in other respects the construction is on similar lines to the Nakuru School.

(5) *Government House, Mombasa.*

Architect : Sir Herbert Baker.

Expenditure : £19,797, of which £9,296 was incurred in 1927.

This building was completed by contract in August under the control of the architects, Messrs. Hurle Bath, Cobb and Archer.

(6) *Indian Boys' School, Nairobi, and Kitale School.*

These structures were under design during the year, and in the case of the former some progress was made at the end of the year in connection with the collection of materials for construction.

18. *Class B Loan Buildings.*

The policy laid down in connection with these buildings was that Africans were to construct them under European supervision. The supply of African labour skilled in the trades required for building is negligible. Such semi-skilled labour as exists ordinarily demands such high wages in relation to output that its employment is uneconomic except in isolated cases. The chief source of supply of African labour for these buildings was the Native Industrial Training Depôt at Kabete and also the Prison Department, which was engaged in training convicts in trades so that on release they would have a good chance of becoming useful members of society. It was an important principle of the policy that the construction of the Class B Loan buildings should be the means of giving the African youths, who were indentured to trades at Kabete, training in practical construction under working conditions. Unfortunately, the supply both from Kabete and the Prison Department was only sufficient to enable a small part of the building programme to be started. Those buildings which were in course of construction proceeded very slowly, with consequent high overheads, and, in spite of constant supervision, items of the work had often to be done two or three times before satisfactory results were obtained. The more complicated portions of the work and those requiring knowledge of certain special trades had to be carried out by the Europeans in charge, as the apprentices and convicts were not capable of anything out of the ordinary. These difficulties were fully anticipated, because the youths from the Native Industrial Training Depôt had only a short period of preliminary training and the convicts little more.

The following Class B buildings were under construction during the year :—

- (a) *Kitui*.—Native Hospital and two Class IV Buildings (Lowland Type). Work was started in April, and by the end of the year the hospital was nearly finished, while the two houses had reached roof level. The new work on the hospital is an addition to an existing structure, and comprises administration block, one eight-bed ward, and an operating theatre with outbuildings. The type of construction is concrete block with corrugated iron roofs.
- (b) *Kakamega*.—Native Hospital, three Class II, three Class III, one Class IV and three Class V Houses (Highland Type). Preliminary work was started in

March in connection with brick manufacture, but construction was greatly delayed by the inadequacy of African labour for erection. The hospital comprises three wards (24 beds each), isolation ward (6 beds), administration block, operating theatre, and outbuildings. Work on the Native Hospital and three of the houses was well in hand at the close of the year.

- (c) *Kwale*.—One Class III house (Lowland Type) and one office. The work is being carried out by the apprentices from the Waa School, but has been extremely slow. The type of construction is concrete block with Mangalore tile roof; the concrete blocks being made by convicts.
- (d) *Eldoret Native Hospital*.—The accommodation to be provided consists of three wards (12 beds each), one ward (6 beds), one ward (4 beds), operating theatre, administration block, and outbuildings. Work was well in hand at the end of the year.
- (e) *Rumuruti*.—One Class II, one Class III, one Class IV and two Class V houses. Only preliminary work in connection with the collection of materials and the construction of a prison for the accommodation of convicts had been carried out before the close of the year. The type of construction is concrete block with corrugated iron roofs.
- (f) *Nairobi*.—31 Class III and IV houses and 100 Class V houses. It was decided to carry out three Class III houses and one Class IV house departmentally with Africans, and the remainder by contract. A start was made on the three Class III houses, progress being slow on account of the shortage of African artisans. The preparation of contract documents for the remaining buildings was in hand at the end of the year.
- (g) *P.W.D. Offices, Stores and Yard, Nakuru and Eldoret*.—These buildings were almost complete by the close of the year.
- (h) *Housing for African Employees of Government*.—Expenditure, £7,738. Work is being carried out departmentally by the agency of apprentices from the Native Industrial Training Depôt and semi-skilled convicts. The type of construction is concrete block with corrugated iron roofs.

At the Racecourse site, accommodation is provided for the following employees in blocks of quarters, with ample space for recreation grounds :—

Senior employees (married) ...	25
Senior employees (single) ...	22
Junior employees (married) ...	55
Junior employees (single) ...	124
Learners (in Dormitory) ...	24

Kitchens, latrines and bathrooms are provided close to each set of quarters, and a water-borne system of sewerage connected to a septic tank for disposal of sewage is being provided. The progress of the work has been good, and it is hoped that the scheme will be finished in the middle of 1928. The work is a very suitable one for training African apprentices, comprising, as it does, much repetition work.

At the P.W.D. Dépôt, accommodation on similar lines is being provided for 144 junior employees and six headmen.

19. *New Buildings and Extensions to existing ones constructed out of Revenue.*

The new buildings and additions to existing ones constructed or partly constructed during the year out of revenue comprise 14 major works (above £500 in individual value) and 44 minor works. They are set forth in detail in Appendix III. Only some of the major buildings will be referred to here. The expenditure on buildings constructed out of revenue was £27,746.

(a) *Asiatic Ward, Native Civil Hospital, Nairobi.*—Expenditure £946. This work comprises two wards with lavatory accommodation in an annexe. The type of construction is steel frame with concrete block wall panels, concrete slab floor and asbestos roofing.

(b) *Extensions to Infectious Diseases Hospital, Nairobi.*—Expenditure £1,594. Work was still in hand at the close of the year as decision regarding site had been delayed. The buildings comprise two large ward blocks for plague and venereal cases respectively, constructed similarly to the Asiatic Ward.

- (c) *Timber Seasoning Buildings, P.W.D. Yard, Nairobi.*—Expenditure £3,900. The installation was brought into operation on November 28th, after the arrival of the Superintendent. It consists of five kilns, each 30 feet by 11 feet by 8 feet, of the Sturtevant external fan type. Each kiln has its own electrically driven fan and heating arrangements, so that each kiln can be operated as a separate unit. An old locomotive boiler, burning waste wood and sawdust, supplies the necessary steam. The usual type of kiln cars and transfer track are incorporated in the layout, which facilitates the handling of the timber into and out of the kilns. The estimated capacity of each kiln is from ten to twelve tons of timber and the yearly output 600 tons of seasoned timber.
- (d) *Kimini Police Post.*—Expenditure £1,862. Attempts to burn bricks by contract proved a failure. The work was built departmentally, using concrete blocks supplied by contract. The work was started early in the year and handed over on June 1st to the Police Department.
- (e) *Cherangani Police Post.*—Expenditure £1,237. A contract was let for this work, and it was about two-thirds finished by the end of the year. It was necessary to omit the stables so as to bring the cost within the limit of the lowest tender.
- (f) *Turbo Police Post.*—Expenditure £891. A contract was let in September, and work was about two-thirds finished at the end of the year.
- (g) *Eldoret Post Office.*—Expenditure £854. The work was started departmentally in September and was practically finished by December 31st.
- (h) *Plant Breeding Station and three houses, Njoro.*—Expenditure £876. A contract was let for this work. It proceeded very slowly, and the buildings were only up to plinth level at the end of the year.
- (i) *Songhor Police Post.*—Expenditure £1,862.—There was much difficulty in procuring artizan labour for this work, which was constructed departmentally. Finding a suitable earth for brick-making presented difficulty. The work was completed during the year.

20. *Maintenance and Minor Improvement of Public Buildings.*

The total expenditure on the maintenance and minor improvement of public buildings was £24,722, as compared with £25,477 in 1926. The work was spread over 933 works orders, of which the majority were concentrated in Nairobi. Most of these were small repairs, others extensive reconstructions, of which the most important was the part reconstruction of the Commissioner of Customs' bungalow at Mombasa at a cost of £1,500.

VI.—ROADS BRANCH.

21. (1) The Road Engineer, Mr. R. S. Moore, was in control of this branch throughout the year. Mr. Moore arrived in the Colony in December, 1926, and after a series of tours throughout much of the Colony and Protectorate submitted his report on the "Kenya Road Problem" in March, 1927. The chief features of Mr. Moore's report were (a) the necessity for establishing the chief arterial and feeder roads on their permanent alignments in lieu of the pioneer alignments which perforce had to be largely adopted in the past on account of lack of funds for the additional earthwork, bridging and drainage, etc., required to secure good gradients and curves; (b) the execution of as much roadwork as possible by machinery; (c) dual tracks, one for ox-drawn traffic and vehicles of a very heavy, destructive or exceptional character, and the other for vehicles in other categories; (d) gradual hard-surfacing of the chief roads on clay soil as funds permitted, so as to render them all-weather in type; (e) a policy of road maintenance and construction suitable for the employment of machinery for construction and maintenance and the engagement of competent road foremen and machinery operators to give effect to that policy. Mr. Moore advocated considerably enhanced expenditure on the road system and emphasised the impossibility of expecting a satisfactory road system to materialise without that expenditure, bearing in mind the prevalence of clay as the surface soil and the absence of good road-making material over most of the settled areas of the Colony. It was satisfactory to observe that Mr. Moore's views diverged in no material degree from those which had been expressed when the Loan Proposals of 1925 were under consideration, when provision had been made for £25,000 for road surveys, £50,000 for road plant, and £50,000 as the first instalment for construction of a capital nature. The principle of the dual track had been established by the Roads Protection Ordinance of 1924, though its application had been limited to a comparatively few roads for financial reasons. Expenditure

against the sums provided under Loan for road surveys and road plant had been held in abeyance almost entirely pending Mr. Moore's arrival. On receipt of his advice, the survey staff, the new road foremen provided for in the 1927 Estimates and much of the road plant were put on order. As the staff and plant came to hand, and existing worn-out tools and plant came to be replaced out of the provision made in the 1927 Estimates, the Executive Engineers found it possible to make a start on some of the chief traffic-carrying roads which could be regarded as being on their best alignments. By the end of the year considerable improvement had been achieved on those roads which were taken in hand in respect of (a) remodelling and widening; (b) drainage; (c) hard surfacing; (d) dual track; while maintenance work was rendered more expeditious in those cases where the light maintenance graders could be employed. An important feature of the work of the year under review was the co-ordination of methods of road construction and maintenance in the different executive divisions which was rendered possible by Mr. Moore's visits to an extent which had never been possible before. Close co-operation with District Road Boards was maintained by the attendance of the Executive Engineers or their representative at nearly all meetings and occasional attendance by Mr. Moore to explain policy or express his views on matters of special importance. Throughout the year the relations of the Department with the various District Road Boards were notable for cordial co-operation, and as usual the District Road Boards gave valuable assistance in the control of the expenditure of public funds on District Roads by the arrangement of petty contracts for maintenance and renewals in collaboration with the Executive Engineers and by assuming the responsibility, either direct or through Road Area Committees, for the proper performance of those contracts. As usual, the maintenance and renewal, either in whole or in part, of bridges and culverts formed a heavy item of expenditure, and the condition of the temporary structures, of which so many still exist, always causes much anxiety, situated as they often are in outlying localities. In the Nyeri Division alone there are 165 bridges above ten feet span on public roads, and most of these are of very temporary type of construction, requiring frequent repairs to one or other part. To replace them by fully permanent bridges, requiring practically no maintenance, would cost not less than £60,000.

(2) An estimate of the mileage of country roads and tracks constructed either in whole or in part out of public funds,

including all which are passable either with facility or difficulty and are used either continuously or at infrequent intervals by motor vehicles, and are in addition sufficiently known in respect of general alignment to enable them to be approximately delineated on a map, has been made and the roads classified as follows :—

		<i>European Areas.</i>	<i>Native Areas.</i>	<i>Other Areas.</i>
		MILES.	MILES.	MILES.
Main Roads	... ..	746	1,040	792
District Roads	... ..	1,633	2,866	328
Northern Frontier Province and Turkana Administra- tion Roads	... ..	—	1,420	—

22. *Maintenance and Improvement of Roads and Bridges*

(1) The total expenditure was £87,354, divided as follows between Divisions :—Nairobi Division, £18,323; Nakuru Division, £13,496; Kisumu Division, £14,100; Eldoret Division, £17,478; Nyeri Division, £11,938; Mombasa Division, £9,863; Miscellaneous, including the Northern Frontier Province, £2,156. Of the total sum, approximately 12 per cent., or £9,579, was expended on township roads, as follows :—Mombasa, £5,486; Eldoret, £1,500; Kitale, £349; Kisumu, £1,255; Nakuru, Naivasha and Ravine, £955; Lumbwa, £34. The sum of £33,414, or 39 per cent., was expended on main country roads in European and Native areas, and £24,459, or 28 per cent., on district country roads in European areas. Allotments to District Commissioners for the maintenance and improvement of native reserve tracks amounted to £6,200 or 6 per cent. of the total. The sum of £3,466, or 4 per cent., was spent on various unclassified tracks, and £10,236, or 12 per cent., on miscellaneous bridge repairs and reconstructions, in addition to work of this character carried out from the individual allotments.

(2) The individual items of road maintenance and improvement are too numerous to refer to in detail, varying as they do from a large number of bridge reconstructions, provision of new drains, culverts and causeways, hard surfacing, modelling earth roads, murraming and metalling of township streets to innumerable items of trivial repair. The expenditure on the individual roads and divisions of roads is set forth in Appendix VIII.

23. *Capital Works.—Roads.*

A.—LOAN ROADS.

(1) *Mombasa-Kilindini Road.*—Expenditure £15,193, of which £15,140 was incurred in 1927.—Work on the reconstruction of this road from the end of Vasco da Gama Street to Kilindini Harbour as a bituminous macadam road by the penetration method was commenced in February. Work was interfered with by rainy weather at not infrequent intervals. By the end of the year 23,540 superficial yards out of a total of 36,050 superficial yards had been finished. In order to compare the wearing qualities and relative economy at Mombasa of natural bitumen with the petroleum residues sold by the Shell-Mex Company, the Mombasa half of the road was constructed with Trinidad Lake bitumen, and the Kilindini half was still under construction with Mexphalte (and Spramex seal coat) at the end of the year. Both materials are in common use throughout the world for streets carrying fairly heavy rubber-tyred traffic and should provide a solid roadway having high lasting qualities. Careful costing of details was made throughout the work, and it was found that the average cost per square yard worked out a Sh. 8/93, a rate which compares favourably with the cost of work of the same standard in other parts of the world.

(2) *Mombasa Town Planning Scheme.*—Some work was carried out for the Town Planning Authority. A road site was acquired by the Authority between Rogers Road and Salim Road. This was taken over and cleared. A contract was arranged for the construction of 2,500 feet and 16 feet carriage-way in Mwache stone with foundation course and water-bound top course to be treated with bitumen. Plans have been prepared for the construction of 6,000 feet of Makupa Road.

(3) *Muhoroni-Songhor-Chemill Road.*—Expenditure, £4,530 of which £4,408 was incurred in 1927.—A complete new alignment with maximum grades towards the railway station of 5 per cent. was surveyed and plans worked out. The flat portions were carried out departmentally, and the rock cuttings and heavy earthwork let to contract. Hard-surfacing for 11 miles has been excavated and stacked on site. Work proceeded slowly on account of the district being a particularly difficult one as regards labour. The work is being carried on in 1928.

B.—REVENUE ROADS. EXPENDITURE, £19,661.

Only the more important items of expenditure on individual roads and bridges which were dealt with will be referred to. A complete list is given in Appendix III.

(1) *Solai Road to Soldier Settlement Road No. 2.*—Expenditure £677.—This road was surveyed and work commenced in July. Two sections and a bridge were done departmentally and the remainder let by contract.

(2) *Surfacing Nairobi-Limoru Road.*—Expenditure, £1,812.—This work formed a continuation towards Limoru of that done in previous years. $3\frac{1}{4}$ miles were murramed 16 feet wide and 4 inches thick by contract, the average cost being £523 per mile. The contract was administered by Colonel Durham as representative of the Department.

(3) *Improvements to Thika-Fort Hall Road.*—Expenditure, £2,047.—277 chains 16 feet wide were surfaced with murrum 4 inches thick at an average cost of £7 9s. per chain, i.e., 5.25 miles at £392 7s. per mile. This road caused much inconvenience during the long drought by corrugation.

(4) *North Coast Road, Mombasa.*—Expenditure, £1,657.—The metalling and causeway work was continued on this road, and by the end of the year it was trafficable in all weathers from Mombasa to Malindi.

(5) *Roads in Uasin Gishu and Trans Nzoia.*—Expenditure, £4,640.—The programme was incomplete last year, and an extensive series of improvements consisting of replacement of junglewood bridges by ones of more lasting type, embanked causeways, realignments, etc., were carried out. The work was not finished at the end of the year mainly because the results of some of the surveys were awaited.

(6) *Roads to Railway Stations, Nyeri Railway.*—Expenditure, £1,163.—The work completed in 1927 consisted of three miles of new earth road and bridgework.

(7) *Roads in Northern Frontier Province.*—Expenditure, £2,015.—Much extension of the road system in the Northern Frontier Province was carried out by the Senior Commissioner, the object being to provide lines of communication passable by motor vehicles between stations. A track was opened up to Lamu.

(8) *Roads in Kerio Province.*—Expenditure, £1,587.—Expenditure was concentrated on the Lodwar Road from the Trans Nzoia Border to the Napao Pass, a distance of approximately 122 miles. In addition to improvement of river approaches and escarpment sections, survey and construction of a new track 52 miles long were carried out in order to eliminate the steep hilly portions of the road which debarred the use of motor transport.

C.—ROAD SURVEYS.—LOAN, £25,000.

24. *Road Surveys.*

During the year new surveyors from abroad were engaged on agreement chargeable to the above loan provision. The staff included Mr. J. Fleming, Road Location Engineer, who was responsible to the Road Engineer for all surveys undertaken by the new survey staff. The selection of the best alignments by the surveyors was thus assured. It is now possible to locate correctly the alignments for new road construction and gradually to improve the alignments of existing roads. Construction on those alignments is now possible in many cases where previously it was impossible on financial grounds. The establishment of the branch railway system during the last few years and a greater knowledge of the agricultural possibilities of the Colony engenders a greater feeling of security in the selection of alignments for considerable capital expenditure than could ever be felt in the past. In the latter half of the year, completed surveys and final locations were prepared over a length of 120 miles—mostly on the important produce-carrying roads of the Colony. In addition, numerous small surveys for realignments and bridges have been carried out. In all cases the surveyors are instructed to survey roads on their best alignments. This is the only correct policy regarding such important public work as roads. Very often it requires the alignments to be surveyed through farms at places which are inconvenient to the farmers, although every endeavour is made during location to align the road where it will cause the least damage to property consistent with as good an alignment as possible being secured. It is satisfactory to record that in all instances where alignments have been contested, the District Road Boards have always unanimously voted in favour of the correct one, thus putting the interests of the community before those of the individual.

VII.—GOVERNMENT TRANSPORT BRANCH.

25. This branch was under the control of the Transport Officer, Mr. F. H. Noon.

(1) The cost of this activity for the year was £3,896, exclusive of Loan building work. The work of the branch during the year (exclusive of certain loan building work) may be summarised as follows :—

- (a) Packages of varying weights and sizes cleared
from the Railway Station and delivered ... 47,337
- (b) Packages collected and despatched by rail ... 38,078

(c) Transport of P.W.D. Stores (excluding furniture)	6,943
(d) Mails bags transported	76,232
(e) Boxes of plants removed and despatched for Forest Department	3,582
(f) Other Services :—	
(i) Conveyance of stores to hospitals and schools.	
(ii) Conveyance of Government furniture and luggage of officials.	
(iii) Arranging accommodation in trains and issuing warrants for travelling.	
(g) The clerical work included the following :—	
(i) Government warrants	6,200
(ii) Consignment notes	6,512
(iii) Waybills	5,192
(iv) P. forms	1,995
(v) Payment vouchers	515

(2) The transport work for loan buildings under construction in Niarobi was carried out by 3 Fordson tractors and trailers, one Albion lorry and one International lorry for part of the year. The number of ton-miles of transport was 57,251 at an average cost including all overheads, depreciation, etc., of Sh. 1.10 per ton-mile. When transporting for long distances, as in the case of material for Ngong buildings, the running costs were found to be much less than the average, the majority of the trips being short hauls in Nairobi with consequent delays. The Transport Officer reports that he regards half the cost of repairs carried out to vehicles to be due to the bad condition of Workshops Road leading from the town to the P.W.D. Yard.

VIII.—MISCELLANEOUS.

26. *Rents and House Allowances.*

The expenditure was £55,072 as compared with £44,614 in 1926. The distribution of rented quarters and offices in respect of stations and the cost are set forth in Appendix IX. The number of quarters rented continuously was 67, and for shorter periods 66, as compared with 47 and 72 respectively in 1926. There were 38 offices rented continuously and 20 for shorter periods, as compared with 26 and 19 respectively during 1926. Expenditure to the amount of £19,202 was incurred

on rents (£13,163 on quarters and £6,038 on offices) and £35,870 on house allowances (£14,158 on European staff and £20,150 on non-European staff) as compared with £15,417 and £29,480 in 1926.

27. *Furniture.*

The expenditure on new furniture for new buildings, including those constructed out of loan, new rented buildings and new appointments was £15,484. The expenditure on the upkeep, repair and renewal of furniture was £2,304. Some of the new furniture for the Government Houses was designed by Sir Herbert Baker and made in England. Other items were made locally.

28. *Tools and Plant.*

The expenditure out of the Loan provision for road plant was £17,328. The expenditure under Public Works Recurrent on tools and plant for roads and all other works was £8,278. Certain workshop machinery for the joinery shop in Nairobi and special plant required for the Loan building programme, such as stone-crushers, concrete mixers, etc., were charged to loan, the capital cost being liquidated gradually by charge to works according to their use. The heavy road and transport plant on charge at the end of the year is shown in Appendix X.

29. *Workshops.*

The workshops at each of the six divisional headquarters were maintained. A new joinery shop was established in the Nairobi yard and the smiths' and fitters' shop was extended. Nearly all the joinery required for new buildings and furniture (except for the Coast) is now made at the Central Workshops in Nairobi in proximity to the timber seasoning installation. It was found most convenient to build the heavy trusses and other steelwork for the larger Loan buildings in the smiths' and fitters' shop where the necessary appliances and staff were available to ensure a good job. Electric power was installed, and the following new machines set up:—Smiths' and Fitters' Shop, 25 h.p. motor, power hammer, power shearing machine and hand shearing machine; Joinery Shop, one 66 h.p. and one 30 h.p. electric motor, each driving a line shaft. Three other electric motors of 5, 3½, and 2½ h.p., respectively, driving independent machines, circular saw, combination planing machine, four-cutter moulding machine, grinding machine, lathe, cross-cut circular saw and a mortising machine.

30. *Labour.*

Appendix XI shows by graph the number of workmen of various designations employed during the year. The supply of unskilled labour was generally good, and no continuous difficulty of magnitude was experienced in recruiting except for Mombasa where the supply from the Taita Hills, on which reliance could formerly be placed, become almost negligible. It became necessary to recruit Kavirondo at intervals to supplement the local labour supply at Mombasa, but the result was not entirely satisfactory. Difficulty was also experienced in obtaining unskilled labour for Rumuruti and Songhor as both localities appear to be unpopular with labourers. In other cases work was impeded for short periods due to such causes as circumcision ceremonies, preparing land, etc. The supply of skilled Indian labour was good, though on the average it remained high in price in relation to output in comparison with some other countries. The supply of skilled African labour on the market still remains almost negligible. Mission-trained boys have been tried but have not been found satisfactory under competitive conditions either because of lack of skill or because the conditions of continuous work do not appeal to them. The best who are employed by the Department are those who have worked for a considerable time as mates, but their number is very small. On the Loan B, buildings apprentices from the Native Industrial Training Depot at Kabete have been employed, and it is hoped that in the course of time those who complete their training may be fitted to compete in the labour market.

31. *Investigations.*

Apart from road and bridge surveys, the principal investigation surveys and reconnaissance carried out during the year were in connection with (1) Water supplies for Mombasa, Kitale, Nyeri, Gilgil, Thika, Kilifi, Ngong and Fort Hall; (2) Sewerage and drainage schemes for Kisumu and a drainage scheme for Nakuru; (3) Drainage of the Pesi Swamp; (4) Investigation of the hydrography of Lake Naivasha; (5) Irrigation in the Njemps area of the Kamasia Reserve.

32. *Loan Buildings Works Committee.*

This Committee held 16 meetings during the year under the chairmanship of the Colonial Secretary. Decisions were made regarding questions of policy in respect of loan buildings and associated matters. The order of priority of construction was decided, and plans were discussed and approved. The Common Expenses Account for Loan Works, which had been

established as a suspense account to cover a large number of items of expenditure connected with the administration of Loan works until they could be charged off to their final sub-heads of expenditure in proportion to the services rendered to each work, was found unworkable in practice; for it was found that most of such expenditure could not be correctly divided between the various sub-heads and the charges liquidated until the loan programme was finished. Varying percentages of the provision made for each work were therefore deducted in each case and credited to new sub-heads of each head entitled Establishment Charges, and the Common Expenses Account was liquidated with effect from October 1st.

33. Correspondence.

The registered correspondence of head and divisional offices (excluding stores and Government transport correspondence) during the year was as follows:—

OFFICE.	Departmental Circulars.	Inward Letters.	Outward Letters.	Inward Telegrams.	Outward Telegrams.
Head Office ..	103	13,070	10,926	750	915
Executive Engineer, Nairobi	2,777	2,388	44	66
Executive Engineer, Mombasa	2,329	1,708	258	277
Executive Engineer, Kisumu	2,100	1,434	243	366
Executive Engineer, Eldoret	3,614	3,128	427	456
Executive Engineer, Nakuru	2,061	1,931	180	280
Assistant Engineer, Nyeri	1,465	1,102	179	176

34. Rainfall and Evaporation.

	Total Rainfall.		Total Evaporation.	
	1927.		1927.	
	inches.		inches.	
Nairobi	23.6	...	49	...
Mombasa	44.54	...	93.3	...
Kisumu	38.53	...	—	...
Nyeri	31.43	...	52.75	...
Eldoret	28.91	...	—	...

35. I have much pleasure in placing on record my appreciation of the loyal co-operation and capable assistance rendered by the staff during the year.

P W D

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I regret to have to record the death of Mr. H. M. Jones, Overseer, on June 18th, 1927. The Department thereby lost a hardworking and reliable officer whose decease was greatly deplored.

H. L. SIKES,
Director of Public Works.

28th May, 1928.

APPENDIX I.

STAFF CHANGES IN 1927.

I.—STAFF CHARGED TO REVENUE.

New Appointments.

H. A. Campbell, <i>Assistant Engineer</i>	...	1/7/1927
E. H. Robins, <i>Assistant Engineer</i>	... ..	28/4/1927
R. C. McKinlay, <i>Foreman</i>	... ..	18/8/1927
A. Gray, <i>Foreman</i>	... ..	13/9/1927
A. H. Bridges, <i>Foreman</i>	... ..	4/6/1927
E. J. W. Carnsew, <i>Foreman</i>	... ..	4/6/1927
T. J. Cranny, <i>Foreman</i>	... ..	4/6/1927
T. A. Walker, <i>Foreman</i>	... ..	4/6/1927
D. Calder, <i>Foreman</i>	... ..	4/6/1927
F. W. Patow, <i>Foreman</i>	... ..	4/6/1927
J. A. Knott, <i>Foreman</i>	... ..	4/6/1927
I. J. W. Crawford, <i>Foreman</i>	... ..	15/11/1927
W. D. Dale, <i>Foreman</i>	... ..	1/4/1927
J. Willoughby, <i>Foreman</i>	... ..	1/4/1927
R. F. Dalziel-Armstrong, <i>Assistant Account- ant</i>	... ..	21/11/1927
R. A. Sutcliffe, <i>Draughtsman</i>	... ..	18/2/1927
J. A. Grigor, <i>Stores Clerk</i>	... ..	1/11/1927
W. F. Knill, <i>Accounts Clerk</i>	... ..	3/11/1927
V. M. Neylan, <i>Stores Clerk</i>	... ..	1/9/1927
Miss C. G. Borthwick, <i>Typist</i>	... ..	1/4/1927
F. Turner, <i>Boring Superintendent</i>	... ..	21/6/1927
S. W. Cairns, <i>Drill Foreman</i>	... ..	14/8/1927
F. Rhodes, <i>Drill Foreman</i>	... ..	14/8/1927
W. J. Cox, <i>Drill Foreman</i>	... ..	14/8/1927
T. V. Cox, <i>Assistant Drill Foreman</i>	... ..	8/11/1927
L. Walker, <i>Clerk, Boring Branch</i>	... ..	23/6/1927
W. D. Arnot, <i>Timber Seasoning Plant Operator</i>	... ..	25/8/1927
J. H. Echalez, <i>Clerk, Timber Seasoning Plant</i>	... ..	13/11/1927

APPENDIX I—(Contd.).

Promotions.

W. Browning from <i>Junior Clerk to Accounts Clerk</i>	1/11/1927
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Resignations.

Nil.

Termination of Appointments.

J. A. Knott, <i>Foreman</i>	11/12/1927
P. G. Harding, <i>Overseer</i>	31/10/1927

Deaths.

H. M. Jones, <i>Overseer</i>	18/6/1927
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II.—STAFF CHARGED TO LOAN.

New Appointments.

W. E. Green, <i>Record Clerk</i>	1/1/1927
F. Montague, <i>Clerk of Works</i>	1/1/1927
W. R. Grant, <i>Clerk of Works</i>	...	...	...	21/1/1927
A. E. R. Margerison, <i>Clerk of Works</i>	...	...	...	2/1/1927
L. Jones, <i>Accounts Clerk</i>	...	...	...	31/1/1927
G. Jones, <i>Foreman</i>	...	...	...	1/2/1927
E. J. Haines, <i>Foreman, Joinery Shop</i>	...	...	...	18/2/1927
A. H. Manger, <i>Foreman, Building</i>	...	...	...	18/2/1927
J. A. Young, <i>Clerk</i>	...	...	...	14/2/1927
W. K. Squires, <i>Foreman, Roads</i>	...	...	...	19/2/1927
J. B. Witherick, <i>Assistant Accountant</i>	...	...	...	14/2/1927
R. S. Brown, <i>Chief Storekeeper</i>	...	...	...	2/3/1927
J. P. Purnell-Edwards, <i>Assistant Engineer</i>	...	...	...	18/3/1927
J. White, <i>Foreman, Roads</i>	...	...	...	16/3/1927
R. O. Barnes, <i>Assistant Engineer</i>	...	...	...	7/3/1927
B. M. Fuller, <i>Records Clerk</i>	...	...	...	9/3/1927
H. H. Bate, <i>Stores Clerk</i>	...	...	...	25/3/1927
S. R. Boyd, <i>Assistant Engineer</i>	...	...	...	25/3/1927
S. L. Blackburne, <i>Draughtsman</i>	...	...	...	25/3/1927
G. D. Graham, <i>Assistant Engineer</i>	...	...	...	7/4/1927
R. K. Robertson, <i>Yard Foreman</i>	...	...	...	1/4/1927
J. F. M. Fowles, <i>Stores Clerk</i>	...	...	...	19/4/1927
J. Macintyre, <i>Assistant Engineer</i>	...	...	...	13/4/1927

APPENDIX I—(Contd.).

II.—STAFF CHARGED TO LOAN—(Contd.).

W. M. Allen, <i>Accounts Clerk</i>	...	...	1/5/1927
S. Daly, <i>Accounts Clerk</i>	...	...	1/5/1927
P. G. H. Lewis, <i>Stores Clerk</i>	...	...	1/5/1927
R. C. W. Earee, <i>Buildings Cost Clerk</i>	...	...	18/5/1927
Miss A. Chambers, <i>Learner</i>	...	...	1/5/1927
P. Berry, <i>Stores Clerk</i>	...	...	16/5/1927
O. H. Barrett, <i>Foreman Mechanic</i>	...	...	1/5/1927
J. R. Bryant, <i>Clerk of Works</i>	...	...	6/5/1927
D. W. Noble, <i>Buildings Cost Clerk</i>	...	...	10/6/1927
D. C. Sydney Smith, <i>Foreman, Buildings</i>	...	...	1/6/1927
W. H. Sanday, <i>Road Superintendent</i>	...	...	4/6/1927
L. W. Martin, <i>Road Surveyor</i>	...	...	11/6/1927
R. C. Bird, <i>Road Surveyor</i>	...	...	11/6/1927
J. J. Bourke, <i>Road Surveyor</i>	...	...	11/6/1927
J. Fleming, <i>Location Engineer</i>	...	...	20/6/1927
C. J. B. Burnes, <i>Buildings Cost Clerk</i>	...	...	4/7/1927
A. D. Durno, <i>Stock Verifier and Stores Clerk</i>	...	...	2/8/1927
R. Kinsey, <i>Foreman Mechanic</i>	...	...	9/8/1927
A. Campbell, <i>Foreman Plasterer</i>	...	...	2/8/1927
Miss C. M. Eiglaar, <i>Typist</i>	...	...	2/8/1927
M. E. Bambrough, <i>Plumbing Supervisor</i>	...	...	5/8/1927
D. O. Thomas, <i>Technical Instructor</i>	...	...	26/9/1927
D. Duncan, <i>Junior Assistant Quantity Surveyor</i>	...	...	12/9/1927
W. C. Rees, <i>Building Foreman</i>	...	...	12/9/1927
J. N. Smyly, <i>Foreman, Mechanical Transport</i>	...	...	11/9/1927
G. W. Brown, <i>Building Cost Clerk</i>	...	...	8/10/1927
J. H. Echalaz, <i>Building Cost Clerk</i>	...	...	5/10/1927
H. Bullen, <i>Clerk, Town Planning</i>	...	...	20/10/1927
J. P. O'Brien, <i>Record Clerk</i>	...	...	17/10/1927
S. H. Freislich, <i>Building Cost Clerk</i>	...	...	1/10/1927
Miss W. Parvin, <i>Typist</i>	...	...	19/10/1927
A. A. B. Kennedy, <i>Record Clerk</i>	...	...	26/10/1927
Miss D. Gent-Wood, <i>Typist</i>	...	...	7/11/1927
S. V. Adams, <i>Building Cost Clerk</i>	...	...	10/11/1927
C. G. Gordon, <i>Technical Instructor</i>	...	...	2/11/1927

APPENDIX I—(Contd.).

Promotions.

Nil.

Resignations.

P. G. H. Lewis, <i>Stores Clerk</i>	14/5/1927
Miss D. Chippindall, <i>Typist and Secretary,</i> <i>Loan Works Committee</i>	23/7/1927
J. E. Bull, <i>Clerk of Works</i>	9/8/1927
O. H. Barrett, <i>Foreman Mechanic</i>	3/9/1927
C. J. B. Burnes, <i>Buildings Cost Clerk</i> ...	15/10/1927
Miss D. Gent-Wood, <i>Typist</i>	24/11/1927
D. O. Thomas, <i>Technical Instructor</i> ...	29/11/1927
W. E. Green, <i>Record Clerk</i>	9/11/1927

Termination of Appointments.

A. Brooks, <i>Erector, Cold Storage</i>	10/2/1927
R. O. Barnes, <i>Assistant Engineer</i>	30/9/1927

Transfer.

J. B. Witherick, <i>Assistant Accountant</i> ...	21/3/1927
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Deaths.

Nil.

APPENDIX III.

SCHEDULE XXVIII—PUBLIC WORKS DEPARTMENT.

SUB-HEAD.	Esti- mates, 1927.	Expendi- ture, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
Personal Emoluments	50,090	50,671	..	581	2nd S/E. £653.
Other Charges:					
Passages	2,550	2,306	244	..	" £660.
Travelling Allowances	900	849	51	..	" £65.
Local Transport and Travel- ling	9,000	7,925	1,075	..	S.W.'s £335 and £190.
Stores Contingencies	200	158	42	..	
Passages, Local Transfers, Sick Pay and Repatriation of Artizans	75	3	72	..	
Drawing Office Material and Office Equipment	400	323	77	..	
Conservancy and Water Rates Contingencies	416	381	35	..	
Uniforms	200	121	79	..	S.W. £50.
Typewriters	50	50	..	..
Telephones	28	28	..	..
Telegrams	287	219	68	..	
Parcel Post and Registered Letters	75	194	..	119	S.W. £110.
Outfit Allowances	52	30	22	..	
	..	90	..	90	S.W.'s £30 and £270.
	14,233	12,677	1,765	209	
	64,323	63,348	1,765	790	
MOMBASA WATER SUPPLY.					
Personal Emoluments	3,698	3,626	72	..	
Other Charges:					
Passages	28	40	..	12	
Travelling Allowances	50	5	45	..	
Local Transport and Travel- ling	160	120	40	..	
General Maintenance: Material and Casual Labour	3,074	2,932	142	..	S.W. £500.
	7,010	6,723	299	12	
<i>Carried forward .. £</i>	71,333	70,071	2,064	802	

APPENDIX III.—Continued.

SCHEDULE XXVIII—PUBLIC WORKS DEPARTMENT.

SUB-HEAD.	Estimates, 1927.	Expenditure, 1927.	Savings.	Excess.	Remarks.
<i>Brought forward .. £</i> {	£ 71,333	£ 70,071	£ 2,064	£ 802	
	7,010	6,723	299	12	
MOMBASA WATER SUPPLY— (Continued).					
Other Charges (Continued):					
Uniforms	80	79	1	..	
Contingencies	14	14	..	..
Extension of Distribution System .. .. .	..	425	..	425	S.W. £1,085.
	7,104	7,241	300	437	
NAKURU WATER SUPPLY.					
Personal Emoluments	525	281	244	..	S.W. £45.
Other Charges:					
General Maintenance—Material and Casual Labour..	380	501	..	121	S.W. £170.
	905	782	244	121	
	72,232	71,371	2,309	1,348	
GOVERNMENT TRANSPORT.					
Personal Emoluments	2,352	2,299	53	..	
Other Charges:					
Passages	28	24	4	..	
Travelling Allowances ..	10	5	5	..	
Local Transport and Travelling	640	531	109	..	
Packing Charges	5	4	1	..	
Purchase of Livestock—Repairs and Renewals to existing Plant and Fodder for Oxen and Mules	900	775	125	..	
Conservancy and Water Rates	15	14	1	..	
Uniforms	23	23	..	..
Telephones	22	21	1	..	
	3,995	3,696	299	..	
<i>Carried forward .. £</i> {	76,327	75,067	2,608	1,348	

APPENDIX III.—Continued.

SCHEDULE XXVIII—PUBLIC WORKS DEPARTMENT.

SUB-HEAD.	Esti- mates, 1927.	Expendi- ture, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
<i>Brought forward..</i> £	76,327	75,067	2,608	1,348	
	3,995	3,696	299	..	
Telegrams	5	..	5	..	
Parcel Post and Registered Letters	5	..	5	..	
Special Expenditure—Purchase of 1 Ton Lorry .. ..	..	200	..	200	S.W. £200.
	4,005	3,896	309	200	
WATER BORING.					
Personal Emoluments	3,720	1,120	2,600	..	
Other Charges :					
Passages	200	76	124	..	
Outfit Allowances	150	30	120	..	
Travelling Allowances	150	5	145	..	
Local Transport and Travel- ling	600	66	534	..	
Transport of Machinery	500	76	424	..	
Fuel and Oil	1,000	73	927	..	
General Tools and Plant, Con- sumable Stores and Casing	1,630	918	712	..	
Repairs	400	4	396	..	
	8,350	2,368	5,982	..	
TIMBER SEASONING.					
Expenses of Operating Timber Seasoning Plant	2,500	601	1,899	..	
TOTAL P.W.D. ..	87,187	78,236	10,499	1,548	
<i>Add Government Coast Agency</i> <i>£3,926 (not incorpor- ated in the Report)..</i>					
£	87,187	78,236	10,499	1,548	

APPENDIX III.—Continued.

SCHEDULE XXVIII—PUBLIC WORKS DEPARTMENT.

SUB-HEAD.	Estimates, 1927.	Expenditure, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
DETAILS: TIMBER SEASONING.					
Personal Emoluments	1,355	387	968	..	
Other Charges:					
Passages	66	82	..	16	
Subsistence Allowance to Ad- visor	250	62	188	..	
Local Transport and Travel- ling	50	..	50	..	
Expenses of Operating— (Fuel, Current, Water, etc.)	779	70	709	..	
TOTAL .. £	2,500	601	1,915	16	

SCHEDULE XXIX—PUBLIC WORKS RECURRENT.

SUB-HEAD.	Estimates, 1927.	Expenditure, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
Maintenance and Improvement of Roads and Bridges ..	93,100	87,354	5,746	..	
Maintenance and Minor Im- provements of Public Build- ings	25,000	24,722	278	..	2nd S/E. £620.
Rents of Offices and Houses and House Allowances in lieu of Quarters	38,500	55,072	..	16,572	2nd S/E. £16,000
Furniture, Upkeep and Repair of, for Government Bunga- lows and Offices	1,900	2,304	..	404	S.W. £400.
Tools and Plant	8,500	8,278	222	..	
Running of Workshops, Fuel, etc.	690	555	135	..	
Expenses of Water Control ..	500	201	299	..	
Loss and Depreciation of Stores	500	112	388	..	
Preliminary Investigation of New Works	500	415	85	..	
TOTAL P.W.R. .. £	169,190	179,013	7,153	16,976	

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY.

SUB-HEAD.	Esti- mates, 1927.	Expendi- ture, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
1. Medical Buildings	1,231	1,413	..	182	S.W. £400.
2. New Press Buildings	1,493	585	908	..	
3. Extensions—Infectious Dis- eases Hospital	1,209	1,758	..	549	S.W. £593.
4. Buildings for Manufacture of Sera	53	205	..	152	S.W. £252.
5. Extensions—Medical Build- ings (N. C. Hospital, Meru)	300	389	..	89	S.E. £100.
6. Postal Buildings	3,050	1,920	1,130	..	
7. European School, Nanyuki	450	343	107	..	
8. Police Stations	12,397	6,069	6,328	..	
9. Supply of Electrical Energy for Kabete Laboratory ..	1,150	917	233	..	
10. Timber Seasoning Plant ..	7,700	5,001	2,699	..	
11. Water Boring Plant	8,895	8,802	93	..	
12. Roads and Bridges	28,270	19,661	8,609	..	S.W's £160 and £1,600.
13. Minor Works	7,478	8,416	..	938	S.W's £1,485, £48 & £400.
14. Furniture for New Buildings	20,000	15,484	4,516	..	
15. Emergency Reserve	3,500	3,899	..	399	S.W. £400.
Establishment of a Plant Breed- ing Station, Njoro .. ..	..	876	..	876	S.W. £4,300, £420 & £345
Purchase of Stores Building at Sagana from Kenya and Uganda Railway for N.F. Transport .. ..	..	125	..	125	S.W. £125.
Nakuru School Drainage Sys- tem .. ..	..	..	..	..	S.W. £1,150.
Nakuru School Drainage System .. ..	..	..	..	..	S.W. £1,150.
Bungalows for Foresters at Pasi, Kaptagal and Mount Elgon ..	..	426	..	426	S.W. £500.
Purchase of Railway Press Building .. ..	..	3,600	..	3,600	S/E. £3,600.
Temporary Buildings for Buret- Sotik Police Post .. ..	..	..	..	..	S.W. £150.
Bridge over Nyanga River .. ..	..	35	..	35	S.W. £300.
Weights and Measures Office, Nairobi .. ..	..	381	..	381	S.W. £500.
Kacheliba—Lodwar Waggon Road .. ..	..	112	..	112	S.W. £1,800.
Completion of Native Hospital, Kitale .. ..	..	82	..	82	S.W. £90.
<i>Carried forward .. £</i>	97,176	80,499	24,623	7,946	

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY

SUB-HEAD.	Esti- mates, 1927.	Expendi- ture, 1927.	Savings.	Excess.	Remarks.
	£	£	£	£	
<i>Brought forward</i> .. £	97,176	80,499	24,623	7,946	
Buildings and Appliances for P.W.D. African Apprentices and Artizans .. .. .	..	1,035	..	1,035	S.W. £490.
Additional Buildings for the Secretariat, Nairobi .. ..	..	200	..	200	S.W. £750.
Mombasa Water Works—Dis- tribution Hobley Road Area	..	563	..	563	S.W. £1,038.
Offices—Port Control, Kilindini	..	3	..	3	
TOTAL P.W.E. .. £	97,176	82,300	24,623	9,747	

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY.—Continued.
DETAILED STATEMENT OF EXPENDITURE.—Continued.

SUB-HEAD.	Estimates, 1927.	Expendi- ture, 1927.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>				
ITEM 12.—ROADS AND BRIDGES— (Continued).				
North Coast Road, Mombasa—Malindi Continuation of Construction and Metalling	2,446	1,657	789	..
New Road from Solai Road to S.S. Road No. 2 (and Bridges, etc.) ..	2,277	677	1,600	..
Bridge over Sioka River, Kapsabet— Kakamega Road	600	248	352	..
Bridge over Lusumu River, Kakamega —Mumias Road	600	..	600	..
Continuation and Improvement of existing tracks and Replacement of Temporary by Semi-permanent Bridges in Eldoret and Trans-Nzoia, and Roads to Railway Stations in Trans Nzoia	7,453	4,640	2,813	..
Continuation of Roads and Bridges to Railway Station, Nyeri	2,000	1,163	837	..
Bridge over Uaso Nyiro River, Rumu- ruti-Nanyuki Road	1,138	991	147	..
Roads and Bridges in Northern Frontier Province	2,000	2,015	..	15
Roads and Bridges in Kerio Province..	1,825	1,587	238	..
Bridge over Sio River, Nairobi-Jinja Road	1,600	858	742	..
Unissued	1,490	..	1,490	..
	30,030	19,661	10,496	127
ITEM 15.—EMERGENCY RESERVE.				
New Press Buildings, Nairobi ..	3,420	3,563	..	143
D.P.W.'s Reserve	480	336	144	..
	3,900	3,899	144	143
ITEM 13.—MINOR WORKS				
Cattle Dipping Tank, Molo	176	296	..	120
New Ward, Kisii Hospital	56	157	..	101
Detention Camps	1,000	926	74	..
<i>Carried forward .. £</i>				

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY.—Continued.
 DETAILED STATEMENT OF EXPENDITURE.—Continued.

SUB-HEAD.	Esti-mates, 1927.	Expendi- ture, 1927.	Savings.	Excess.
	£	£	£	£
<i>Brought forward</i> .. £				
ITEM 13.—MINOR WORKS—(Contd.).				
Improvement to Drainage—Native Civil Hospital, Mombasa	125	129	..	4
Addition to Office of Colonial Sec- retary's Bungalow	40	37	3	..
Strong Room, Land Office, Nairobi ..	190	190	..	..
Room for Photo Printing of Plans, Survey Department, Nairobi ..	90	132	..	42
Latrines for Female Staff, Health Office, Mombasa	28	18	10	..
Temporary Latrines of wood and iron— Arab School, Mombasa	150	114	36	..
Removal and re-erection of Latrine near bathroom, Treasury Bungalow, Nairobi	37	39	..	2
Erection of Bathroom to the Bungalow of the Farm Manager's House, Kabete	33	31	2	..
Additional Bedroom and Connecting Passage to Bungalow No. 56 occupied by Assistant Director of Public Works	200	221	..	21
Bed boards in 19 Prisons	634	467	167	..
Repairs and additions to Prisons ..	271	292	..	21
Installation of Electric Light in Nairobi Prison	350	275	75	..
Re-erection of Latrines at the Police Training Depot, Nairobi	285	278	7	..
Converting existing Landhi into Two Lock-up Cells at Thika	40	50	..	10
Preservation of Ancient Ruins	80	42	38	..
Huts for Meteorological Survey	150	..	150	..
Morania Furrow, Nyeri	120	160	..	40
Two Rooms for Native Game Scouts, Nairobi	70	61	9	..
Fireproof Record Room—Supreme Court, Nairobi	400	375	25	..
Three additional rooms to Police Head Office, Nairobi	197	147	50	..
Additions to Kisumu Prison	109	115	..	6
Alterations to Quarters for Chief War- der, Eldoret Prison	54	54	..	..
<i>Carried forward</i> .. £				

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY.—Continued.
DETAILED STATEMENT OF EXPENDITURE.—Continued.

SUB-HEAD.	Estimates, 1927.	Expendi- ture, 1927.	Savings.	Excess.
	£	£	£	£
<i>Brought forward .. £</i>				
ITEM 13.—MINOR WORKS—(Contd.).				
One set of Steel Private Letter Boxes, Nairobi Post Office	60	40	20	..
Labour Camps at Sagana, Kendu and Yalla	1,000	551	449	..
Anti-mosquito Scheme	500	315	185	..
Buildings in N.F. Province	800	664	136	..
Buildings in Kerio Province.. .. .	200	199	1	..
Construction of New Cells, Nairobi Gaol	400	336	64	..
Alterations and Additions to Slaughter House, Mombasa	475	411	64	..
Alterations to the outfall drain, Ndia Kuu, Mombasa	500	426	74	..
Extension of Mombasa Water Supply Distribution System, Shimanzi Area	310	254	56	..
Erection of Four Blocks of Public Latrines of Two buckets each at Eldoret	200	109	91	..
Garage at Government House, Mom- basa .. .. .	..	79	..	79
Completion of Government House, Mombasa .. .. .	..	363	..	363
Metal Screen for Government House, Mombasa	17	16	1	..
Store for Meteorological Observatory to Kabete Laboratory	48	47	1	..
Unissued	16	..	16	..
TOTALS .. £	9,411	8,416	1,804	809
ITEM 15.—EMERGENCY RESERVE. D.P.W.'s RESERVE.				
Installation of Electric Lights— Ruiru Police Station	35	..	35	..
Electric Service Lines—Sub-Quarters, P.W.D., Nairobi	13	12	1	..
Rope and Pulley System—Treasury, Nairobi	30	..	30	..
Dais for His Excellency on 3rd June..	6	3	3	..
Partition in Nair's Building, Nairobi..	55	55	..	..
<i>Carried forward .. £</i>				

APPENDIX III.—Continued.

SCHEDULE XXX—PUBLIC WORKS EXTRAORDINARY.—Continued.

DETAILED STATEMENT OF EXPENDITURE.—Continued.

SUB-HEAD.	Estimates, 1927.	Expendi- ture, 1927.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>	371	278	130	37
ITEM 15.—EMERGENCY RESERVE—				
D.P.W.'s RESERVE—(Contd.).				
Alterations to Medical Department				
Head Office, Nairobi	5	6	..	1
Post Office Fireplace, Kericho.. ..	15	..	15	..
Screens for Health Office, Nakuru ..	10	9	1	..
Urinal and Latrines for Nairobi Stores, P.W.D.	30	47	..	17
Iron Gate Doors for Mathari Mental Hospital	14	16	..	2
P.W.D. Sub-divisional Offices, Kitale	96	89	7	..
Re-organisation of Masai Reserve ..	6	7	..	1
Alterations, etc. to Thika Police Post..	18	34	..	16
Labour Camps at Sagana	38	..	38	..
Sunshade for Guest House—Director of Education's Bungalow	4	..	4	..
Screen for Memorial Hall	19	18	1	..
Platform for Armistice Service, Nairobi	..	1	..	1
Visit of Royal and South African Air Forces, Nairobi	16	32	..	16
Store 9' x 8' for C.I.D. Offices, Nairobi	18	1	17	..
Enlargement of Garage—Land Office, Nairobi	5	4	1	..
Removing and refixing Window— Land Office, Nairobi	4	2	2	..
Unissued	43	..	43	..
TOTAL .. £	480	336	198	54

APPENDIX IV.

COLONIAL LOAN EXPENDITURE.

	Estimate.	Less Contribution to Establishment Head.	Amount available for Expenditure other than Establishment.	Expenditure.			Total.
				1925.	1926.	1927.	
	£	£	£	£	£	£	£
1. ERECTION OF SCHOOLS :							
(a) European—Kabete Secondary School	80,000	8,600	71,400	43	1,957	..	2,000
(b) Indian—Indian School, Nairobi	20,000	2,150	17,850	..	..	2,525	2,525
(c) Arab	13,000	1,400	11,600	..	..	..	..
Quarters for African Employees	40,000	5,300	34,700	..	..	..	..
		Less					
	£	Estab.	Net.				
(i) Nairobi Racecourse	18,250	2,418	15,832	..	..	6,483	6,483
(ii) Nairobi, P.W.D.	4,500	596	3,904	..	..	1,255	1,255
(iii) Mombasa	10,500	1,391	9,109	..	..	..	..
(iv) Eldoret	3,250	431	2,819	..	..	..	..
(v) Nakuru	3,500	464	3,036	..	..	..	..
(vi) Machakos	150	21	129	..	..	..	..
	£40,150	5,321	34,829				
4. MOMBASA WATER SUPPLY	100,000	10,250	89,750	504	739	3,144	4,387
6. COLD STORAGE INSTALLATION	15,000	3,700	11,300	747	9,841	709	11,297
7. KISUMU WATER SUPPLY	27,500	1,830	25,670	7,209	9,488	7,307	24,004
8. ELDORET WATER SUPPLY	30,000	2,000	28,000	21,534	21,534
<i>Carried forward</i> £	325,500	35,230	290,270	8,503	22,025	42,957	73,485

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COLONIAL LOAN EXPENDITURE.—Continued.

	Estimate.	Less Contribution to Establishment Head.	Amount available for Expenditure other than Establishment.	Expenditure.			Total.	
				1925.	1926.	1927.		
<i>Brought forward</i> .. £	£ 325,500	£ 35,230	£ 290,270	£ 8,503	£ 22,025	£ 42,957	£ 73,485	
11. PUBLIC BUILDINGS :								
(a) Housing for European and Non-European Servants of Government—Approved by Works Committee :								
		Less Estab.	Net.					
	£	£	£					
(i) Government House, Mombasa .. .. .	.. .. .	.. .. .	19,400	19,400	..	10,501	9,296	19,797
(ii) Government House, Nairobi	60,600	5,510	55,090	60,600	5,510	5,083	46,491	51,574
(iii) Housing at Outstations .. .. .	.. .. .	.. .. .	.. .. .	111,036	9,440	.. .. .	.. .. .	.. .. .
Kwale	1,600	136	1,464	.. .. .	.. .. .	.. .. .	456	469
Kitui	4,305	392	3,913	.. .. .	.. .. .	.. .. .	2,153	2,153
Machakos	6,493	591	5,902	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Eldoret	16,293	1,450	14,843	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Kakamega	14,319	1,303	13,016	.. .. .	.. .. .	.. .. .	1,982	1,982
Kisumu	8,694	791	7,903	.. .. .	.. .. .	.. .. .	3,500	3,500
Meru	4,704	428	4,276	.. .. .	.. .. .	.. .. .	22	22
Nakuru	6,600	600	6,000	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Rumuruti	6,308	374	5,734	.. .. .	.. .. .	.. .. .	933	933
Fort Hall	2,756	250	2,506	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Kerugoya	2,708	246	2,462	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Muriranjias	2,708	246	2,462	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
Nyeri	1,875	171	1,704	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .
	£79,363	7,178	72,185					
<i>Carried forward</i> .. £	£ 516,536	£ 50,180	£ 466,356	£ 8,503	£ 37,622	£ 107,790	£ 153,915	

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APPENDIX IV.—Continued.
 COLONIAL LOAN EXPENDITURE.—Continued.

					Estimate.	Less Con- tribution to Estab- lishment Head.	Amount available for Ex- penditure other than Estab- lishment.	Expenditure.			Total.
								1925.	1926.	1927.	
					£	£	£	£	£	£	£
<i>Brought forward .. £</i>											
11. PUBLIC BUILDINGS—(Continued):											
			Less. Estab.	Net.							
			£	£							
(b) MEDICAL BUILDINGS					79,667	8,567	71,100				
Eldoret Native Hospital ..	5,000	535	4,465						970	970	
Kakamega " " ..	8,200	881	7,319						686	686	
Kitui " " ..	3,075	313	2,762						1,494	1,494	
Meru " " ..	2,085	224	1,861						19	19	
Nakuru " " ..	5,213	560	4,653								
Machakos " " ..	4,170	448	3,722								
Fort Hall " " ..	3,128	336	2,792								
Muriranjias " " ..	3,127	335	2,792								
Kerugoya " " ..	3,128	336	2,792								
	£ 37,126	3,968	33,158								
<i>Carried forward .. £</i>					991,597	126,045	865,552	8,503	37,996	112,289	158,788

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APPENDIX IV—Continued.
COLONIAL LOAN EXPENDITURE.—Continued.

	Estimate.	Less Con- tribution to Estab- lishment Head.	Amount available for Ex- penditure other than Estab- lishment.	Expenditure.			Total.
				1925.	1926.	1927.	
<i>Brought forward .. £</i>	£	£	£	£	£	£	£
1. PUBLIC BUILDINGS—(Continued):							
	£	Less Estab. £	Net. £				
(g) EDUCATION BUILDINGS ..				175,000	17,750	157,250	..
Indian School, Nairobi ..	40,000	4,300	35,700	..	..	..	..
European School, Nairobi ..	38,312	3,812	34,500	..	..	..	30,813
" " Nakuru ..	37,500	4,000	33,500	..	..	50	17,197
" " Eldoret ..	40,000	4,300	35,700	..	..	..	5,363
" " Kitale ..	20,000	..	22,500	..	..	..	54
Three Schools—Parklands, Upper Parklands and Kil- imani	20,000	..	20,000	..	..	..	..
Sewerage System, Nairobi School	3,200	350	2,850	..	..	..	..
£	199,012	16,762	184,750				
<i>Carried forward .. £</i>	1,300,410	170,408	1,130,002	8,503	68,052	168,197	244,752

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APPENDIX IV.—Continued.

COLONIAL LOAN EXPENDITURE.—Continued.

	Estimate.	Less Contribution to Establishment Head.	Amount available for Expenditure other than Establishment.	Expenditure.			Total.
				1925.	1926	1927.	
<i>Brought forward</i> .. £	£ 1,300,410	£ 170,408	£ 1,130,002	£ 8,503	£ 68,052	£ 168,197	£ 244,752
13. ROADS AND BRIDGES:							
(a) Road Survey of Colony	25,000	16,500	8,500	..	1,795	3,814	5,609
(b) Main Roads and Bridges	50,000	6,960	43,040	..	..	..	..
		Excluding Estab.					
		£					
Mombasa-Kilindini Road.. .. .	..	21,500	..	..	53	15,140	15,193
Muhoroni-Songhor-Chemil Road .. .. .	..	18,500	..	..	122	4,408	4,530
(c) Makupa Causeway	50,000	..	50,000	..	..	10,032	10,032
(d) Road Plant	50,000	3,500	46,500	..	1,083	17,328	18,411
14. NAKURU WATER SUPPLY	11,000	950	10,050	..	25	8,748	8,773
Establishment:							
(a) Buildings .. .. .	..	..	..	95	11,609	36,207	47,911
(b) Roads .. .. .	..	..	..	..	914	5,543	6,457
(c) Water Supplies .. .. .	..	..	..	..	748	2,707	3,455
Nairobi Loan Transport .. .. .	..	..	..	..	560	1,440	2,000
Mwache Stone Account .. .. .	..	..	..	..	1,252	9,435	10,687
Machinery and Plant .. .. .	..	..	..	..	590	8,983	9,573
Joinery Machine Shop .. .. .	..	..	..	..	87	4,375	4,462
Blacksmiths Shop	245	245
	£ 1,486,410	£ 198,318	£ 1,288,092	£ 8,598	£ 86,890	£ 296,602	£ 392,090

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APPENDIX V.

MOMBASA WATER SUPPLY.
TRADING ACCOUNT, 1927.

REVENUE.	£	EXPENDITURE.	£
Government Departments ..	817	Engineering and Headquarters Staff (partly estimated), Clerical Staff, Sub-Overseer, Inferior Establishment and Office Boys	4,526
Shipping	4,446	General Maintenance, etc.	3,025
Kiosks	3,747	Passages and Local Travelling	165
Commercial	2,290	Overhead Charges not specifically appropriated under Mombasa Water Supply Schedule (estimated) ..	500
House Connections	5,800	CAPITAL ACCOUNT.	
Meter Rents	653	£127.145 at £6.12% ..	8,391
Turn-on Fees	42		
Kenya and Uganda Railway	9,881		
		Balance being Gross Profits for 1927	11,069
	27,676		16,607
(Original Estimate, £23,800. Revised Estimate, £24,000)			
	£ 27,676		£ 27,676

SUMMARY OF BALANCE SHEETS UP TO 31st DECEMBER, 1927.

	Gross Profit.		Gross Loss.
	£		£
1-1-1917 to 31- 3-1918 ..	..		6,715
1-4-1918 „ 31- 3-1919 ..	..		250
1-4-1919 „ 31- 3-1920 ..	..		423
1-4-1920 „ 31- 3-1921 ..	4,082		..
1-4-1921 „ 31-12-1921 ..	2,415		..
1922	1,667		..
1923	2,959		..
1924	4,826		..
1925	7,171		..
1926	7,666		..
1927	11,069	*Balance of Gross Profit ..	34,467
	£ 41,855		£ 41,855

* No depreciation of Plant, Pipe-line or Buildings taken into Account.

APPENDIX VI.

NAKURU WATER SUPPLY.
TRADING ACCOUNT, 1927.

REVENUE.	£	EXPENDITURE.	£
House Connections.. ..	1,655	Engineering and other Staff (Executive Engineer, Head Office, etc.) esti- mated	490
Kenya and Uganda Railway	683	General Maintenance—Ma- terial and Labour	501
		Overhead Charges not speci- fically appropriated under Nakuru Water Supply (estimated)	35
		CAPITAL ACCOUNT. £12,944 at £6.12%	854
	2,338		1,880
(Original Estimate, £2,000, Revised Estimate, £2,500)	2,338	Balance of Gross Profit	458
			£ 2,338

SUMMARY OF BALANCE SHEETS UP TO 31st DECEMBER, 1927.

	Gross Profit.		Gross Loss.
	£		£
1926	532		..
1927	458	*Balance of Gross Profit	990
	£ 990		£ 990

KISUMU WATER SUPPLY.

REVENUE.	£	EXPENDITURE.	£
House Connections .. ..	..	Engineering and other Staff (Executive Engineer, Head Office, etc.) esti- mated	100
Kenya and Uganda Railway	1,206	General Maintenance .. ..	..
		Overhead Charges not speci- fically appropriated under Kisumu Water Supply (estimated)	5
		CAPITAL ACCOUNT. £16,697 at £6.12%	1,102
	1,206		1,207
(Original Estimate, £1,000) Balance of Gross Loss	1	Balance of Gross Profit .. ..	..
	£ 1,207		£ 1,207

* No depreciation of Plant, Pipe-line or Buildings taken into Account.

APPENDIX VIII.

MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expendi- ture.	Savings.	Excesses.
	£	£	£	£
NAIROBI DIVISION.				
1. Nairobi-Thika	1,750	2,125	..	375
2. Thika-Fort Hall	1,200	1,969	..	769
3. Nairobi-Naivasha to top of Escarpment	360	436	..	76
4. Nairobi-Athi	300	658	..	358
5. Nairobi-Ngong-Junction No. 17 to No. 19, <i>via</i> Ngong ..	720	959	..	239
6. Nairobi-Limuru Route A ..	252	263	..	11
7. Limuru-Junction 250	98	88	10	..
8. Kiambu-Fort Hall Road ..	56	56	..	..
9. Thika-Kitui Settled Area ..	225	225	..	..
10. Thika-Kitui Unsettled Area ..	335	301	34	..
11. Athi River-Machakos	480	775	..	295
12. Machakos-Kapiti	300	147	153	..
13. Ngong-Namanga	500	458	42	..
14. Nairobi-Kiambu	422	697	..	275
15. Junction 5-Limuru, Route D..	238	243	..	5
16. Limuru and Kiambu District, Route B	252	255	..	3
17. Limuru and Kiambu District, Route C	252	239	13	..
18. Limuru and Kiambu District, Route E	70	63	7	..
19. Limuru-Uplands	98	87	11	..
20. Kiambu-Kahawa	70	70	..	..
21. Kiambu Church-Makuyu	84	84	..	..
22. Ruiru-Bennett's Bridge	84	84	..	..
23. Ruiru-Murera	84	84	..	..
24. Ruiru-Magatha	84	84	..	..
25. Ruiru-Theta	70	70	..	..
26. Ruiru-Nzenda	56	56	..	..
27. Nairobi-Kikuyu (Kabete) ..	750	326	424	..
28. Nairobi-Kabete Farm	200	341	..	141
29. Dagoretti-Ngong Road (po tion of)	45	140	..	95
30. Thika District Roads	140	102	38	..
31. Athi Bridge to Junction 675 ..	70	70	..	..
32. Machakos-Ngolani-Donyo Sabuk	310	183	127	..
33. Machakos-Kima	50	..	50	..
34. Thika Bridge Link Road ..	30	30	..	..
35. Mile 39, Thika-Fort Hall Road, Makuyu, Kiboko, Ithanga Hills	280	..	280	..
36. Makuyu House Junction-Punda Milia-Maragua	75	70	5	..
<i>Carried forward</i> .. £	10,390	11,838	1,194	2,642

APPENDIX VII.—Continued.

MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expendi- ture.	Savings.	Exces- ses.
	£	£	£	£
<i>Brought forward .. £</i>	10,390	11,838	1,194	2,642
NAIROBI DIVISION—(Continued).				
37. Mile 55, Thika-Fort Hall Road to a distance of five miles in Maragua Allotments	100	50	50	..
38. Thika-Kitina Junction-Karingalel-Makuyu House Junction ..	110	160	..	50
37. Kitina Junction-Thika Rapids Junction-Kitito-Ithanga	90	90	..	..
40. Thika Rapids-Kakuzi	200	200	..	..
41. Lukonia-Kamathunga	200	112	88	..
42. Magadi Junction eastwards ..	50	50	..	..
43. Eastern Donyo Sabuk	240	240	..	..
44. Mua Hills Road	50	49	1	..
45. S.S. Road through Mbagathi Farms	100	146	..	46
46. Kikuyu Reserve	1,250	982	268	..
47. Akamba Reserve	600	665	..	65
48. Miscellaneous Tracks	2,600	999	1,601	..
49. Miscellaneous Bridge Repairs and Renewals	4,000	2,742	1,258	..
TOTAL NAIROBI DIVISION .. £	19,980	18,323	4,460	2,803
NAKURU DIVISION.				
50. Nakuru-Rongai	340	253	87	..
51. Rongai-Ravine	420	640	..	220
52. Ravine-Campi-Nyassa (Eldoret Road)	800	123	677	..
53. Londiani-Campi Nyassa (Eldoret Road)	990	761	229	..
54. Londiani-Kedowa	60	53	7	..
55. Ravine-Londiani	420	450	..	30
56. Nakuru-Njoro	300	299	1	..
57. Njoro-Londiani	700	959	..	259
58. Nakuru-Solai	450	547	..	97
59. Nakuru-Gilgil	420	462	..	42
60. Gilgil-Nairobi (to top of Escarpment)	840	1,293	..	453
61. Gilgil-Thompson's Falls East Road	840	662	178	..
62. Kijabe-Narok-Mara	600	467	133	..
63. Nakuru-Lower-Molo	200	170	30	..
<i>Carried forward .. £</i>	7,380	7,139	1,342	1,101

APPENDIX VIII.—Continued.

MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expendi- ture.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>	7,380	7,139	1,342	1,101
NAKURU DIVISION—(Contd.).				
64. Rongai-Lower Molo	120	100	20	..
65. West Molo	150	150	..	..
66. East Molo	144	145	..	1
67. Njoro-Eldalat	135	135	..	..
68. Nakuru-Sabukia S.S. No. 1 ..	425	406	19	..
69. Gilgil-Thomson's Falls West Road	460	238	222	..
70. Naivasha-Njabini	120	109	11	..
71. Naivasha-Kinangop Forest ..	150	272	..	122
72. Longonot-Kinangop	150	132	18	..
73. Naivasha Lake Road	320	286	34	..
74. Nakuru-Thomson's Falls ..	216	281	..	65
75. Junction 238/240 to Equator ..	90	53	37	..
76. Railway Feeder Roads	500	313	187	..
77. Kinangop Escarpment-Uplands Junction 214	140	180	..	40
78. S.S. Road No. 2	200	215	..	15
79. Miscellaneous Tracks, European Areas	900	538	362	..
80. Miscellaneous Tracks, Native Areas	400	191	209	..
81. Township Roads, General	1,000	955	45	..
82. Miscellaneous Bridge Repairs, including New Bridges	2,400	1,658	742	..
TOTAL NAKURU DIVISION .. £	15,400	13,496	3,248	1,344
KISUMU DIVISION.				
83. Kisumu-Busia	1,200	1,499	..	299
84. Kisumu-Kaimosi	1,040	642	398	..
85. Kisumu-Londiani	1,500	1,569	..	69
86. Kisumu-Sondu	500	426	74	..
87. Mumias-Mbale (to border) ..	140	114	26	..
88. Kiruis-Uganda (Tororo)	165	175	..	10
89. Kaimosi-Mumias	161	158	3	..
90. Muhoroni-Songhor	320	290	30	..
91. Lumbwa-Kedowa	80	61	19	..
92. Lumbwa-Sotik	2,000	2,042	..	42
93. Jamji-Sondu	100	100	..	..
94. Lutein-Monire	120	..	120	..
95. Kisii-Sondu	200	172	28	..
96. Kisii-Kendu	200	227	..	27
97. Kaimosi-Azores	50	..	50	..
<i>Carried forward .. £</i>	7,776	7,475	748	447

APPENDIX VIII.—Continued.

MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expendi- ture.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>	7,776	7,475	748	447
KISUMU DIVISION—(Continued).				
98. Muhoroni-Soba	60	60	..	..
99. Songhor-Timboroa	270	270	..	..
100. Songhor-Divisional Boundary towards Kapsabet	220	220	..	..
101. Songhor-Lessos	100	100	..	..
102. Songhor-Chemil	130	113	17	..
103. Koru Roads	120	120	..	..
104. Fort Ternan	70	67	3	..
105. Lumbwa North Road	120	120	..	..
106. Jamsie-Magogosiet	130	128	2	..
107. Monire-Kipsonoi	100	100	..	..
108. Miscellaneous Tracks, European Areas	800	292	508	..
109. North Kavirondo Native Reserve	400	312	88	..
110. South Kavirondo Native Reserve	750	605	145	..
111. Lumbwa Native Reserve	500	392	108	..
112. Miscellaneous Tracks, Native Areas	500	294	206	..
113. Kisumu Township	1,000	945	55	..
114. Lumbwa Township	200	34	166	..
115. Miscellaneous Bridge Repairs, etc.	3,000	2,143	857	..
116. Maintenance of Dhow Pier	324	310	14	..
TOTAL KISUMU DIVISION .. £	16,570	14,100	2,917	447
ELDORET DIVISION.				
117. Eldoret-Campi Nyassa	1,200	1,307	..	107
118. Eldoret-Kapsabet	600	623	..	23
119. Eldoret-West Trans Nzoia	1,200	1,286	..	86
120. Eldoret-Kitale	1,500	1,875	..	375
121. Eldoret-Charangani	750	750	..	..
122. Eldoret-Sergoit	650	690	..	40
123. Turbo-Broderick Falls	300	305	..	5
124. Turbo-Soy	500	532	..	32
125. Kitale-Malakisi	1,000	986	14	..
126. Kitale-Kacheliba	650	685	..	35
127. Campi Nyassa to Kakamega	1,000	627	373	..
128. Kakamega-Kamakoiya	200	195	5	..
129. Uasin Gishu District Roads	1,800	1,736	64	..
<i>Carried forward .. £</i>	11,350	11,597	456	703

APPENDIX VIII.—Continued.

MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expenditure.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>	11,350	11,597	456	703
ELDORET DIVISION—(Continued).				
130. Trans Nzoia District Roads ..	1,200	1,200	..	..
131. Suk Reserve	250	65	185	..
132. Marakwet Reserve	150	121	29	..
133. Elgeyo Reserve	200	159	41	..
134. Nandi Reserve	250	185	65	..
135. Eldoret Township	1,500	1,500	..	..
136. District Roads, Turbo	250	243	7	..
137. Kitale Township	350	3 9	1	..
138. Miscellaneous Tracks	500	450	50	..
139. Miscellaneous Bridges	2,400	1,609	791	..
TOTAL ELDORET DIVISION .. £	18,400	17,478	1,625	703
NYERI DIVISION.				
139a. Fort Hall—Thika to Maragua ..	..	220	..	220
140. Fort Hall—Nyeri	1,500	1,514	..	14
141. Nyeri—Meru	1,400	1,996	..	596
142. Fort Hall—Embu	700	474	226	..
143. Embu—Meru	1,100	739	361	..
144. Nyeri—Rumuruti	1,000	1,004	..	4
145. Rumuruti—Thomson's Falls Road	400	414	..	14
146. Nyeri Division District and Township Roads	1,900	1,913	..	13
147. Embu Reserve	500	496	4	..
148. Meru Reserve	400	299	101	..
149. Nyeri Reserve	550	399	151	..
150. Miscellaneous Tracks, European Areas	550	551	..	1
151. Miscellaneous Bridge Repairs ..	1,500	1,919	..	419
TOTAL NYERI DIVISION .. £	11,500	11,938	843	1,281
MOMBASA DIVISION.				
152. North Coast Road	1,120	1,187	..	67
153. Voi—Taveta	350	288	62	..
154. Mombasa—Kwale—Vanga	400	508	..	108
155. Mombasa—Gazi (South Coast Road)	350	495	..	145
<i>Carried forward .. £</i>	2,220	2,478	62	320

APPENDIX VIII.—*Continued.*MAINTENANCE AND IMPROVEMENT OF ROADS AND BRIDGES.
DISTRIBUTION OF EXPENDITURE.

SUB-HEAD.	Grant.	Expenditure.	Savings.	Excesses.
	£	£	£	£
<i>Brought forward .. £</i>	2,220	2,478	62	320
MOMBASA DIVISION—(Continued).				
156. Kinango-Voi	570	361	209	..
157. Mombasa Island	5,700	5,486	214	..
158. Lamu District	800	769	31	..
159. Malindi and Kilifi Districts	300	286	14	..
160. Digo District	150	81	69	..
161. Voi District	150	96	54	..
162. Miscellaneous Tracks	110	141	..	31
163. Miscellaneous Bridge Repairs and Renewals	150	165	..	15
TOTAL MOMBASA DIVISION .. £	10,150	9,863	653	366

APPENDIX IX.

DISTRIBUTION OF RENTED QUARTERS AND OFFICES IN
RESPECT OF STATIONS IN 1927.

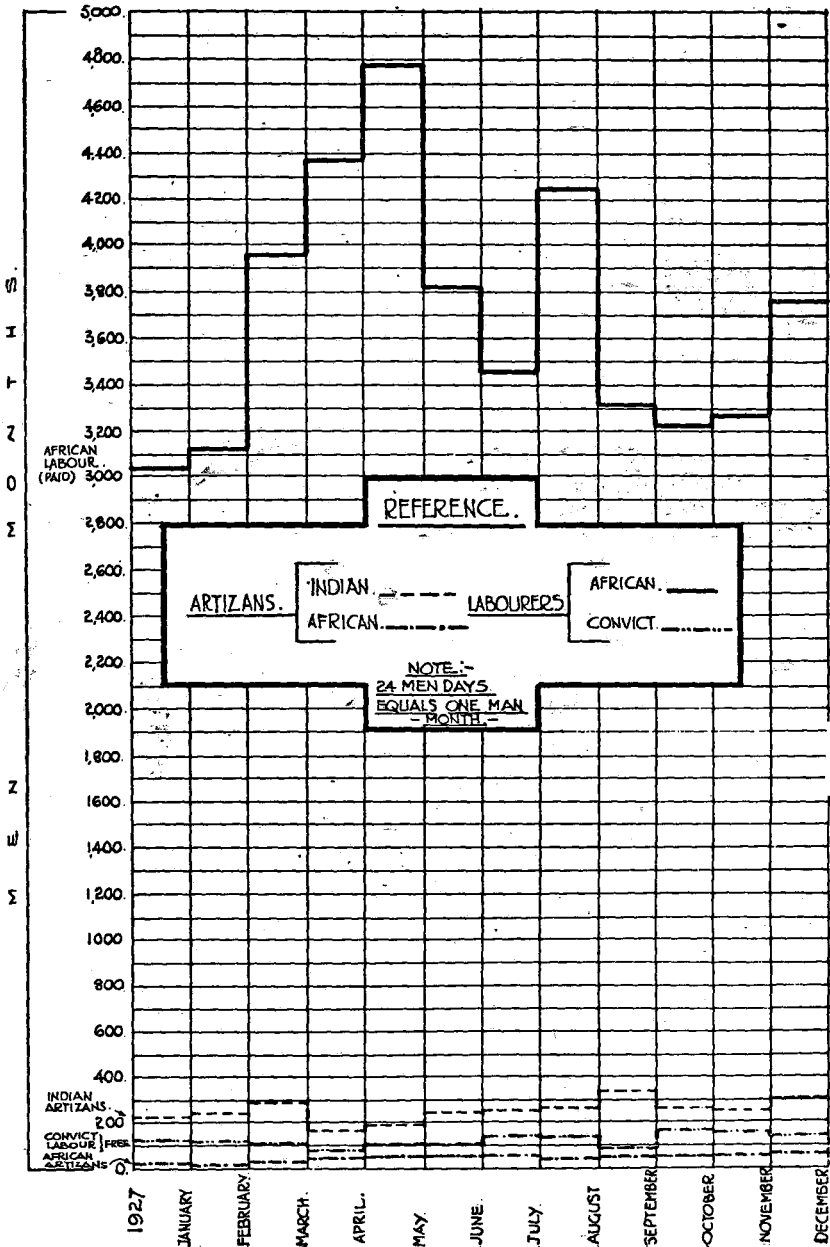
STATIONS.	Quarters rented continuously.		Quarters rented for shorter period.		Offices rented continuously.		Offices rented for shorter period.		TOTALS.	
	No.	Rent.	No.	Rent.	No.	Rent.	No.	Rent.	No.	Rent.
Mombasa ..	2	£ 235	14	1,158	3	466	2	107	21	1,966
Nairobi ..	47	6,512	31	2,121	8	3,460	5	94	91	12,187
Lamu ..	1	90	..	..	4	222	1	5	6	317
Takaungu ..	..	..	..	..	1	18	..	..	1	18
Malindi ..	2	100	1	12	5	117	1	20	9	249
Voi ..	1	36	..	..	1	48	1	28	3	112
Kajiado ..	3	150	3	50	3	150	..	..	9	350
Nanyuki ..	..	..	..	..	1	60	..	..	1	60
Nyeri ..	..	..	..	..	1	110	..	..	1	110
Gilgil ..	..	..	..	..	1	126	..	..	1	126
Nakuru ..	1	256	5	199	1	216	5	284	12	955
Kericho ..	1	29	..	..	..	..	..	..	1	29
Lumbwa ..	..	..	1	12	2	42	1	19	4	73
Kisumu ..	4	447	3	115	2	277	..	..	9	839
Soy ..	..	..	..	..	1	24	..	..	1	24
Rongai ..	..	..	..	..	1	4	..	..	1	4
Eldoret ..	4	522	6	447	1	144	1	158	12	1,271
Kitale ..	1	120	1	96	1	180	..	..	3	396
Rumuruti ..	..	..	1	83	..	..	..	..	1	83
Londiani ..	..	..	..	..	..	..	1	11	1	11
Changamwe ..	..	..	..	..	1	18	1	1	2	19
Vanga ..	..	..	..	..	..	..	1	3	1	3
TOTALS ..	67	8,497	66	4,293	38	5,682	20	730	191	19,202

APPENDIX X.

HEAVY ROAD AND TRANSPORT MECHANICAL
PLANT ON CHARGE AT THE END OF 1927.

Graders, ox-drawn	...	...	...	...	...	6
Graders, Mechanical	...	...	...	...	...	29
Lorries, water-carts (convertible)	...	...	...	...	...	6
Lorries, general	...	...	...	...	...	36
Rollers, ox-drawn	...	...	...	...	...	12
Rollers, steam	...	...	...	...	...	18
Rollers, motor	...	...	...	...	...	5
Rollers, crude-oil	...	...	...	...	...	1
Rollers, water ballast (ox-drawn)	...	...	...	...	...	1
Scarifiers	...	...	...	...	...	1
Tractors	...	...	...	...	...	29
Trailers	...	...	...	...	...	10
Trollies	...	...	...	...	...	5
Tar-spraying machines	...	...	...	...	...	4

APPENDIX XI.
DIAGRAM SHOWING TOTAL MONTHLY
LABOUR DURING 1927 IN MEN MONTHS.



From 1/6

281

(6)

THE KENYA POLICE
ANNUAL REPORT,
1927.

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The Kenya Police Annual Report, 1927.

Part I.—The Force.

1.—CHANGES.

The principal changes among the officers were :—

Mr. J. M. Lumley, Assistant Commissioner, was appointed Deputy Commissioner.

Mr. J. F. Wolseley-Bourne, M.C., Superintendent, was appointed Assistant Commissioner.

Mr. R. G. B. Spicer, M.C., Commissioner, proceeded on leave in July, Mr. J. M. Lumley undertaking in his absence the duties of Acting Commissioner; Mr. J. F. Wolseley-Bourne, M.C., those of Acting Deputy Commissioner, and Captain M. St. C. Thom those of Acting Assistant Commissioner.

Captain G. Pritchard Brown, Superintendent, on return from leave re-assumed the duties of Staff Officer.

Mr. J. B. Grenfell-Hicks, Superintendent, took charge of the Criminal Investigation Department.

Mr. F. Peacock, Assistant Superintendent, assumed charge of Nakuru Police District, relieving Captain R. F. Rainsford, Superintendent.

Mr. G. Kearney, Assistant Superintendent, on return from leave in October took temporary charge of Eldoret District.

Mr. N. Stewart, M.M., was promoted to Superintendent, and Mr. H. H. Longuet Higgins, Assistant Inspector, was appointed Acting Assistant Superintendent.

The following cadet officers were appointed to the force on probation :—

Messrs. D. D. M. McGoun and R. G. Forbes-Bassett.

Mr. C. I. Sempill, M.M., resigned his appointment as Assistant Superintendent of Police in December.

The following officers proceeded on leave during the year :—

Mr. R. G. B. Spicer, M.C., Captains R. F. Rainsford and E. K. Catchpole, Messrs. G. Kearney, E. D. Theunissen and C. I. Sempill, M.M.

2.—STRENGTH.

The following alterations in the establishment of the Force received the sanction of Government in 1927 :—

(a) The rank of Assistant Commissioner of Police was increased from one to two from 1st January, 1927, and the designation of the senior Assistant Commissioner was altered to Deputy Commissioner. The appointment was necessary in view of additional administrative work occasioned by the increase in Police Stations and duties generally throughout the Colony as well as by the fact that closer and more regular inspection of all units is essential to maintain efficiency.

(b) *Inspectors and Assistant Inspectors.*—Two inspectors additional to last year's strength were authorised, one being for the Weights and Measures Office, Nairobi, a trained inspector with the necessary qualifications being obtained in London. The second inspector was allocated to the Railway and Harbour Police.

An increase of seven assistant inspectors was found necessary either to staff new police stations or to replace European constables by more senior and responsible officers. Stations thus provided for were Solai, Nanyuki, Eastleigh, Turbo, Thika, Koru, and the Headquarters Store.

(c) *European Constables.*—Four were added to the strength, of which three were for the Railway and Harbour Police, and one to take up the duties of Inspector for the Society for Prevention of Cruelty to Animals. The pay of this constable being defrayed by the Society.

(d) *Assistant Sub-Inspectors.*—Two assistant sub-inspectors were appointed for the Railway and Harbour Police.

(e) *African Police.*—A general reduction in all ranks of the African personnel of the Force amounting in all to 190 men was made in 1927. This in general was effected by the reduction of Police strength in Native Reserve and non-settled areas.

The sanctioned and the actual strength of the Force on 31st December, 1927, were as follows :—

	Sanctioned	Actual
Commissioner	1	1
Deputy Commissioner	1	1
Assistant Commissioner	1	1
Superintendents and Asst. Superintendents ..	23	22
Chief Inspectors	2	2
Inspectors and Asst. Inspectors	40	40
European Constables	45	45
Chief Sub-Inspectors	3	3
Sub-Inspectors	41	41
Indian Sergeants and Constables	4	4
African Sergeants.. .. .	89	86
African Corporals, Constables and Recruits ..	1,909	1,910
	2,159	2,156

The Force was below its sanctioned establishment by a total of 3 at the close of the year.

3.—NATIONALITIES AND AFRICAN TRIBES.

The Force comprised the following :—

Europeans (including officers) ...	112
Asiatics	46
Africans	1,998
	<u>2,156</u>

Tribes composing the African rank and file of the Force were :—

	At 31st December, 1926.	At 31st December, 1927.
Abyssinian	3	16
Akamba	485	498
Arab	3	6
Baganda	16	16
Kavirondo	541	535
Kikuyu	103	115
Lumbwa	99	95
Nandi	67	65
Masai	14	19
Watende	68	84
Nubian	31	39
Somali	36	135
Swahili	12	17
Wanyamwezi	40	37
Miscellaneous	524	319
	2,042	1,996

(a) *Sub-Inspectors*.—There were two African Sub-Inspectors in the Force at the end of the year, one being a Baganda and one a Kikuyu.

The literate Africans fitted educationally for these positions as subordinate officers are still loath to face the depôt preliminary training upon which I rigidly insist. They invariably wish to escape this six months' training in discipline, manners and Police procedure, and as long as they adopt this attitude I propose to carry on without them, and hope with our own increasing internal education to find men in the ranks, who have been through the mill, worthy of promotion to that rank.

(b) The only notable increase of any particular tribe is that of Somalis, who are found best suited for policing the Northern Frontier Province, where the conditions prevailing are found to be too exacting for the average African.

Recruiting among the Gurreh and other tribes in the Northern Frontier was also started, with the assistance of local Administrative officers, for Police Frontier Service Units. I am most grateful for these recruits, they are shaping well, but time and experience alone will prove their worth when they are re-transferred to the Frontier in the ranks of those

units. They will certainly be more fitted than the Kavirondo to cope with the conditions under which they will work, safari, and probably fight, but their integrity as Police in contact with their own kith and kin will need careful watching. With judicious placing, however, we hope to turn them into a good class of frontier levy.

(c) The physical standard of African candidates for enlistment continued to be below the average of a year or so back.

4. EDUCATION.

(a) *Degree of Literacy.*—An incentive to the African personnel to attain educational efficiency is provided by an extra monthly allowance which is granted to those African Police who are able to pass a standard test in writing and reading Kiswahili in English characters, while an increased allowance is drawn by those who pass a similar examination in English.

These allowances provide an undoubted stimulus to self-improvement and education.

The numbers of Police drawing these allowances on 31st December during the past two years are :—

<i>Allowance for writing Swahili.</i>		<i>Allowance for writing English.</i>	
<i>1926.</i>	<i>1927.</i>	<i>1926.</i>	<i>1927.</i>
230	248	28	27

The standard required for allowances was raised considerably during the year, and resulted in comparatively few men passing the tests.

In 1927, 66 Police qualified for, and were granted, the allowance for Swahili and 7 for English.

No less than 23 African Police have now been educated to a standard of proficiency in English enabling them to write up Police Station Occurrence Books and the simpler station records, thus relieving European officers from routine duty that formerly tied them to their offices when they should have been out in their districts preventing and detecting crime. It is from these men that I hope to evolve the African Sub-Inspector of the future.

Police schools, the majority of which were established in 1925 and 1926, were in operation at the following centres:—

STATION.	English Classes.	Swahili Classes.	TEACHERS.			Average daily attendance.	
			Euro-peans.	Asiatics.	Natives.	1926	1927
Depot ..	1	4	1	..	4	65	108.4
Eldoret ..	1	1	..	..	1	13	9
*Fort Hall ..	1	1	..	..	1	14	12
Kiambu ..	1	1	..	..	1	6.27	9.67
Kisumu ..	..	1	..	..	1	15.17	12
Kitale ..	..	1	..	..	1	15	15
Lumbwa ..	1	1	..	..	1	13.50	6
Machakos ..	..	1	..	..	1	16.15	9.2
Mombasa ..	1	1	..	..	1	32	46
Nairobi ..	1	1	..	..	2	73	63
Nakuru ..	1	1	..	..	2	19	12
Nyeri ..	1	1	..	..	1	12.55	15
Rumuruti ..	..	1	..	1	..	13	10.35
Kilifi (closed for 2 months)	..	1	..	..	1	7.05	1.22
Lamu ..	..	1	..	..	1	10	8.8
Meru ..	..	1	..	..	1	13.05	11.76
Kakamega ..	..	1	..	..	1	8	11.21
*Voi ..	1	1	..	..	1	6.22	8.8

* Teacher is a literate African policeman.

In the course of the last 12 months Police schools were opened, or arrangements made for African rank and file to attend educational classes as scheduled below. All these units are detached units serving under Administrative officers, and I am most grateful to them as officers in charge Police for their interest and help.

STATION.	English Classes.	Swahili Classes.	TEACHERS.			Average daily attendance.
			Euro-peans.	Asiatics.	Natives.	
*Embu	1	..	..	1	6.71
Kericho	1	..	..	1	10.83
Kajiado	1	..	..	1	9
Kapsabet	1	..	..	1	9.33
Kwale	1	..	..	1	3.70
Ravine	1	..	..	1	5.32
*Tambach	1	..	..	1	15
Kisii	1	..	..	1	10

* Teacher is a literate African policeman.

5.—LENGTH OF SERVICE.

Of the African Police serving there are :—

30 men (1.5 per cent. of total) who have served for over 18 years.

31 men (1.5 per cent.) with service between 15 and 18 years.

177 men (8.8 per cent.) with 10 and under 15 years' service.

465 men (23.2 per cent.) with 5 and under 10 years' service.

1,293 men (64.7 per cent.) with service under 5 years.

1,996

Although the number of Police who voluntarily took their discharge during the year fell below the total for 1926, long service, in so far as the African personnel is concerned, continues to be the exception rather than the rule, only some 12 per cent. having completed ten years or over in the Force, a truly deplorable percentage. The grant of full pay whilst on leave is one of the provisions of the amended Police Ordinance shortly to be submitted to the Legislative Council.

That concession will, it is hoped, remove a long-standing source of discontent.

The scheme for pensioning African rank and file after long and satisfactory service is under the consideration of Government. Until the African can be assured that provision will be made for his declining years, when after long and faithful service for the Government he is no longer capable of actively fending for himself, his continuity of service and the making of Police work the man's profession throughout life cannot be expected; with resulting inefficiency.

6.—CASUALTIES.

Force casualties in 1927 were :—

	1926	1927
TOTAL STRENGTH	2,183	2,156
Killed in action	3	1
Died	8	17
Deserted	6	3
Dismissed for misconduct	51	72
Retired on pension	2	..
Resigned .. .. .	..	2
Discharged, medically unfit	32	23
" inefficient	20	14
" time expired	252	220
" on purchase	6	5
Transferred to other Colonies or Departments .. .. .	..	3
	380	360

(a) *Killed in Action*.—It is with regret that the death in action of 9200 3rd Class Constable Muchaniki Chacha (M'tende) is recorded. He was shot while in the brave execution of his duty during an engagement between the Police and a party of Abyssinian raiders who had invaded British territory.

(b) *Deaths*.—Under this category is included an African Corporal who was shot by a comrade under circumstances detailed in paragraph 10 (c).

Wild animals were responsible for the death of two African Police stationed in the Northern Frontier Province.

Of these, one, No. 1151 3rd Class Constable Kiptonui arap Koske (Lumbwa), when on patrol was suddenly attacked by an elephant which inflicted injuries causing almost immediate death.

The other, No. 9357 Corporal Shey Osman (Bajun), in charge of a road cutting party near Sankuri, was dragged from his bed by a lion which had seized him by the leg. The wounds sustained turned septic and eventually caused death.

A Corporal, No. 769 Dafalla Abdulla (Nubian), was invalided out of the Force on account of disability following injuries received during the suppression of a riot among native labourers on a coffee estate, who resisted Police conducting a search for stolen liquor. This corporal received compensation for his injuries from Government and was also granted life exemption from payment of hut tax.

Assistant Inspectors J. F. Faithfull and C. H. Ward were transferred on promotion to the West Coast of Africa, while Inspector C. G. MacArthur was transferred to the Kenya Game Department.

Assistant Inspector L. N. Reynolds resigned his appointment in order to join the Sarawak Police.

7.—ENLISTMENTS.

Of Africans presenting themselves for enlistment 429 were selected and enrolled, of that number 139 were discharged after trial either as unlikely to prove suitable or on reduction of the African establishment.

Recruits were enrolled from the following tribes :—

Abyssinians	...	...	...	...	17
Baganda	...	...	...	...	2
Akamba	...	...	...	...	83
Kavirondo (Bantu)	...	...	...	...	48
Kavirondo (Nilotic)	...	...	...	...	19
Kikuyu	...	...	...	...	30
Kisii	...	...	...	...	15
Lumbwa	...	...	...	...	3
Masai	...	...	...	...	9
Nandi	...	...	...	...	5
Nubians	...	...	...	...	7
Somalis	...	...	...	...	63
Wanyamwezi	...	...	...	...	2
Watendi	...	...	...	...	42
Others	...	...	...	...	84
				Total	429

8.—TRAINING SCHOOL.

360 recruits were trained during the year and were posted to units of the Force after passing the examination for proficiency held on completion of recruit training.

The instructional methods recently introduced in the dépôt are satisfactory and productive of greater efficiency both in actual training and in the standard attained by the individual recruit on the conclusion of his course at the school.

Baton exercises have been introduced with the idea of familiarising the policeman-to-be with the use of his baton not only as a weapon of offence, but in defending himself against attack.

Tuition in elementary first aid has been widened to cover instruction to the African recruit in stretcher drill and the correct methods of lifting and carrying the injured or disabled.

Tuition by means of practical demonstration continues to be a prominent part of the methods used in converting the native from his raw condition on joining into the finished article known to the public of Kenya.

Mr. C. A. Christian, formerly Regimental Sergeant-Major of the 3rd Battalion, the King's African Rifles, and ex-Squadron Sergeant-Major, 5/6th Dragoon Guards, joined the staff of the Police Training School as Sergeant Instructor in April in which capacity he has rendered valuable assistance.

9.—INSTRUCTIONAL COURSES.

Courses of instruction in the United Kingdom were attended during 1927 as follows:—

(a) *The New Scotland Yard Course for Senior Police Officers.*—Captain R. F. Rainsford.

(b) *Royal Ulster Constabulary Course for Non-Commissioned Officers and Constables.*—Assistant Inspector W. Kerr, D.C.M.

Three European constables on first appointment to the Kenya Police also attended a Royal Ulster Constabulary Course of preliminary instruction in police duties.

(c) *Army Drill Course.*—Mr. G. Kearney, Assistant Superintendent, with the Inniskilling-Royal Irish Fusiliers.

Mr. F. Peacock, Assistant Superintendent, with the Middlesex Regiment.

(d) *Immigration Training and Procedure (London).*—Assistant Inspector E. J. Harrison.

(e) Mr. R. G. B. Spicer, M.C., Commissioner, when on leave inspected:—

1. The South African Police Dog System and Depôt.
2. The training course for non-commissioned officers and constables at the Royal Ulster Constabulary Depôt.
3. The Metropolitan Mounted Police System and Depôt, Imber Court.

10.—CONDUCT.

(a) *Punishments.*—Punishments imposed in units under the charge of Police officers were :—

	1923	1924	1925	1926	1927
Dismissed	44	35	46	51	72
Sentenced to imprisonment.. ..	25	19	2	27	11
Sentenced to fine	403	399	276	35	40
Sentenced to minor punishment ..	139	185	236	277	329
Reduced in Rank or Grade	3	9	8	12	34
Reprimanded	7	7	18	19	29
Judicially punished	14	9	19	16	12

(b) It will be seen from the above that a higher standard of conduct and demeanour is now being demanded of the African rank and file, and this, with the growth in education and efficiency, is as it should be.

I am gratified to note that the bad system of fining as a disciplinary punishment except in the cases of absence without leave or loss of Government property has almost disappeared from the Force.

(c) An Akamba constable stationed in Southern Turkhana was convicted of murder and sentenced to death by the Supreme Court for shooting a Corporal of Police.

The constable at the time was sentry of the quarter guard and deserted his post, taking his rifle and ammunition with which he fired at his corporal and two other natives, hitting and killing the first named.

It appeared that the constable nursed a grievance against the deceased corporal on account of punishment inflicted for disobedience and, it is thought, concerning other matters outside of police duty.

The services of two European constables were dispensed with in 1927 on the general grounds of unsuitability.

(d) *Good Conduct.*

AWARD OF MEDALS.

His Majesty the King was graciously pleased to award the following medals to members of this Force :—

(1) *King's Police Medal.*

Awarded to Mr. G. W. Richardson, late Quartermaster, in recognition of his long and meritorious service and of the exceptional ability displayed by him.

(2) *African Police Medal for Meritorious Service.*

Awarded to :—2570 2nd Sergeant Nakina Ogut (Kavirondo). A non-commissioned officer with seventeen years' service of outstanding ability and integrity.

2987 2nd Sergeant Kioko Ngenya (M'Kamba). Enlisted in this Force 1-3-1912, and holds an unblemished record for good conduct and attention to duty. He served in the Great War.

1395 3rd Sergeant Mohamed Sheik (Swahili). Joined the Police on 15-3-1907, was commended in 1919 for good work performed by him during the War. Has completed 21 years' faithful and meritorious service.

2393 3rd Sergeant Bakari Ahmed (Somali), who has borne an excellent record throughout his service of seventeen years.

2508 3rd Sergeant Munyasia Mainje (M'Kamba). A reliable and zealous sergeant who enlisted on 24-4-1911.

2794 Corporal Okeri Omadi (Kavirondo). A corporal with over 16 years' faithful service accompanied throughout by a strict regard for duty.

162 1st Constable Saburi Mabruki (Swahili). A reliable officer of excellent character who enlisted in the Force on 2-7-1908.

(3) *Long Service and Good Conduct Medal (Army).*

Was granted during the year to Sergeant Instructor C. A. Christian in respect of his Army service in the 5th/6th Dragoon Guards and the King's African Rifles.

(4) *Hong Kong Police Medal.*

Awarded to European Constable R. Knowles, formerly of the Hong Kong Police, for conspicuous service rendered when in that Force during the General Strike, 1925, in Hong Kong.

(e) *Instances of Individual Good Conduct Displayed.*

(1) 8609 3rd Constable Temeteo Mochi (M'Kamba) was rewarded for bravery and determination in closing with and arresting a Masai who, on the constable's approach, shot an arrow at the constable.

(2) 9458 1st Constable Mohamed Handali. This constable stationed in Northern Turkana in charge of a patrol was entrusted with the delicate mission of getting

into touch with a warlike tribe, situated towards the Sudan Border, which had been a source of difficulty.

1st Constable Mohamed performed this task with great tact and enabled the local administration to establish friendly relations with the tribe in question. His conduct on this occasion was specially commended by the Administration and he was suitably rewarded.

(3) *Forbearance in Dealing with Rioters.*—In May, a body of some forty Somalis moved cattle from villages on the Uaso Nyiro River in North Nyeri District, which they were then temporarily occupying, across North Laikipia into an area occupied by Suk tribesmen. This move of stock was carried out in contravention of the Diseases of Animals Ordinance, and on the return of the party with sheep and goats which they had exchanged for cattle with the Suk it was intercepted by a patrol of two African Police, who were accompanied by native guides.

The efforts of the Police to perform their duty and detain the stock thus being illegally moved were promptly countered by armed resistance by the Somalis concerned, who opened fire on the Police with revolvers and shotguns at each attempt to detain their flocks.

The situation was handled with noteworthy discretion and courage by the African constable in charge of the patrol, who did not permit the fire of the Somalis to be returned until he ultimately found such essential to succour his comrade who was in grave danger.

Some ten arrests of Somalis were subsequently effected by the Police in various parts of the Colony on the charge of implication in this riot. Of that number six were convicted by the Supreme Court either for rioting or rioting armed with deadly weapons. Exemplary sentences were imposed, the maximum being 18 months' hard labour.

The constable concerned received a reward.

The decision of Government to move the Somalis resident on the Uaso Nyiro, whence the party causing this disturbance came, was put into effect towards the close of the year. Police were detailed for the maintenance of order during the move, which occupied a considerable period.

(f) *Rewards.*

Police work of an exceptional nature and where outstanding initiative has been displayed in the performance of duty is encouraged by the grant of suitable rewards.

This recognition of specially good work is made only by Police Headquarters and in its results the policy has been fully justified as a means of encouragement to the individual policeman displaying zeal and ability above the average of his fellows.

It has been found particularly effective as a stimulus to the energy and initiative of the African personnel, and the general efficiency of the Force has been advanced accordingly.

Number of Rewards made.			Totals disbursed.		
1925	1926	1927	1925	1926	1927
88	149	217	Shs. 871/-	Shs. 2,607/46	Shs. 3,529/85

11.—HOUSING THE FORCE.

New buildings of a permanent nature erected during the year were :—

(a) *Nairobi.*—An office and suitably equipped workshop and testing room for the use of the recently appointed Inspector of Weights and Measures were completed.

(b) *Songhor (Muhoroni Area), Kiminini (Kitale).*—New Police stations with quarters for European non-commissioned officers and African ranks were erected at the above centres.

(c) *Cherangani (Kitale), Turbo (Eldoret).*—Work was commenced during the year on Police stations and quarters urgently required in these areas.

(d) *Solai (Nakuru), Koru (Kisumu).*—Sanction was obtained in 1927 for the provision of Police stations at Solai and Koru, where increased settlement calls imperatively for adequate policing to be conducted and controlled from local Police stations, instead of as heretofore from distant Police centres.

(e) *Rumuruti.*—Sanction was obtained for the erection of buildings at Rumuruti of a permanent and habitable nature to replace the thatch and mud sheds which have up to now accommodated the Police in Laikipia both as to office and residences.

(f) *Nairobi Police.*—The Nairobi main lines and Police station are still *in statu quo ante*.

Better housing in Nairobi for the European non-commissioned officers and the African rank and file is one of the most urgent needs of the Force.

12.—CLERICAL STAFF.

The clerical staff of the Force on 31st December was :

European Clerk : 1.

Non-European Clerks: 55.

The following members of the clerical staff are commended for good work performed by them during the year :—

Mr. V. Collaco, Confidential Stenographer to Commissioner of Police.

Mr. R. Castellino, Chief Clerk in Pay and Accounts Office.

Mr. J. D. Pinto, Chief Clerk in Mombasa Police Office.

Mr. A. R. Talati, Immigration Office, Mombasa.

Mr. R. B. Patel, Office of the Commissioner of Police.

Mr. S. Dourado, Office of the Commissioner of Police.

Mr. C. K. Mitra, Office of the Superintendent i/c Depot.

13.—Cost.

	£	s.	c.
The total expenditure authorised by Government for 1927 was	149,317	0	00
The total sum expended was	137,945	10	61
<hr/>			
The saving on the year's Estimates being	£11,371	9	39

Other sums refunded to, or earned by, the Police were :—

	£	s.	c.
Refund on account of Railway Police by Kenya and Uganda Railway	9,492	6	20
Police stores supplied to Government Departments (approximately)	1,121	3	00
Hire of Police for private purposes	104	5	00
Special Police guards for Banks, etc.	452	0	00
Passport Office fees, etc.	1,079	0	00
Motor Traffic Ordinance, Drivers' Certificates, etc.	3,584	9	00
Civil Court Process, Fees for service of, by Police	217	13	00
Stage Plays and Cinema Licences*... ..	11	0	00
Sundry Revenue	145	2	00
<hr/>			
	£16,206	18	20

The proportion of Police to population in Kenya is 1 policeman to 1,190 persons.

In the London Metropolitan Police Area	1	to	373
In Cyprus	...	to	465
In Western Australia	...	to	683
In Mauritius	...	to	259
In Zanzibar	...	to	339
In Ceylon	...	to	1,538

14.—POLICE STATIONS AND OFFICES.

The organisation of the Force on 31st December comprised 21 Police offices and 38 Police stations. Those figures in 1925 were 17 and 31 respectively.

Police posts and stations throughout the Colony total 76.

As settlement becomes closer so must more Police stations be opened in settled areas. Police cannot deal with crime, nor can any patrol system be effective, when the areas in which crime has to be prevented and investigated are too great to permit of real preventive action or prompt arrival at the scene of crime.

Police must get to the head rather than to the tail of the criminal.

Part II.—Crime.

15.—CRIME IN SETTLED AND URBAN AREAS—GENERAL CHARACTER OF THE YEAR.

In 1927 the Police in settled and urban areas of the Colony dealt with 3,594 cognisable cases under the Indian Penal Code; of that number, 1,097 were classified as serious crime, the latter figure being 251, or 18 per cent. below the 1926 total.

Convictions were recorded by Magistrates or by the Supreme Court in 2,091 of the total of 3,594 cognisable charges under the Indian Penal Code, 3,121 persons being charged in court by the Police, 2,604 or 83 per cent. being convicted.

In serious crime, convictions were obtained in 464 cases, 577 persons being convicted.

On magisterial instructions, a further 246 minor and non-cognisable offences under the Indian Penal Code were investigated by the Police, 192 persons being convicted.

The outstanding feature of the year's work is the success that has followed Police activity in combating offences against property, more particularly housebreaking, a crime that, in any degree prevalent, is productive of considerable annoyance and disquiet to the public.

Increasing Police vigilance and activity in organised night patrolling and in systematic surveillance of re-convicted offenders resulted in Police success in the prevention of crime, and continued to prove throughout the year the efficacy of those measures as the most powerful weapons in Police work in this Colony.

Stock theft and theft generally were also reduced in number in comparison with 1926; nevertheless, in spite of the distinct success achieved, as the figures demonstrate, in preventing and detecting stock theft in the year under review, I am not prepared at this stage to state that we have got stock theft under complete control.

These results have been achieved despite the increase in numbers and proficiency of the native professional criminal. Instances illustrative of the presence of the criminal expert were given in my 1926 Report. I will only add here:—

(1) The progressive increase year by year in the number of natives who are convicted for the second time or more.

(2) A case of housebreaking by a native, able to drive a car, who in order to effect his escape with the property stolen broke into a garage, stole a car, and drove away with his booty. He was subsequently arrested and sentenced to five years' rigorous imprisonment.

(3) Two outbreaks of housebreaking in Nairobi were traced to professional housebreakers who had but recently been released from prison.

COGNISABLE CRIME UNDER I.P.C., SETTLED AND URBAN AREAS.

	1923	1924	1925	1926	1927
TOTALS ..	3,126	3,898	3,926	3,942	3,594

	1925	1926	1927
Number of cases in which convictions obtained	1,853	1,946	2,091
Percentage of convictions obtained to true cases	47%	56%	65%

16.—DISTRIBUTION OF CRIME.

(a) *Settled and Urban Areas.*—The distribution throughout settled and urban areas of crime under the Indian Penal Code is set out in the table at the end of the Report.

(b) *Native Reserve areas.*—The following statistics reflecting on crime in Native Reserve areas have been supplied by the courtesy of officers of the Administration :—

A total is shown of 4,498 cases under all categories for 1927, compared with 4,307 in 1926. Of that total :—

1,454	were cognisable offences under the I.P.C.
2,967	were charges brought under Local and Special Laws.
77	were non-cognisable offences under the I.P.C.

4,498

(These figures apply only to Native Reserve areas.)

17.—INVESTIGATION AND DETECTION OF CRIME.

(a) *General.*—The value of prompt arrival at the scene of a grave crime has been insisted on in continuance of our previous policy.

In this respect, however, we are handicapped by inadequate transport.

The formation of the Criminal Investigation Department has undoubtedly led to the more thorough and successful investigation of the more intricate cases.

Our figures alone demonstrate the improvement maintained :—

Conviction Percentage of True Cases.

	1926.	1927.
Housebreaking	36%	50%
Stock Theft	42%	43%
Theft	55%	66%
Robbery	38%	69%

I am confident that were the Force equipped with proper mobile transport and a much augmented telephone service we could produce even better results than these.

(b) *Modus Operandi System in the Detection of Crime.*—The detailed and systematic recording of the class of crime to which the individual re-convicted criminal is addicted and the method of commission adopted by him—for the professional criminal seldom varies either his crime or methods—is of the utmost value to the Police in the detection of crime.

The provision of such records and their classification and extension so as to include all who have proved themselves to be members of the professional criminal fraternity is one of the most important tasks of the Criminal Investigation Department. With few exceptions it is the skilled criminal who is responsible for the more daring and serious offences against property and as he advances in proficiency and in numbers equally will the records of the Modus Operandi Bureau appreciate in their value to the Force in the investigation and detection of crime.

*Capture of a Dangerous Housebreaker and
Prison-breaker.*

The adherence of the professional criminal to the particular class of crime with which he has familiarised himself was illustrated during the year by the exploits of a native named Widwika, who had many convictions for housebreaking, and was known as the local " Jack Sheppard " on account of his frequent escapes from prison.

Widwika broke out of gaol for the fifth time in March, and eventually succeeded in reaching his own district, Kisumu, where he concealed himself.

In Kisumu Township the occurrence shortly after of a series of daring housebreakings in the European and Indian areas convinced the Police that an experienced criminal was at work.

Police enquiries soon elicited the fact that the runaway in question was in an adjacent Native Reserve, and in possession of a firearm. A watch being maintained on his movements it was quickly known when he next visited Kisumu.

Police were sent to surround the building in the Township into which he had entered, but on their approach the convict and another native were seen to bolt.

They were at once followed by two parties of Police and after a long chase both were captured and then found to be in possession of property very recently stolen.

The second native also proved to be an escaped convict, and their arrest led to the recovery of the proceeds of a number of housebreakings and thefts, also a stolen shotgun which Widwika had hidden, together with some files which he stated he had used in effecting one of his escapes from prison.

Both men received long terms of imprisonment, Widwika being sentenced to 24 lashes in addition.

Housebreaking in Kisumu ceased almost entirely after the arrest of these two men.

(c) The Force has frequently received valuable assistance on certain technical points connected with crime investigation from the Deputy Director of Laboratory Services and his staff, to whom the Force is much indebted for the prompt and competent manner in which Police requests for technical help are invariably handled at the Laboratory.

18.—MURDER, ATTEMPTED MURDER, AND CULPABLE HOMICIDE.

Grave crime of this nature against the person during the period under review amounted in all to 39 cases, a reduction of 6 on the total for the preceding year. Convictions were obtained in 18 cases.

Murder.—Charges of actual murder were 20, and in examining motives occasioning such it was found that :—

7 cases were due to jealousy or other motives in connection with women.

6 cases were due to a desire for plunder.

2 cases were the result of a quarrel.

1 case was caused through the insanity of the offender.

1 case was attributed to spear-blooding by a native youth following a tribal circumcision ceremony.

In 1 case the accused was intoxicated.

In 2 instances the motive was not ascertainable.

With the exception of 2 cases, in which both victims and accused were Asiatics, natives only were concerned in cases of murder reported to the Police during the year.

Women were murdered in 5, and children in 3 instances.

The methods adopted were :—

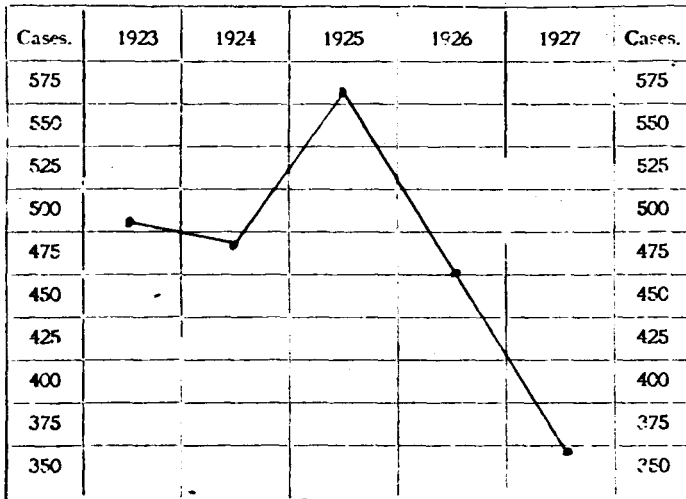
	Cases.
By stabbing or cutting	11
Shooting	2
Beating with a heavy instrument	4
Strangulation	2
Poison	1

19.—HOUSEBREAKING.

The pointer for this most serious of all offences against property continued to show a most gratifying fall. Reported cases during the year amounted to 373, a reduction of 102, or 21 per cent., on the previous year's total of 475.

Comparative figures are illustrated on the graph below.

HOUSEBREAKING.
(SETTLED AND URBAN AREAS).



In 1926, convictions were obtained in 161 cases; in 1927, 170. The conviction percentage of true cases being 36 per cent. for 1926, and 50 per cent. for 1927.

I have no hesitation in attributing these successful results to Police concentration on the prevention of crime, and I submit that these figures and the reduction they show in a period of 5 years in this rapidly advancing Colony will favourably challenge comparison with those of any other civilised or semi-civilised Colony.

Preventive Police work in so far as housebreaking is concerned consists in general of :—

(1) *Efficient and Systematised Night Patrolling.*—The organisation of these patrols has been made a conspicuous feature of Police work during the past two years. I quote the following figures indicative of Police activity in this direction.

ARRESTS BY NIGHT PATROLS.—(SETTLED AND URBAN AREAS.)

YEAR.	Persons arrested by Night Patrols.	Number of arrests subsequently convicted under Township Regulations or for other offences.
1925.. ..	830	751 or 90%
1926.. ..	1,456	1,192 or 81%
1927.. ..	3,052	2,720 or 89%

(2) *Police Surveillance of Habitual Criminals.*—Police supervision has done much to curtail the nocturnal activities of the professional criminal, and while this work is efficiently performed it is conducted in such a manner as not to prejudice the individual's opportunities for acquiring an honest livelihood.

A tribute to Police efficiency in this respect was made recently by several natives of this class in Nairobi, who remarked that they are now so well known to the "Serkali" that they dare not commit offences as discovery was regarded as inevitable.

Householders can do much to assist the Police by the provision and use of adequate locks and bolts to doors and windows. Where windows must necessarily be open during the hours of darkness some form of metal netting or bars should be inserted in the apertures of windows accessible from outside the house. Further, immediate notification to the Police of the occurrence of a theft or housebreaking very considerably helps the Police and enhances the possibility of successful detection and recovery of the stolen property.

20.—THEFT AND ROBBERY.

Number of Cases in Settled and Urban Areas.

YEAR.	THEFT (CASES).		Robbery.
	Value of Shs. 100 or over.	Value under Shs. 100.	
1923.. ..	246	1,348	33
1924.. ..	331	1,735	41
1925.. ..	348	1,833	25
1926.. ..	490	1,751	21
1927.. ..	373	1,627	27

	Theft.		Robbery.	
	1926	1927	1926	1927
Percentage of convictions to true cases	55%	66%	38%	69%

The decline both in major and petty theft is most marked. The towns and districts in which the decrease was specially conspicuous were Nairobi, Mombasa and Nakuru.

The bicycle thief has been with us for many years although his activities have of late been much curtailed.

Motor vehicle theft is yet in its infancy in Kenya although the Police are alive to the attraction offered the daring thief by cars that are frequently to be found unguarded by night as well as by day throughout the Colony.

The following statistics deal with the theft of cars and cycles in all settled and urban areas during 1927 :—

	Bicycles.	Motor cycles.	Cars.
Number stolen in 1927	55	2	7
Number recovered	32	2	7
Number of cases in which convictions obtained	23	1	1

21.—STOCK THEFT.

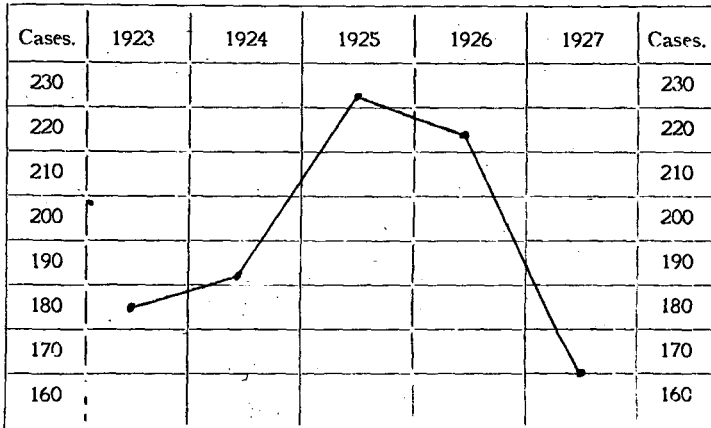
Cases reported during the past five years are shown on the graph.

170 cases in 1927 represent a reduction of 24 per cent. on the previous year. Almost without exception the reduction in this form of predatory crime has been reflected in all settled areas and the aggregate is the lowest the Colony has known for some years. The conviction percentage of true cases during the past twelve months was 43 per cent. in comparison with 42 per cent. in 1926.

The institution of a patrol on the Sotik-Kisii border did much to put down the theft by Kisii of squatters' cattle on farms in the Sotik area of Kericho.

STOCK THEFT.

(SETTLED AND URBAN AREAS).



22.—STOLEN PROPERTY.

The stated value of property (including stock) reported to have been stolen as the result of theft, burglary, etc., during the past six years is appended.

YEAR.	Value of stolen property	Value of stolen property subsequently recovered.	Recovery Percentage.
	<i>Shs.</i>	<i>Shs.</i>	
1922.. .. .	315,794	111,950	35.45%
1923.. .. .	291,697	108,194	37.09%
1924.. .. .	272,264	100,810	37.02%
1925.. .. .	440,187	207,646	47.17%
1926.. .. .	383,665	137,958	35.95%
1927.. .. .	302,404	154,714	51.16%

The percentage of recovery of stolen property by the Police in other parts of the Empire is given below:—

Burma, 1926	...	...	...	...	26.0 per cent.
Rangoon Town, 1926	...	...	...	...	18.0 „ „
Southern Nigeria, 1926	...	...	...	...	23.0 „ „
Mauritius (Praedial Larceny only), 1926	...	...	...	...	33.0 „ „
Bombay Presidency, 1926	...	...	...	...	39.3 „ „
Nyasaland, 1926	...	...	...	...	27.0 „ „
Zanzibar, 1926	...	...	...	...	31.0 „ „
Metropolitan Police (London), 1925	...	...	...	...	13.0 „ „
Kenya, 1927	...	...	...	...	51.1 „ „
Nairobi, 1927	...	...	...	...	68.9 „ „

The ratio of recovery attained in Kenya generally and in Nairobi particularly is phenomenal and is sufficient tribute to the efficiency of Police investigation.

23.—LOCAL AND SPECIAL ORDINANCES.

Police prosecutions under local and special laws totalled 13,706 during 1927 compared with 9,944 during the foregoing twelve months, or 37 per cent. increase. In 12,420 charges convictions were obtained, 13,257 persons being convicted.

The Ordinances, under which the majority of these cases were taken are:—

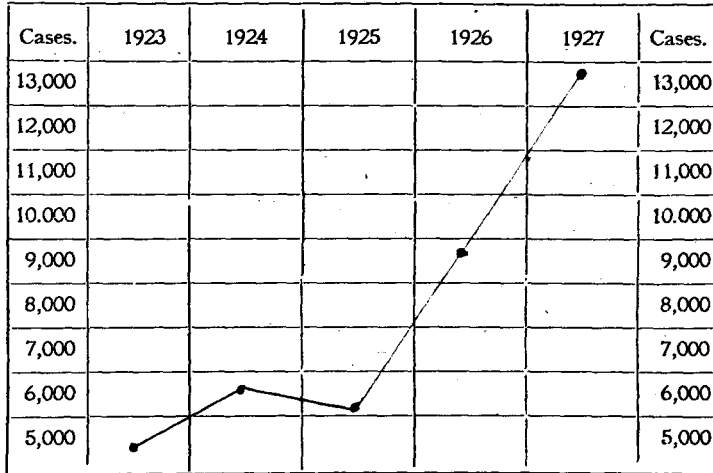
Number of Prosecutions.

809, Motor Traffic Ordinance.
696, Resident Natives Ordinance.
202, Liquor Ordinance.
692, Native Liquor Ordinance.
3,594, Township Regulations.
135, Cruelty to Animals Ordinance.
281, Vagrancy Ordinance.
632, Diseases of Animals Ordinance.

Zeal in respect of the enforcement of minor laws is not only a sign of continued watchfulness and Police activity but it effects control and supervision of undesirable characters with consequent prevention of more serious crime.

LOCAL AND SPECIAL ORDINANCES.

(SETTLED AND URBAN AREAS).



24.—RECONVICTED CRIMINALS.

Persons convicted for the second time or having already two or more previous convictions against them are :—

Year.	<i>Convicted for the second time or over.</i>			
1919	141
1920	181
1921	304
1922	670
1923	691
1924	798
1925	806
1926	966
1927	1,101 (14% increase.)

Of the total for 1927, 1,069 were natives.

Persons with four or more convictions were 320 (313 being natives) in comparison with 191 in 1926, or 67 per cent. additional.

Of native reconvicted criminals resident at the moment in urban or settled areas, or reconvicted during 1927, 36 are classified by the Police as " dangerous ".

The steady increase reflected by these figures in the ranks of the professional native criminal is a feature of the development of a young Colony with an extensive native population that has come into contact with the mere fringe of civilisation.

The native criminal class is composed in the main of the detribalised and town-dwelling African who usually possesses some small degree of education and the mental training undergone in its acquisition enables him to bring comparatively a keen intelligence and ingenuity to the planning and execution of crime.

25.—CRIMINAL INVESTIGATION DEPARTMENT.

This department continued its activities on the lines laid down on its inauguration in 1926.

The duties pertaining to the Central Arms Bureau under the new Arms Ordinance for the Colony were allotted at the close of the year to the Criminal Investigation Department but no additional staff was allotted for this intricate task.

(a) *Crime Branch*.—This branch undertakes the investigation on behalf of, or in conjunction with, the uniform Police, of important enquiries and cases and those presenting features of unusual complexity.

40 cases and enquiries were conducted during the year, in connection with which 35 persons were brought to Court accused of offences, 30 being convicted.

A further 84 persons were arrested for offences detected by the Criminal Investigation Department and handed over for prosecution to the Police of the districts concerned.

20 old offenders whose whereabouts had been lost were traced and returned to active Police surveillance; and 18 persons " wanted " were located.

District Police on 14 different occasions applied for and received assistance from the Criminal Investigation Department staff.

(b) *Records Branch.*

(1) *Deportations.*—Information supplied by this important branch of the Criminal Investigation Department was instrumental in the following being sent out of the Colony :

Europeans	...	...	...	...	12
Asiatics	...	...	...	...	2
Somalis	...	...	...	...	2
Natives	...	...	...	...	1
					<hr/>
					17
					<hr/>

(2) *Files.*—The number of files in the records section increased from 1,613 to a total of 2,041, or 26 per cent. additional.

To facilitate reference to the information recorded in this section, an increase has been made in the number of card indices, and at the close of the year 12 such were in use.

(c) *Surveillance Branch.*—On 31-12-27, 633 persons were under Police surveillance, a considerable increase on the total for 1926. Of these—

5 are Europeans.

2 are Asians.

626 are Natives.

633

88 surveillees were photographed during the twelve months bringing the total number of photographs on record in this branch to 440.

It is of interest to note that Akikuyu comprise 34 per cent. of the total of 633 convicts under surveillance, and Kavirondo a further 18 per cent.

121 Police surveillees were reconvicted.

(d) *Passport Control Office.*—A branch Passport Office under the supervision of the Criminal Investigation Department, Nairobi, was opened at Mombasa in October to meet the convenience of the public in the Coast area.

PASSPORTS ISSUED.

	1926	1927
Nairobi	1,068	1,477
Mombasa .. .. .	..	57
TOTALS ..	1,068	1,534

PASSPORTS RENEWED.

	1926	1927
Nairobi	3,301	2,444
Mombasa .. .. .	..	187
TOTALS ..	3,301	2,631

LETTERS OF RECOMMENDATION.

	1926	1927
Nairobi	61	28
Mombasa .. .. .	..	12
TOTALS ..	61	40

(e) *C.I.D. Staff.*—The following of the staff of the Criminal Investigation Department performed good work during the year :—

Acting Assistant Inspector D. M. Stephens.

European Constable A. Poskitt,

Chief Sub-Inspector Manilal Mehta.

Sub-Inspector Luka Kiwanuka.

Sub-Inspector Charag Din.

26.—CO-OPERATION BY THE PUBLIC.

Rewards granted to individual members of the public for assistance given to the Police in exceptional circumstances, or when the help has involved considerable inconvenience, loss or danger to the informant, are as below :—

YEAR.				Number of persons rewarded.	Total sum paid.
1925	..	..	..	48	<i>Shs.</i> 528
1926	..	..	..	84	1,377
1927	..	..	..	122	2,272

Part III.—Outstations.

27.—OUTSTATIONS.

Eldoret.

(a) *Eldoret*.—Stock theft, which during the previous year in this district had shown a considerable rise, was reduced to 41 cases, a fall of 33 per cent.

This was effected by Police activity in the form of border patrols and the seizure early in the year by a special patrol of a considerable number of cattle on which brands were found to have been altered or mutilated.

The infliction of collective punishment on neighbouring Reserves also proved of material assistance to the Police in their efforts to control this popular form of native crime.

Valuable aid was rendered by tribal retainers in adjoining reserves in three cases of stock theft. Help of this nature is keenly appreciated by the Police, particularly so as they are debarred from operating in Native Reserves save in exceptional circumstances.

About the middle of the year a number of thefts of cash left unattended in motor cars in Eldoret Township took place. Three Nandi were arrested by the Police on suspicion, a considerable sum in cash being discovered in their possession. This class of theft ceased after these arrests.

Police work in the Turbo area was heavy, largely owing to the presence of the Railway construction camp.

The transference of the camp to Uganda has already diminished crime in that locality.

A motor accident, which may be classed as one of the most serious known in the Colony, took place at the close of the year in Eldoret when a car left the road near the Sosiani River Bridge and turned completely over in the bed of the stream.

Two of the occupants were pinned under water beneath the overturned car. Although immediate efforts were made to rescue them and artificial respiration resorted to for over an hour and a half, neither recovered.

The magistrate remarked at the inquest upon the excellent work performed by the Police in rescuing the victims of the accident and in attempting to resuscitate by artificial respiration those who had been immersed in the river.

Fort Hall.

(b) *Fort Hall.*—Two Police Stations which had been in close proximity at Chania and Thika Township were amalgamated early in the year into one station at Thika, staffed by an inspector, a European constable and the customary African personnel. This step has resulted in enhanced efficiency, economy, and more effective control of crime.

This station is under the control of the Assistant Superintendent of Police at Fort Hall and has jurisdiction over the Ndurugu area, formerly in Kiambu Police District, and over part of Donyo Sabuk hitherto policed from Machakos.

The inclusion in Fort Hall of these areas has resulted in a slight general increase being reflected in the crime statistics for that district. It is satisfactory to note that housebreaking, nevertheless, has decreased, the year showing only 16 cases throughout the whole district. Theft and stock theft also were controlled, and exhibit a decrease.

The District Police received valuable assistance from tribal retainers in the local Reserves in arresting offenders and conducting searches for stolen property conveyed into the Reserves for concealment.

Kiambu.

(c) *Kiambu.*—The Police work in general showed satisfactory results.

Three cases of armed housebreaking occurred in the early part of 1927, in one of which an Indian storekeeper was seriously injured by his assailants. Police investigation led to the arrest of three natives all of whom were convicted and received heavy sentences. Subsequently crime of that nature ceased.

The Thika Police and Ndurugu areas of Kiambu were, as mentioned above, transferred to Fort Hall Police District during the period under review.

The Kikuyu Police District is difficult to police effectively, and since it lies in close proximity to native reserve areas, the work of the Police becomes a complicated problem.

Crime is marked in the Kabete area of this region, and since its comparative contiguity to the Nairobi suburbs is undoubtedly the cause thereof, early provision for a Police Station at Kabete is one of the most urgent needs of the Force.

Mr. N. Stewart, M.M., Superintendent of Police, Kiambu, did consistently good work throughout the year.

Kisumu.

(d) *Kisumu*.—The decrease in crime in this district was marked, particularly so as regards offences against property.

The reduction of stock theft by 50 per cent. on the 1926 total, fourteen cases only being reported during last year, is particularly gratifying.

Mr. R. T. H. Anderson, in charge of the District, is to be congratulated on the businesslike way in which he organised night patrols and generally controlled the work of his Police unit.

The capture by the Kisumu Police in 1927 of a native well known as a professional house- and jail-breaker is commented on in paragraph 17.

Kitale.

(e) *Kitale*.—Crime on the whole showed a slight increase but the figures for both stock theft and housebreaking, the two most serious crimes against property, show a decrease.

	1926	1927
Housebreaking	23 cases	19 cases
Stock Theft	27 "	26 "

Kitale is increasing in importance very rapidly from a Police point of view, and the Assistant Superintendent of Police in charge, Mr. T. R. J. Ridgway, did well to keep grave crime down to the figures he has during the year.

Lumbwa.

(f) *Lumbwa*.—The influx of Akikuyu squatters on to farms in Lumbwa District and the ill-feeling existent between them and the Lumbwa resulted in an appreciable increase in crime; in the main theft from members of one tribe by those of the other. Charges of theft rose from 33 in 1926 to 61 in 1927. Stock theft from 5 to 13 cases.

The presence of a special patrol of 20 men under a European constable for policing South Lumbwa-Kisii border and the Sotik-Buret Reserve produced good results in the suppression of stock theft and raiding by the Lumbwa. No raid whatsoever occurring in 1927.

Machakos.

(g) *Machakos*.—An outlying portion of this district situated in the vicinity of Donyo Sabuk being too remote for effective Police supervision from Machakos was transferred to the jurisdiction of Thika Police Station. This step has made for additional efficiency and for convenience to residents in that locality.

Only 41 cases of actual crime occurred in the twelve months, none being worthy of special remark.

One report only of stock theft was made and this, on Police investigation, was found to be a case where cattle had strayed, no offence being committed.

The Assistant Inspector in charge, W. R. Elliott, maintained his command in good order, but is handicapped by the fact that he has no literate sub-inspector on his staff, and hence is unable to patrol his district as efficiently as I should like.

Mombasa.

(h) *Mombasa*.—The Port town and the Island of Mombasa from the Police point of view are changing rapidly. All classes of the community are increasing in numbers, while the execution of town planning schemes is causing the partial migration of the native population to residences distant from the actual town of Mombasa. The existence of work at remunerative rates is attracting to the island an influx of up-country natives who tend to oust the old law-abiding Arab, and to change for the worse the characteristics of the native population of the island.

To meet these new conditions re-allocation of Police to outlying parts of the island is essential and the first step in that direction, early in 1928, must be to provide a Police Station and staff at Shimanzi. Subsequently Police stations will be required on the mainland adjacent to the island.

Vehicular traffic has increased very considerably in the Coast town and its regulation and supervision has become an important factor in the work of the local Police.

At Mombasa, fire control duties are undertaken by the Police who receive training in this branch of their duties and new fire-fighting equipment has been recently provided and placed in a special shed at the main Police station.

The determined attack on housebreaking, the prevalence of which in past years brought Mombasa an unenviable notoriety, was continued during the year with marked success; the total cases reported in the year numbered 42 only (1926 total, 49), while an even greater diminution was effected in thefts, the total being 177 or 64 less than in the preceding year.

Only one housebreaking and one theft from a dwelling were reported from the European quarter of the town in 1927.

Careful Police surveillance of known criminals contributed in large measure to the success of the Mombasa Police in controlling crime.

There were 114 natives thus under observation. Their descriptions and *modus operandi* in crime so far as possible have been recorded, and compiled into a local "Who's Who" of recidivists.

An outbreak of gold ornament snatching in the streets occurred towards the end of the year, five cases being reported in two months.

The Police were on the *qui vive* for the offender and shortly afterwards arrested the culprit, a Baganda, red-handed. He received the exemplary sentence of three years' R.I. and 24 lashes. No further cases occurred.

A canteen was built and opened in the Police lines at Mnazi Moja, where the African police now purchase their requirements in food and clothing. Here also they obtain refreshments such as tea and coffee, and thus are no longer compelled after a strenuous day's work to walk to the bazaar to satisfy their needs.

Captain E. R. Sullivan-Tailyour, Superintendent of Police, Mombasa, worked exceedingly hard throughout the year, and the fact that crime is controlled in Mombasa is undoubtedly due to his personal leadership together with the institution of the night patrol system and closer surveillance of habitual criminals.

The Police in Mombasa have received particular help and valuable advice from the Resident Commissioner.

Nakuru.

(i) *Nakuru*.—Serious crime in this District shows a slight decrease save in housebreaking of which the total of 60 is one case over the figures for 1926.

As in the past much of the crime in the area was occasioned by tembo brewing and drinking by squatters on farms. The Native Liquor Amendment Ordinance enacted at the end of the year will strengthen the hands of the Police considerably in controlling traffic in native intoxicating liquor, the possession on a farm without a permit of such liquor now being illegal.

It is hoped that work will be commenced early in 1928 on buildings for a Police Station at Solai where the need of Police staff on the spot is imperative. Njoro also demands its own station, the crime of that area cannot be efficiently controlled from Nakuru headquarters.

Nakuru township and the entire district is under-policed, and if we are to continue to control crime considerable Police expansion is necessary, particularly in the Gilgil area where the new railway operations will undoubtedly bring crime into the district.

Nyeri.

(j) *Nyeri*.—The advent of the railway through the district and the removal of the Somalis from the land temporarily occupied by them on the Uaso Nyiro caused a heavy call generally on the Police of the unit during the twelve months.

Special attention was paid to the enforcement of the Resident Native Labourers Ordinance and although comparatively few cases were brought to Court, Police work has resulted in the satisfactory regulation generally of squatters and their stock.

No increase in crime occurred despite the presence of railway construction camps in the district.

Captain B. W. D. Cochrane, Assistant Superintendent of Police, maintained his command in good order.

Rumuruti.

(k) *Rumuruti*.—Criminal work in this district is small.

Prevention of infringements of the Diseases of Animals Ordinance constitutes much of the Police work in this area, and patrols to stop illicit movement of stock are essential. Action was taken in 55 cases under this Ordinance, 59 persons being convicted.

Inspector G. E. Griffiths, who was in charge of this unit, maintained it in good order.

Part IV.—Nairobi.

28.—GROWTH OF NAIROBI AND INCREASE OF
POLICE DUTIES.

The growth of Nairobi, not only in population, but in what more directly increases the work of the Police, dwellings, is of interest.

There were, exclusive of the commercial area, bazaar, native villages and rural districts, the following :—

	Dwellings.
On January 1st, 1926	730
On January 1st, 1927	830
On December 31st, 1927	955

The outer suburbs of the town have grown correspondingly in extent, and the area in the direction of Kabete and Dagoretti causes the Police anxiety.

Africans in actual employment in Nairobi urban areas total approximately 22,655 (of whom 21,003 are adult males), a figure that does not include a considerable floating population composed of natives seeking work in, or passing through, Nairobi.

Besides the additional Police work in the prevention of crime necessitated by the expansion of the town and its population, increased demands were met in 1927 by the Nairobi Police in connection with traffic duty, street accidents, at the Eastern Africa Agricultural and other Shows, Air Force visits, and on other ceremonial occasions.

Notwithstanding the numerous calls on their services all ranks of the unit performed their duties readily and efficiently throughout the year. To give one instance of their conscientious work, I quote the fact that not a single case of theft was reported at the Eastern Africa Agricultural Show held in Nairobi on August 1st, 2nd and 3rd, the largest exhibition ever held in the Colony, where over 1,000 cars were parked.

29.—CRIME IN NAIROBI.

The year produced results in the reduction of crime, which I submit would bear favourable comparison with those of any other existing Police Force, colonial or otherwise.

(a) Housebreaking.

Number of Cases.

1925.	1926.	1927.	Decrease.
261	170	77	54%

Conviction percentage in 1926 was 28% ; in 1927, 46%.

This type of crime is regarded as the most serious of those offences against property which it is the duty of the Police to prevent. That the efforts of the Police in that direction have been rightly directed and phenomenal in success is illustrated by these figures.

The 77 cases in 1927 of housebreaking in Nairobi were committed on :—

European dwellings	...	...	...	23
Asiatic dwellings	...	...	...	21
African huts	...	...	...	23
In commercial area (offices, shops)	...	...	...	7
In outlying farms	...	...	...	3

In 25 cases, or approximately 33 per cent., entry was obtained through window apertures.

(b) Theft.

Number of Cases.

1925.	1926.	1927.
747	650	495

The decrease in theft during 1927 amounted to 23 per cent., compared with 1926, and to 32 per cent. on the 1925 figures.

The reduction comprises both major and petty theft.

The percentage of convictions to true cases was : 1927, 59%, and 1926, 48%.

Fowl stealing, of which Nairobi experienced an outbreak in 1926, did not recur.

(c) Property Stolen and Recovered.

The value of property stolen in Nairobi totalled Sh. 97,240 and of that figure Sh. 67,080 was subsequently recovered on investigation. The percentage is 68.9%, to which I would draw particular attention. It is outstandingly high.

(d) Local and Special Ordinances.

Prosecutions by the Police under Local Ordinances were :—

	No of cases.	No of cases in which convictions obtained.
1926.. .. .	4,574	4,255
1927.. .. .	4,758	4,358

Of the total for 1927, 2,467 were cases in which the Police took action under the Township Regulations, and 496 were cases under the Liquor Ordinance.

30.—NIGHT PATROLLING, NAIROBI.

The decrease in serious crime in the capital is mainly due—

- (a) to Police activity in patrolling both day and night;
- (b) to the fact that surveillance over known bad characters has been so carefully maintained that a surveillee is now rarely found to be the author of a serious offence.

The populated areas of the town have been divided into six sections for night patrol duties, and there are in addition five points to which the patrolmen report at certain frequent intervals.

Some of these points are in telephonic communication with the main Police station, and the Force in Nairobi is now working towards the lines of the Police telephone box system recently adopted in some parts of England and elsewhere in the Empire.

The box system is proving suitable and satisfactory in meeting the conditions peculiar to Police work in the Colony and its use will be extended by the provision of further boxes when, and if, possible.

Night patrols in Nairobi arrested 941 persons during the year, of whom 883 were convicted magisterially for various offences.

31.—STREET AND TRAFFIC CONTROL, NAIROBI.

The regulation of traffic in Nairobi streets and at public functions, theatre, and dances, etc., was handled by a special traffic squad composed of four European and twenty-eight African Police. This squad will require augmentation in the near future.

The number of accidents in Nairobi and surrounding district showed a large increase over those of the previous years :—

1925	...	...	...	52
1926	...	...	...	145
1927	...	...	...	227

It is significant that more vehicular accidents were attributable to negligence than to any other cause.

In 1927 death resulted from three accidents, while 105 persons sustained injuries in street accidents. The Police instituted prosecutions in 42 instances.

Action was taken by the Police in 332 cases under the Motor Traffic Ordinance and 18 drivers' licences were suspended.

In view of the heavy toll of motor accidents on public thoroughfares, the Municipal Council, the Roads and Traffic Committee, and the R.E.A.A.A. recommended to Government the adoption of speed limits within the Township boundaries. I trust that the motoring public will realise that the enforcement of speed limits is an unpleasant duty that the Police have to perform without fear or favour.

	1926	1927
Number of passenger motor cars plying for hire	41	63
Number of passenger lorries plying for hire ..	62	82
Number of rickshaws licensed for hire (approximately)	300	200
Number of vehicles, all classes, licensed to carry goods	893	894
Number of pedal cycles licensed	2,915	3,009
	4,211	4,248

32.—FIRES.

40 fire calls were received during the year, 9 being false, of which 3 were mischievous.

Actual fires in buildings totalled 13, three of that total being serious.

33.—GENERAL.

(a) *Police "Review"*.—A *Police Review*, issued monthly, and containing resumés and notes on Police cases of importance, information and news of Police interest, was started by Captain Rice, Superintendent of Police, Nairobi. The departure is of service as a medium for the dissemination of Force news, and tends to maintain general interest in Police matters amongst literate members of all ranks.

(b) *Dormitory Accommodation*.—The substitution of large dormitories for the non-married African constables, in place of the dark and ill-ventilated cubicles formerly provided, and shared by two or more men, has tended to increase the comfort of those ranks pending the provision of adequate and suitable living quarters for the Nairobi unit.

34.—SPECIAL MENTION.

I wish to commend specially to the notice of the Government the good work performed in Nairobi by Captain H. P. Rice, Superintendent, who was in charge of the unit throughout the year, to whose efficiency and consistent hard work is attributable the successful crime results obtained last year in the capital.

I would also commend the general efficiency and devotion to duty of the following:—

Chief Inspector R. Middleditch, Nairobi Central Station.

Asst. Inspector W. H. Scott, Kilimani Station.

European Constable F. J. Griffin, Investigation Branch, Nairobi Station.

European Constable D. C. Connor, Traffic and Stables Section.

Sub-Inspector Nadir Hussein, Nairobi Station.

Part V.—Motor Vehicles.

35.—MOTOR VEHICLE REGISTRATION.

Motor vehicles licensed in Kenya are as follows :—

	1926	1927
Motor cars	3,469	4,488
Motor lorries	622	636
Motor cycles	1,248	1,488
TOTAL	5,339	6,612

36.—MOTOR DRIVERS' CERTIFICATES OF COMPETENCY.

Certificates of driving competency are issued by the Police after actual test of the applicant's capacity in driving and controlling his vehicle, in his knowledge of the rules of the road and the tenets of road courtesy.

Certificates were issued as follows :—

1924.	1925.	1926.	1927.
1,021	1,581	1,914	2,107

295 duplicate certificates were issued in 1927.

Total drivers' certificates suspended by Magistrates in 1927	31
Total drivers' certificates endorsed by Magistrates in 1927	8
Total drivers' certificates cancelled by Magistrates in 1927	1

37.—MOTOR TRAFFIC.

The motor traffic of Kenya continues to increase in volume and, largely through the selfishness and ignorance of a small minority of drivers, in the degree of danger it presents on the highway.

Traffic control and the enforcement of the provisions of the Motor Traffic Ordinance and Township Regulations governing general vehicular and motor traffic form a constantly expanding demand on the personnel of the Force.

The staff of the Motor Traffic Bureau, which deals with all matters pertaining to traffic and to motor traffic in particular, was increased during the year to cope with the extra volume of work thrown on it.

Regulations were passed by Government at the end of the year restricting the maximum speeds of motor lorries and omnibuses in accordance with weight, making it obligatory to carry rear-reflecting mirrors and prescribing other regulations which had long been necessary for the safety of those using such vehicles as well as for the road-using public as a whole.

It is in this connection that I would like to remark that a section of the motoring public of Kenya do not apparently grasp the fact that the Police are not the law but the arm of the law.

If the law exists then the Police must enforce that law.

38.—ACCIDENTS.

The following table reflects details of those accidents which came to the notice of the Police during 1927.

Of the total of 300 reported, motor vehicles were responsible for 261.

In 10 accidents, death resulted from injuries received, and in 141 personal injuries were caused.

The Police prosecuted in connection with 65 accidents.

STREET ACCIDENTS.

ACCIDENTS DUE TO	VEHICLES RESPONSIBLE.						Total No. of acci- dents.
	Motor.			Animal drawn vehicles	Rick- shaws	Pedal cycles	
	Cars	Cycles	Lorries and Buses				
Negligence ..	41	6	22	4	4	4	81
Intoxication ...	3	..	..	..	..	..	3
Mechanical break- downs and faults	14	1	4	1	..	1	21
Skids and bad roads ..	8	1	4	..	..	..	13
Blind corners ..	2	..	..	..	..	..	2
Pedestrians' faults	33	2	6	..	..	1	42
Cyclists' faults ..	7	2	1	..	..	9	19
Other causes, human error, and uncertain ..	64	19	21	5	5	5	119
TOTAL ..	172	31	58	10	9	20	300

Part VI.—Miscellaneous.

39.—NEW BRANCHES AND INSTITUTIONS OF THE FORCE.

During the past three years the scope and activities of the Force have been extended by the organisation of the following branches :—

- Criminal Investigation Department.
- Motor Traffic Bureau.
- Boys' Brigade.
- Arms Bureau.
- Railway and Harbour Police.
- Police Schools in the majority of districts.
- Re-opening of the Weights and Measures Office, Nairobi.
- Branch Passport Office in Mombasa.
- Police Sports Club in Nairobi.
- Instruction in Bayonet Fighting.
- Instruction in Baton Drill.
- Instruction in First Aid and lifts for the injured, etc.
- Regular and closer inspections of Native Reserve units under the provincial system.
- Policing of the Northern Frontier Province and Turkana District.
- Card Index System and Central Registry for Surveillees.

40.—FINGER PRINT BUREAU.

The Criminal Records section of the Finger Print Bureau carried out a total of 8,634 searches during the year, 7,091 being of accused persons awaiting trial. 2,141 finger print slips were identified as those of persons who had been previously convicted, 275 of whom assumed an alias on being again charged. 15 arrests were effected solely on information furnished by the Finger Print Bureau.

Finger prints left on glass or other substances at the scene of crime were examined by experts from the Bureau in 62 cases. In one such instance where a particularly daring and well-planned burglary was carried out in Nairobi, the culprit (a native) was singled out by the Bureau from a number of other suspects by means of a finger print left by the thief on a vermouth bottle when committing the crime.

The total of prints recorded in the Criminal Records section of the Bureau on 31st December was 40,888, classified as follows :—

Europeans	328
Asiatics	1,091
Natives	39,469
	<hr/>
	40,888
	<hr/>

The Force is indebted to Mr. Wallace Burgess, officer in charge of the Bureau, and to Captain W. S. Taylor, for their ready co-operation and assistance in all matters and work connected with the Police.

41.—THE RAILWAY POLICE.

This unit, which was organised in 1926 to take the place of the system of Police detailed solely for " watch and ward " duties at certain railway stations, had a sanctioned strength of all ranks in 1927 of 174.

The length of line over which the unit has jurisdiction was approximately 1,154 miles, exclusive of the new wharves and sheds at Kilindini.

All ranks are now becoming conversant with the special nature of their duties and although the unit is still in its infancy considerable progress towards efficiency has been made resulting in undeniably good work during the year.

Theft forms the greater part of the crime in this unit, of which 186 cases were reported, in comparison with 184 in 1926. Convictions were obtained in 120 cases.

The value of the property stolen amounted to Sh. 8,621/02, recovery being made of a total of Sh. 3,730, or 43 per cent., a high percentage when compared with the statistical returns of other Forces, at home and abroad.

The following cases are worthy of note :—

- (a) Property valued at Sh. 1,000 was stolen from the Voi Dak Bungalow. Prompt investigation by the Police led to the arrest of the offender and the recovery within an hour of all the property stolen.
- (b) A European railway employee was convicted of breach of trust in respect of a considerable quantity of maize consigned to the railway, which he was detected in the act of selling.

Five cases of theft from ships' cargo were reported and in each instance all the property stolen was recovered and the accused convicted.

The Police prosecuted in 338 cases under Local and Special Ordinances (including 84 under the Railway Ordinance) in comparison with 149 similar prosecutions in 1926.

Success was obtained in dealing with stone-throwing at trains; here train patrols travelling on all passenger and on occasional goods trains rendered good service.

42.—IMMIGRATION.

The following tables relate to the work of the Immigration Department at Mombasa.

A.—IMMIGRANTS INTO KENYA COLONY ONLY.

Nationality.	1925	1926	1927
Europeans ..	4,212	5,173	5,388
Indians ..	7,161	7,271	8,163
Goans	754	743	690
Arabs	1,134	1,223	1,243
Others	1,907	1,895	2,030
TOTAL ..	15,168	16,305	17,514

B.—IMMIGRANTS INTO TANGANYIKA TERRITORY, UGANDA, AND CONGO BELGE, PASSING THROUGH MOMBASA.

Nationality.	1925	1926	1927
Europeans ..	739	885	913
Indians ..	2,379	2,482	1,993
Goans	199	231	181
Arabs	91	43	41
Others	169	191	120
TOTAL..	3,577	3,832	3,248

C.—EMIGRANTS THROUGH MOMBASA FROM KENYA,
TANGANYIKA, UGANDA, AND CONGO BELGE, ETC.

Nationality.	1925	1926	1927
Europeans ..	3,844	4,648	5,044
Indians ..	4,865	6,529	7,045
Goans	533	638	648
Arabs	911	622	833
Others ..	1,693	2,095	1,987
TOTAL..	11,846	14,532	15,557

D.—PASSENGER-CARRYING STEAMERS AND DHOWS.

	1926	1927
Steamers	377	390
Dhows.. .. .	54	47
TOTAL ..	431	437

Proceedings under the Immigration Restriction Ordinance were taken at Mombasa by the Immigration Department in 37 instances, as compared with 23 prosecutions in 1923.

57 persons were refused permission to land on presenting themselves before the Immigration Officers on arrival at the Port.

The Department collected deposits amounting to Sh. 463,550 from immigrants.

43.—WEIGHTS AND MEASURES OFFICE, NAIROBI.

This office had been closed since the end of 1923, owing to the retirement through ill-health of the former Inspector of Weights and Measures.

A qualified Inspector was engaged in England and arrived in the Colony in time to reorganise this branch of the Force in readiness for the renewed application of the Ordinance from 1st January, 1928.

44.—THE ARMS BUREAU.

The establishment of the Central Arms Office under the provisions of the new Arms Ordinance of the Colony was assigned to the Police. The Central Office is for the purpose of recording all licences and permits issued under the Ordinance and a special section of the Criminal Investigation Department was formed at the close of the year to prepare organisation in order to take up the duties involved.

45.—MEANS OF COMMUNICATION.

(a) *Railway*.—Rail communication was extended 23 miles north of Nyeri on the Fort Hall-Nyeri line, and through to Uganda on the Eldoret branch line.

(b) *Telephones*.—No development of special note in telephonic facilities affecting the Police occurred during the year. Provision of long-distance telephones throughout the Colony will very considerably aid the Force in matters of urgent importance. The existence of means for rapid and direct circulation of information and orders in cases of sudden emergency is obviously desirable.

(c) *Transport*.—The following animals were on Police charge at the close of the year :—

Horses and ponies	...	...	...	...	27
Mules	...	...	...	...	28
Oxen	...	...	...	...	14
Donkeys	...	...	...	...	46

The majority of European officers and other ranks in the Force provide their own motor vehicles which they employ on Government service.

28 pedal bicycles are in use among Police stations for African non-commissioned officers and Police messengers.

46.—FIRST AID.

Instructional lectures on the St. John Ambulance syllabus were conducted for literate officers, and nine of those attending obtained the St. John Ambulance Brigade proficiency certificate, European Constable F. J. Griffin being awarded the St. John gold medallion.

23 European members of the Force now hold the St. John Ambulance certificate as qualified to render first aid.

Further progress has been made in training the African personnel in the simpler details of assisting the injured, such as stretcher drill, correct method of lifting a disabled person, and artificial respiration. This important side of Police work is now becoming generally familiar to the African Police.

In this Colony of far-flung Police posts and distant medical help, the efficiency and equipment of the Force to render first aid, until the services of a qualified doctor can be obtained, is an obvious Police essential, and no effort will be spared to render the Force efficient in this respect.

47.—PREVENTION OF CRUELTY TO ANIMALS.

The East African Society for Prevention of Cruelty to Animals was assigned the services of a European Constable to carry out the duties of inspector in Nairobi, the Society undertaking to defray the cost of salary. 135 cases under the Prevention of Cruelty to Animals Ordinance were dealt with, the total for the foregoing year being 104. 114 convictions involving 117 persons were recorded in 1927.

48.—POLICE BOYS' BRIGADE.

The second year following the institution of the Police Boys' Brigade saw an advance in the strength from 54 to a total of 73 boys.

The healthy discipline, education and habits of cleanliness and self-respect taught the boys have proved beneficial in every way and to be essential factors in training the young African.

Of the total strength, 63 boys are employed for a portion of each day at Police offices or stations in the capacity of messengers. They are paid for this work a small wage graduated according to age, and while receiving useful training they release for Police duty proper a number of trained policemen.

49.—POLICE REST CAMP AT MOMBASA.

The desirability of providing officers and their families with facilities for obtaining rest and a change of climatic conditions at the Coast from the altitude and work in highland stations was met during the year by the temporary assignment to the Police of a plot of land at English Point opposite Mombasa Harbour.

Here a suitable rest house in ideal surroundings has been built at the expense of the officers, who are thus encouraged to take advantage of local leave which they have had in the past to deny themselves on the score of expense.

50.—EVENTS OF THE YEAR.

(a) *Olympic Sports*.—At the annual Olympic sports, held on March 15th for native competitors from the whole of the Colony, the following events were won by members of the Kenya Police :—

Tug of War.—Nairobi Police Unit.

Long Jump.—No. 7736 3rd Sergeant Theodore Atamaroru of the Police Training Depôt.

100 yards.—No. 6600 1st Constable N'jia Ochillo of Nairobi Unit.

1 mile.—No. 8514 2nd Constable Nganga Chegge of Nairobi Unit.

120 yards Hurdles.—No. 8710 3rd Constable Getau Kinuthia of Nakuru Unit.

Obstacle Race.—No. 8710 3rd Constable Getau Kinuthia of Nakuru Unit.

(b) *Notley Cup for Revolver Shooting*.—European Constable N. Hamer.

(c) *General Edwards Musketry Cup*.—Police Training Depôt.

(d) *Kenya Police Cup*.—The officers of the Police presented a cup at the Nairobi July Races which was won by Commander S. L. K. Lawford's "Othello."

(e) *Police Football Team*.—In this, its first year of inauguration, the Police football team won the Dobbie and May Cups.

To European Constable D. Nicol, the captain, is due much credit for its training and the success attained by the team, which has done much to foster *esprit de corps* and camaraderie within the Force.

(f) *June 3rd, 1927*.—On the anniversary of His Majesty's Birthday, the ceremony of Trooping the Colour was carried out by the 3rd King's African Rifles in the presence of His Excellency the Acting Governor, Sir Edward Denham, K.B.E., C.M.G. Our grateful thanks are due to Lieut-Colonel C. S. Davies, C.M.G., D.S.O., for kindly permitting a guard to be provided by the Police which participated in the parade.

(g) *Armistice Day*.—The Police carried out the requisite dispositions in connection with this solemn anniversary. His Excellency the Governor was pleased to express his appreciation of the manner in which the Police arrangements were carried out.

51.—SUMMARY.

I submit that considerable strides in Police efficiency have been made during the year under review but we have before us many obstacles to overcome; while we ourselves are not unmindful of our failings to combat which, however, no effort or energy will be spared.

The new Police Ordinance will, we hope, pass into law during the coming year and will, if approved by Government, enable us to surmount a number of the difficulties under which we are at present labouring.

Special Mention.

Mr. J. M. Lumley, Deputy Commissioner, acted for me from July to the end of the year, during the time that I was on leave. He carried on the work and command of the Force in a most zealous and loyal manner and I am most grateful to him for his efficient work.

The Headquarters Staff, consisting of—

The Assistant Commissioner, Mr. J. F. Wolseley-Bourne, M.C.;

The Acting Assistant Commissioner, Captain M. St. C. Thom (during my absence on leave);

The Staff Officer, Captain G. Pritchard Brown; all worked hard and efficiently, and have brought the internal working of Force Headquarters to a high standard of method and system.

Mr. C. F. Bristow, as Headquarter Superintendent in charge of the Stores and Pay work of the Force, rendered yeoman service.

In conclusion, I desire to bring to the notice of His Excellency the Governor the services of those officers, non-commissioned officers, subordinate officers, clerks and African ranks mentioned in this report, and to thank them for their zeal and loyalty.

R. G. B. SPICER,
Commissioner of Police.

DISTRIBUTION OF COGNISABLE CRIME IN SETTLED AND URBAN AREAS IN THE COLONY
AND PROTECTORATE.

STATIONS.	Murder, Culpable Homicide and attempts etc.		Other Offences Against Person.		House-breakings.		Stock Thefts.		Robbery and Dacoity.		Theft (excluding stock).		Other Offences under I.P.C. cognisable.		TOTAL.	
	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927
Eldoret	2	4	24	32	39	40	62	41	..	2	189	214	59	56	375	389
Fort Hall	6	2	14	17	18	16	9	5	1	6	78	76	37	49	163	171
Kiambu	2	3	29	34	41	41	11	5	1	2	160	136	49	51	293	272
Kisumu .. .. .	..	2	23	11	34	42	28	14	2	1	177	136	46	33	310	239
Kitale	2	2	14	27	23	19	27	26	2	1	150	137	38	56	256	268
Lumbwa	2	2	5	7	9	13	5	13	1	..	33	61	8	16	63	112
Machakos	1	2	3	6	4	3	5	1	1	1	18	20	4	8	36	41
Mombasa	6	8	42	29	49	42	5	3	..	3	241	177	43	62	386	324
Nairobi	9	3	98	62	170	77	7	4	6	4	650	495	171	166	1,111	811
Nakuru	9	7	60	64	59	60	42	37	7	2	289	274	67	93	533	537
Nyeri	2	3	7	14	8	6	16	15	..	1	56	60	36	34	125	133
Rumuruti	2	..	7	6	3	4	7	5	..	1	16	28	11	11	46	55
Railway and Harbour Police	2	1	10	19	18	10	..	1	..	3	184	186	31	22	245	242
TOTAL ..	45	39	336	328	475	373	224	170	21	27	2,241	2,000	600	657	3,942	3,594

THE KENYA PRISONS
ANNUAL REPORT, 1927.

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COLONY AND PROTECTORATE OF KENYA.

PRISONS DEPARTMENT.

ANNUAL REPORT, 1927.

1.—PRISONS.

1. The established prisons in the Colony during 1927 were as follows :— Number and class.

3 First Class Prisons at Nairobi, Mombasa and Kisumu.

3 Second Class Prisons at the provincial centres at Lamu, Nakuru and Nyeri.

22 Third Class Prisons at the district headquarters at Eldama Ravine, Eldoret, Embu, Fort Hall, Kacheliba, Kakamega, Kapsabet, Kericho, Kilifi, Kipini, Kisii, Kitale, Kitui, Kwale, Kyambu, Machakos, Malindi, Meru, Naivasha, Narok, Rumuruti, and Voi.

The Special Prison at Ngong was closed on the 30th June, 1927, but was reopened for a short time at the end of the year to house a gang of convicts sent from Nairobi Prison to repair the main road to Ngong.

A Special Prison was inaugurated at Kitui on 3rd May, 1927, when 20 African convict artizans from Nairobi Prison, with a European technical instructor, were sent to undertake the construction of new buildings.

Population.

2. Committals to prison throughout the Colony during 1927 as compared with the two preceding years were as follows :— Committals.
(Appendices I and II).

	1927.	1926.	1925.
On conviction ...	8,117	7,545	6,736
* On remand ...	3,341	3,082	3,100
Lunatics ...	108	95	90
Civil debtors ...	166	183	122
Total ...	11,732	10,905	10,048

* Excluding those subsequently sentenced to imprisonment.

Showing an increase of 572, or 7½ per cent. in committals of convicted prisoners, an increase in remand prisoners admitted but not convicted of 259, or 8 per cent. and a decrease in civil debtors of 17. The net increase in the total committals in 1927 as compared with 1926 was 827 or 7½ per cent.

The figures for each prison are given in Appendix I, and a comparison with 1926 is shown in Appendix II.

Daily average.
(Appendix III.)

3. The daily average of prisoners in all the prisons combined increased from 2,243 in 1926 to 2,524 during 1927, an increase of 12½ per cent. This daily average was made up as follows : —

	1927	1926
Convicted prisoners undergoing sentence of imprisonment ...	2,324	2,023
Remand prisoners, lunatics, and debtors ...	200	220
Total daily average ...	2,524	2,243

It is to be noted that the increase in the daily average of persons undergoing penal imprisonment, comparing 1927 with 1926, was 15 per cent.

Appendix III contains a statement of the daily average population of each prison for the past five years.

Nationalities.

4. The nationalities of the 8,117 persons committed to prison to serve sentences of imprisonment during 1927 compared with the two preceding years were as follows :—

	1927	1926	1925
EUROPEANS	12	22	13
ASIATICS—Goonas, etc. .. .	5	13	7
Indians	37	53	31
Arabs	55	33	50
Somalis	30	32	36
AFRICANS	7,978	7,392	6,599

The nationalities and tribes of the 7,978 Africans committed to undergo sentence of penal imprisonment in 1927, as compared with 7,392 so committed during 1926, were as follows :—

Natives of Kenya.

(1) Up-country Tribes :—	1927.	1926.
Kikuyu	1,842	1,694
Kavirondo Luo	960	814
Kavirondo Bantu	905	1,016
Nandi	614	432
Wakamba	507	771
Lumbwa	404	314
Kisii	335	367
Suk	132	52
Meru	120	233
Masai	114	257
Embu	99	117
Kamasia	59	47
Elgeyo	51	58
Various	67	—
	<hr/> 6,209	<hr/> 6,172
	<hr/>	<hr/>
(2) Coast Tribes :—	1927.	1926.
Giriama	445	114
Swahili	314	136
Taita	37	42
Pokomo	34	28
Digo	26	39
Various	88	136
	<hr/> 944	<hr/> 495
	<hr/>	<hr/>
(3) Natives of neighbouring territories :—	1927.	1926.
Natives of Uganda	409	410
Tanganyika	303	233
Nyasaland	46	45
Nubians	38	26
Portuguese East Africa	17	—
Various	12	11
	<hr/> 825	<hr/> 725
	<hr/>	<hr/>

5. There was an increase in 1927, as compared with 1926, in female convicted prisoners, but a decrease in juvenile prisoners, as the following table shows :—

Sex and age proportions.

	1927.	1926.
Female convicts	93	77
Juvenile convicts	190	217

The majority of the sentences passed on females were for short periods of imprisonment, whilst, in the case of juveniles, 42 were sentenced to periods of from one to five years in a reformatory, as compared with 28 in 1926, and were transferred to Kabete Reformatory, 4 served short sentences of imprisonment in local prisons, and 144 were sentenced to caning only, as against 183 sentenced to caning in 1926. Thus, although there was a decrease in the total number of juveniles sentenced, there was a greater number for more serious offences.

Recidivists.

6. The number of previously convicted prisoners rose from 8 per cent of the total in 1925 and 9½ per cent. in 1926 to nearly 11 per cent. in 1927. The actual numbers were:—

Previously convicted.

	Once.	Twice.	Thrice or more.	Total.
1927	472	169	213	874
1926	439	139	148	726
1925	300	91	124	515

As usual, the great majority of the recidivists were convicted in the towns, the actual figures being as under:—

District	Total convicted	No. of Recidivists	Per cent.
Mombasa	907	347	38
Lamu	75	23	31
Nairobi	581	174	30
Kisumu	780	84	11
Eldoret	590	58	10
Nakuru	609	46	7
Six towns	3,542	732	21
All other districts	4,575	142	3
	8,117	874	10.8

Civil debtors.

7. The number of debtors committed to prison decreased from 183 in 1926 to 166 in 1927.

The majority of these were Arabs committed at Mombasa and Malindi for non-payment of Non-Native Poll Tax.

8. The total number of prisoners admitted on remand ^{Remand} during 1927 was 7,184 as against 7,086 during the previous ^{Prisoners.} year. The disposal of these prisoners was as follows :—

Remaining on remand at end of 1926 ...	201
Admitted on remand during 1927 ...	7,184

Total ...	7,385
-----------	-------

Convicted and sentenced to imprisonment ...	3,546
Discharged from prison custody ...	3,650
Remaining on remand at end of 1927 ...	189

Total ...	7,385
-----------	-------

The daily average number of remand prisoners in all prisons throughout the year was 200 and the following table shows in which districts the largest numbers of admissions occurred :—

District.	Admitted.	Sentenced to imprisonment.	Discharged from prison custody.
Kisumu ...	795	449	332
Kitale ...	669	389	272
Eldoret ...	612	258	343
Nakuru ...	554	330	202
Nyeri ...	490	189	289
Nairobi ...	465	199	266
Mombasa ...	456	251	182
Kyambu ...	401	158	241
Fort Hall ...	352	160	189

The average period of detention on remand for all prisons during 1927 works out at over 10 days, but in the following prisons the average was higher than this, *viz* : Lamu, 23 days; Malindi and Meru, 18 days; Nyeri, 16 days; Mombasa, Kwale, and Machakos, 15 days; Voi, 14 days; Nairobi and Kisii, 12 days.

9. There was an increase in the number of lunatics ^{Lunatics.} admitted to prison during 1927 over the previous year, the total being 108 (83 males and 25 females) as compared with 95 (84 males and 11 females) in 1926. The increase was thus in female lunatics.

The following is a statement of admissions and their disposal :—

Lunatics.

	MALES.		FEMALES.		TOTAL.	
	Ordinary.	Criminal.	Ordinary.	Criminal.	Ordinary.	Criminal.
Remaining from 1926 ...	1	4	2	..	3	4
Admitted, 1927	79	4	22	3	101	7
TOTAL ...	80	8	24	3	104	11
Discharged	47	..	12	..	59	..
Sent to Mathari Mental Hospital	26	6	10	2	36	8
Died	4	..	1	..	5	..
Remaining on 31-12-27 ...	3	2	1	1	4	3
TOTAL ...	80	8	24	3	104	11

The largest numbers of admissions of lunatics were at Mombasa, 20; Nakuru, 19; Kisumu, 16; Fort Hall, 12; Nyeri, 11; and Eldoret, 10.

Class of crime.
(Appendix IV.)

10. Appendix IV contains a statement showing the class of offence of which the 8,117 prisoners were convicted and sentenced to imprisonment in 1927. From the comparison afforded with the years 1925 and 1926 it will be seen that there has been a steady increase in the number of imprisonments both for offences under the Indian Penal Code and under local Ordinances. Under the Indian Penal Code the increase is mainly in offences against the State, public tranquillity, health, safety and justice; whilst under Local Ordinances, in spite of the fact that many of these offences were dealt with under the Detention Camp Ordinance, there was a large increase in the number of imprisonments for contraventions of the Native Registration Ordinance and the Native Liquor Ordinance.

Sentences of imprisonment for serious offences against the person, person and property or property only, occurred mainly in the towns and in settled areas, viz. :—

			1927		1926
Nairobi	...	...	219	...	316
Kisumu	...	...	204	...	221
Nakuru	...	...	173	...	137
Eldoret	...	...	158	...	159
Mombasa	...	...	119	...	137

Appendix V contains a monthly statement for the years 1925, 1926 and 1927 of committals to serve sentences of imprisonment for offences under the Indian Penal Code.

11. Thirty-six prisoners (10 long term, 16 short term and 10 remands) escaped from custody during the year as compared with 40 in 1926. Of the 36 escapes, 17 were from within prison enclosures and 19 were prisoners at work outside the prisons. 22 were recaptured and 14 (2 long term, 8 short term and 4 remands) were still at large at the end of the year. Escapes.

The figures may be summarised as follows:—

	Long Term.	Short Term.	Re-mands.	Total.	Recap-tured.	Not recaptured
From Inside ..	3	8	6	17	10	7
.. Outside ..	7	8	4	19	12	7
TOTAL ..	10	16	10	36	22	14

The thirty-six escapes occurred at the following prisons:—

5 each from Kakamega and Kitui; 3 each from Kwale, Fort Hall, and Kisii; 2 each from Narok, Eldoret, Meru, Nyeri, Eldama Ravine, and Kilifi; 1 each from Nairobi, Rumuruti, Voi, Kisumu, and Naivasha.

12. The total number of punishments awarded to prisoners for prison offences during 1927 was considerably less than in previous years, though there was an increase in the awards of corporal punishment. Punishments.

The decrease occurred mainly in Nairobi Prison, where the total number of punishments was 148, as compared with 282 during 1926.

The following is a summary for all prisons :—

	1927.	1926.	1925.
Corporal Punishment	39	31	31
Penal Diet	43	232	182
Solitary Confinement	5	10	9
Solitary Confinement and Penal Diet	202	112	87
Loss of Remission	10	21	46
Loss of Remission and Penal Diet	62	47	31
Leg Irons	9	3	10
Reprimanded	9	10	17
Extra Imprisonment	10	6	11
TOTAL ..	389	472	424

In ten of the smaller prisons no punishments were awarded. As might be expected the majority of the punishments were inflicted in the three first-class prisons, where long-sentence convicts are imprisoned, the numbers being as follows :—

Nairobi	148
Mombasa	119
Kisumu	64
Total ...	331

Licences to be
at large.

13. Under the provisions of the Prisons (Amendment) Ordinance, 1918, which permits of the release on licence of a first offender on completion of two-thirds of a sentence of not less than three years, 40 convicts were released on licence during 1927 as compared with 62 in 1926. In three cases the licences were revoked for breach of conditions.

Industries and Labour.

Industries.

14. The Colony's estimates of expenditure for 1927 provided a sum of £6,150 for the purpose of raw materials for prison industries of which £3,842 was expended. The revenue estimates showed an anticipated revenue from this source for the year of £7,150. The actual amount paid into the Treasury was £6,975, *i.e.*, £175 less than the estimate. The failure to reach the anticipated revenue is accounted for by the fact that less convict labour was available for hire on payment owing to the large number of convicts employed (without payment) on the reconstruction of Government House and other work for the Public Works Department. The

decrease in the revenue for 1927 as compared with 1926 is considerable, that of 1927 being £3,161 below that of the previous year, which however included £906 actually earned in 1925 and only brought to credit in 1926. The remaining £2,000 decrease is due to the discontinuance of the making of police uniforms and the reduction in the numbers engaged in tailoring in order to provide larger gangs on public works. The revenue from prison industries does not by any means represent the actual value to Government of the convict labour employed, as, apart from the cost of materials used, all tailoring, carpentry and masonry work performed for Government departments is free of cost except for a small charge to cover wear and tear of tools and plant.

The arrival of five of the six European Technical Instructors ordered from England has enabled a beginning to be made in the training of a large number of convicts as carpenters and masons. These instructors are not on the Prisons staff, their salaries being paid from the works on which they and their convict gangs are employed. Coincident with their training they have been employed on the construction of Loan Fund buildings with very satisfactory results. Technical training.

Approximately 100 convicts were employed at Ngong for several months on the construction of new provincial headquarters, thereby greatly reducing the cost of the new buildings.

A Special Prison was established at Kitui in May, 1927, to which 20 convict masons, under one of the newly appointed European instructors, were drafted. A hospital and two houses have been built by these convicts, aided by African apprentices from the Native Industrial Training Depot, without assistance beyond that of European foremen and instructors. The saving in wages of highly paid Asiatic artizans, who otherwise would have been employed on these works, must have been considerable.

At Nairobi, in addition to a gang of 90 convicts employed in the Public Works Department Yard throughout the year on the making of concrete blocks for Government buildings, other gangs have been employed by the Public Works Department under European instructors, on (1) the reconstruction of Government House, Nairobi, (2) the building of Public Works Department staff quarters, (3) the construction of houses for African employees of Government, (4) the making of doors and window frames for new Government buildings; (5) repairing Government furniture.

At the end of the year arrangements were being made for the establishment of a Special Prison at Rumuruti, to which convict artizans from Nairobi Prison were to be sent to be employed on new buildings.

As can well be imagined, the demands made by the Public Works Department and other departments for convict artizan labour left none available for construction of much-needed prison buildings, *e.g.*, a new Central Prison, staff quarters, etc., and the only work done by them on prison buildings during the year was the erection of more temporary huts at Nairobi Prison upon which a sum of £400 was expended from savings on Prison Votes.

The Public Works Department staff have expressed appreciation of the quality and output of these convict artizans, comparing it favourably with that of paid African labour. The progress made by African convict artizans during the few months' training under European instructors (the first of whom arrived in July, 1927) is remarkable, and goes to show that the African, when under strict discipline, is highly receptive of industrial training.

As there is no provision in Kenya for the education or reformation of prisoners, and no machinery for aid to prisoners on discharge, the technical training now being afforded to convicts, enabling them to secure well-paid employment on release, is to be welcomed as meeting a long-felt want. The best convict artizans are usually those who are undergoing long terms of imprisonment which allow time for their efficient training, and who are as a rule recidivists. If they can qualify, whilst in prison, for employment as artizans on release, the probability of their return to prison is greatly lessened.

The Prisons Department was fortunate in 1927 in securing, through the medium of the Crown Agents for the Colonies, the services of a competent European technical instructor for Nairobi Prison, and the carpentry and other classes who have been working under his supervision in the Prison Workshops. have made good progress under his capable direction.

One Indian mason instructor is still employed at Nairobi Prison training convicts in stone dressing.

At Mombasa Prison a small carpentry class has done good work under an Indian carpenter instructor.

A small poultry farm was started during the month of July on the suggestion of the Colonial Secretary. The object of the farm is two-fold, to utilise food refuse from the Prison and to provide a supply of fresh eggs for the European Hospital. Despite the loss of one or two birds from disease, the farm shows a profit.

15. The distribution of convict labour in the three first-class prisons at Nairobi, Mombasa and Kisumu, and in the comparatively large second-class prison at Nakuru was as follows :—

Distribution of convict labour.

	DAILY AVERAGE OF PRISONERS EMPLOYED.				
	Nairobi	Mombasa	Kisumu	Nakuru	Total.
On Prison domestic duties	59	32	13	5	109
On Prison grounds and farms	19	..	40	4	63
On light duties and females	32	9	14	1	56
On Prison Industries ..	301	133	88	11	533
On Payment	25	9	91	12	137
By Government Departments (free of charge)	269	107	61	86	523
TOTAL ..	705	290	307	119	1,421

*In the smaller prisons, prisoners are usually employed on prison domestic duties, on prison farms, and on general township conservancy work.

16. As stated above, the amount paid into the revenue of the Colony by the Prisons Department gives but little idea of the value to Government of convict labour in Kenya prisons, since Government Departments make no payment for convict labour, skilled or unskilled. Assuming the average value of skilled or semi-skilled labour employed on prison industries to be Sh. 1/25 per day, and unskilled labour to be worth on an average from 50 to 75 cents a day, it is estimated that the total value of the convict labour in all prisons in 1927 was approximately £20,127 as shown below :—

Value of convict labour.

ESTIMATED TOTAL VALUE OF CONVICT LABOUR IN 1927

PRISON.	Estimated Value of Convict Labour Employed on Industries.	Estimated Value of Convict Labour Supplied free to Govt. Depts.	Net Revenue from Convict Labour.	Estimated Value of Produce Grown in Prison Farms.	Total.
	£	£	£	£	£
Nairobi	5,640	3,027	597	..	9,264
Mombasa	2,540	1,271	15	..	3,826
Kisumu	143	553	803	145	1,649
Nakuru	13	736	92	151	1,055
24 Smaller Prisons	..	3,536	196	601	4,333
TOTAL... £	8,336	9,173	1,703	910	20,127

The principal employers of convict labour without payment during 1927 were :—

Public Works Department	...	117,133 units value	£4,398
Conservancy and Medical Officers of Health in Townships	... ..	26,200	,, ,, £840
Government House Grounds (Nairobi and Mombasa)	...	15,739	,, ,, £600
Station Hands	... ..	125,000	,, ,, £3,300

Prison Dietary and Prisoners' Weights Records.

African dietaries. (Appendix VI.)

17. The experimental prison dietaries for Africans introduced in July, 1925, were confirmed by Government in September, 1926. The authorised scales, for long-term and short-term prisoners, are shown in Appendix VI. The weighing records during the past year, at the majority of the smaller prisons, have shown that the general tendency is for prisoners to increase in weight during confinement, but at the first-class prisons where there are convicts serving long terms of imprisonment, it is noticeable that after two or three years in prison, in spite of the more liberal diet issued to long-sentence men, they often decrease in weight.

Cost of feeding prisoners. (Appendix VII.)

18. The total expenditure on prisoners' food during 1927 was higher than in 1926, due to the increased prison population, and the fact that food for the inmates of all the detention camps had to be provided from the Prisons Vote. The daily average cost per head was reduced from 22½ in 1926 to 21

cents a head in 1927, as is shown in Appendix VII. Prison farms at the majority of the smaller prisons, which in the past have been of material assistance in securing economy under this head, have not been so successful in the year under review owing to the partial failure of the rains.

Prison Buildings.

19. Very little was achieved during 1927 to improve or extend the accommodation of any of the prisons, and the increased population accentuated the difficulty in housing prisoners. Appendix VIII shows the accommodation at each prison, the daily average number in such prison, and the average cubic space per prisoner. It will be seen that the general average was far below what is regarded by the Medical Authorities as the minimum cubic space needed by prisoners at night, and that most of the prisons were overcrowded. At Nairobi Prison, a grant of £400 enabled the Superintendent to purchase sufficient material to erect four blocks of temporary buildings, housing 160 convicts. This work was entirely carried out by convict labour.

At Nakuru Prison, the Chief Warden's quarters were improved at a cost of £235.

20. Reference was made in previous reports as to the need for a proper Central Penal Establishment in Kenya for long-sentence convicts. It is a matter for regret that no progress was made in 1927 with the scheme.

Expenditure.

21. In Appendix IX will be found a graph showing the daily average population and total expenditure of the Prisons Department for the past five years. A comparative statement of expenditure for 1926 and 1927 is also shown. It will be observed that the total expenditure in 1927 (excluding expenditure for raw materials, prison industries, which is more than covered by revenue) was higher than in the preceding four years, owing to the increased population.

The total expenditure of the Prisons Department for 1927 was £39,181. From this sum should be deducted £350 expended on food for detainees, leaving £38,831 which, divided by a daily average prison population of 2,524, gives a gross cost per head of under £15/8/00, which is lower than in the preceding five years, with the exception of 1924, as shown below :—

Year.			Daily average in Prison.		Cost per head.
1922	...	...	1,949	...	£18 19 0
1923	...	...	2,086	...	£15 19 0
1924	...	...	2,282	...	£15 2 0
1925	...	...	2,135	...	£16 18 0
1926	...	...	2,243	...	£16 15 0
1927	...	...	2,524	...	£15 8 0

This reduction is due to the fact that there has been no increase in staff to cope with a largely increased prison population.

If from the total expenditure is deducted the value of convict labour, which, as shown in paragraph 16, is estimated in 1927 to have been about £20,127, the net cost of the Prisons Department in 1927 was £18,704 only, equivalent to £7/8/00 per annum per head of prison population.

Sick rate. (Appendix X.) 22. The general health of prisoners was slightly better in 1927 than during 1926. A comparison with three preceding years is shown below :—

YEAR.	Daily Average in Prison.	Admissions to Hospital.	Daily Average on Sick List.	Per cent. of total Inmates.	Deaths.
1927	2,524	1,973	83.31	3.3	61
1926	2,242	2,296	79.8	3.6	76
1925	2,135	1,531	66.7	3.1	35
1924	2,282	1,758	82.7	3.6	50

The number of deaths, though above the average, is considerably less than in 1926, the reduction having been mainly at Nairobi Prison.

Appendix X gives the figures as regards sickness and deaths for each of the 28 prisons.

23. The 61 deaths, including three lunatics, were from Deaths, natural causes, and were due to the following diseases :—

	Nairobi Prison.	All other Prisons.	Total.
Pneumonia ..	16	11	27
Dysentery ..	4	3	7
Other Diseases	7	20	27
TOTAL ..	27	34	61

24. In addition 7 convicts (6 male and 1 female) were executed by hanging, five at Nairobi, one at Mombasa, and one at Kisumu.

25. The prisoners who died or were executed during 1927 were of the following tribes :—

TRIBE.	Deaths.	Executions.
Kavirondo	14	..
Nandi	8	..
Kamba	7	1
Kikuyu	7	2
Kisii	5	1
Natives of Uganda ..	4	..
Embu	3	..
Kamasia	2	..
Lumbwa	2	..
Meru	2	1
Giriama	2	1
Indian	1	..
Suk	1	..
Turkana	1	..
Swahili	1	..
Taita	1	..
Masai .. .. .	..	1

II.—HOUSES OF DETENTION.

26. In the absence of other provision for vagrants and Vagrants, destitute persons the prisons are used as houses of detention, as (Appendix XI.) constituted under the Vagrancy Ordinance.

There was a reduction in the number of vagrants committed during 1927, when compared with the previous year, the total being 53 only, as compared with 55 in 1926 and 68 in

1925. The bulk of these were natives of Kenya or neighbouring territories who were returned to their reserves. There were 10 male and 1 female European vagrants, and 3 Asiatic, as against 8 Europeans in 1926.

In Appendix XI will be found a statement of vagrants, showing race, sex, and disposal.

III.—STAFF AND DISCIPLINE.

Establishment. 27. The Prisons Department staff remained the same as in 1926 except that the remaining two Asiatic chief warders were replaced by Europeans.

European staff. 28. Mr. C. E. Spencer, Commissioner of Prisons, returned from leave on 2nd September, 1927.

Mr. S. R. Hill, Assistant Commissioner of Prisons, proceeded on leave on 3rd September, 1927, pending transfer to Tanganyika Territory.

Mr. H. P. Robertson, Superintendent of Prisons, was on duty throughout the year as Acting Assistant Commissioner of Prisons.

Mr. R. A. Poulden, Superintendent of Prisons, was on duty throughout the year and was transferred from Kisumu to Mombasa Prison on 28th March, 1927.

Mr. J. Finch, Assistant Superintendent of Prisons proceeded on leave (prior to retirement) on 30th April, 1927.

Mr. M. Dards, Assistant Superintendent of Prisons returned from leave on 3rd February, 1927, and was posted to Kisumu Prison as Acting Superintendent of Prisons.

Mr. A. C. Taylor, Assistant Superintendent of Prisons, proceeded on leave on 2nd April, 1927, and returned on 25th November, 1927. He was posted to Nairobi Prison for duty.

Mr. B. B. Donald, Assistant Superintendent of Prisons, was on duty throughout the year. His appointment to the permanent and pensionable staff as Assistant Superintendent of Prisons was approved during 1927 with effect from the date of his first appointment. He was transferred from Nairobi to Mombasa Prison on 24th November, 1927.

Mr. W. W. Whitby, Assistant Superintendent of Prisons, was on duty throughout the year at Nairobi Prison.

Mrs. M. Landels, Matron, returned from leave on 17th February, 1927, and resumed her duties as Matron of Mombasa Prison.

European Chief Warder Staff.

The services of Chief Warder Mr. T. B. Brereton, were dispensed with on 12th July, 1927.

Mr. W. J. T. Jones, Chief Warder, was on duty throughout the year. He was transferred to Eldoret Prison on 26th January, 1927.

Mr. J. A. Foot, Chief Warder, was on duty throughout the year. He was transferred to Nakuru Prison on 28th January, 1927.

Mr. R. L. Watts, Chief Warder, resigned on 31st January, 1927.

Mr. F. J. B. Jordan, Chief Warder, was transferred from the Medical Department on 1st April, 1927. He was posted to Nairobi Prison for duty.

The following Chief Warders were enlisted during the year :—

Mr. J. H. Daly on 1st March, 1927.

Mr. L. G. Clough on 1st April, 1927.

Mr. B. S. Lush on 1st August, 1927.

Instructors.

Mr. A. W. J. Mitchell, Technical Instructor, arrived from England on 6th August, 1927, and was posted to Nairobi.

The undernoted instructors engaged for the training of convict artizans for work on Loan Fund buildings arrived on the dates shown :—

Mr. G. H. Tulloch, Carpentry Instructor, 21-7-27.

Mr. N. Murray, Mason Builder Instructor, 21-7-27.

Mr. W. Dewar, Mason Builder Instructor, 2-9-27.

Mr. A. MacKenzie, Mason Builder Instructor, 9-11-27.

Mr. S. J. Leonard, Carpentry Instructor, 9-11-27.

Asiatic and African staff.

29. 71 warders were discharged during the year for the following reasons :—

Time expired	...	...	...	...	37
Dismissed	...	...	...	...	19
Medically unfit	...	...	...	...	4
Unlikely to become efficient	...	...	...	...	4
Imprisoned	...	...	...	...	2
Died	...	...	...	...	2
By Purchase	...	...	...	...	3
					71
					—

Ninety-five recruits were enlisted during the year, and received preliminary instructional training and drill at Nairobi Prison. Of these, 39 were Kavirondo, 21 Kikuyu, 18 Kamba, 5 Natives of Tanganyika, 4 Kisii, 3 Nubian, 2 Lumbwa, 1 Coast Tribe, 1 Meru, and 1 Somali.

Discipline.

30. The total of fines imposed on warders for breaches of discipline during 1927 was Sh. 912/99, an increase of Sh. 51 from the previous year's total of Sh. 862.

Rewards and fines fund.

31. The Prison Rewards and Fines Fund was credited with the sum of Sh. 912/99, fines imposed on warders, and grants from the fund totalling Sh. 62/50 were made, leaving a credit balance in the fund of Sh. 6,221/29 at the end of the year.

Musketry.

32. At only one prison, Narok, was the annual musketry course carried out. The inadequacy of the prison warder staff in comparison with the prison population makes it difficult for time to be found for musketry training or practice.

Inspections.
(Appendix XII.)

33. In accordance with section 14 of the Prisons Ordinance, 26 prisons were inspected by the Commissioner of Prisons during the year. Appendix XII shows the dates of such inspections.

Visiting justices.

34. The staff of Visiting Justices to the various prisons was brought up to date during the year by new appointments including Lady Visiting Justices at the Nairobi and Mombasa Female Prisons.

Visits of Visiting Justices have been regular in the three first-class prisons.

At Kisumu Prison and at six of the smaller prisons, local non-officials have kindly given their services as Visiting Justices.

35. The distribution of the Prisons staff is as follows :— Distribution of staff.

	Commissioner.	Assistant Commissioner.	Superintendent.	Assistant Superintendent.	European Chief Warden.	Matron.	Technical Instructors.	African Staff.
Headquarters Office	1	..	..	..	..	..	..	1 Drill Sergt 10 Recruits.
Nairobi Prison	..	1	..	2	4	..	3	131
Mombasa ..	..	..	1	1	..	1	1	50
Kisumu ..	..	..	1	..	..	..	..	49
Nakuru ..	..	..	..	..	1	..	..	17
Eldoret ..	..	..	..	..	1	..	..	9
*23 Local Prisons	..	..	..	..	..	..	..	128
On Leave ..	..	..	..	1	..	..	..	..
TOTAL ..	1	..	3	4	6	1	4	395

* 23 local prisons are under the superintendence of district officers.

The duties of Assistant Commissioner, Superintendent of Nairobi Prison, and Quartermaster of Prisons are combined in one person, an economical but unsatisfactory arrangement.

IV.—GENERAL.

36. The Detention Camps Ordinance was brought into force at the end of 1926, and a report on the administration of the Ordinance during 1927 is attached to this report as Appendix XIII. Detention camps. (Appendix XIII.)

C. E. SPENCER,

Commissioner of Prisons.

Nairobi,

30th April, 1928.

APPENDIX I.

STATEMENT SHOWING NUMBER OF ADMISSIONS TO PRISONS IN KENYA
DURING 1927.

Prison.	Total number of prisoners committed.	Committed.			Previously convicted.				Sentences.			Casing only.
		For debt.	For safe custody.	For imprisonment.	Once.	Twice.	Thrice or more.	5 years or more.	1 to 5 years.	Over 3 months but under one year.	Three months or less.	
Nairobi	870	20	269	581	73	36	65	9	38	87	400	47
Mombasa	1,186	77	202	907	163	77	107	5	51	85	755	11
Kisumu	1,139	12	347	780	62	13	9	8	127	177	452	16
Lamu	113	18	20	75	17	4	2	1	3	13	56	2
Nakuru	831	1	221	609	31	10	5	7	70	137	377	18
Nyeri	580	..	303	277	8	..	1	3	24	80	160	10
Eldama Ravine ..	154	..	58	96	..	..	..	2	6	30	58	..
Eldoret	948	5	353	590	47	10	1	6	57	120	348	59
Embu	96	..	18	78	..	..	..	1	1	22	54	..
Fort Hall	584	..	201	383	5	2	7	3	20	80	280	..
Kacheliba	228	..	83	145	..	..	..	..	2	14	129	..
Kakamega	472	..	115	357	2	..	..	2	19	105	228	3
Kapsabet	164	..	81	83	2	..	..	..	14	17	52	..
Kericho	307	..	44	263	30	4	1	..	28	45	189	1
Kilifi	437	3	116	318	..	..	..	2	15	140	149	12
Kipini... ..	66	1	11	54	..	..	..	1	..	11	42	..
Kisii	362	..	70	292	4	..	..	1	33	67	190	1
Kitale	771	1	273	497	4	..	1	3	41	113	340	..
Kitui	196	..	74	122	..	..	..	..	1	24	97	..
Kwale	125	..	31	94	1	..	..	2	9	42	41	..
Kyambu	560	2	241	317	10	5	9	4	29	67	211	6
Machakos	290	1	42	247	1	3	3	1	9	18	219	..
Malindi	342	25	64	253	..	..	..	2	1	16	234	..
Meru	124	..	44	80	..	1	..	4	5	24	45	2
Naivasha	319	..	62	257	7	2	1	1	19	33	186	18
Narok	143	..	16	127	1	1	..	2	15	8	101	1
Rumuruti	193	..	11	182	4	1	1	..	8	14	160	..
Voi	132	..	79	53	..	..	..	..	7	6	40	..
TOTAL	11,732	166	3,449	8,117	472	169	213	70	652	1,595	5,593	207
Men	11,352	162	3,356	7,834	463	163	207	62	611	1,586	5,512	63
Women	163	3	67	93	7	6	6	2	5	9	77	..
Juveniles	217	1	26	190	2	..	..	6	36	..	4	144

APPENDIX III.

TABLE SHOWING DAILY AVERAGE POPULATION OF THE VARIOUS PRISONS IN KENYA FOR THE PAST FIVE YEARS.

PRISON.	1923.	1924.	1925.	1926.	1927.	Average over 5 Years.	Remarks.
Nairobi (including Ngong Special) ..	794	865	650	806	847	792	
Mombasa	286	339	264	242	317	290	
Kisumu	201	232	358	295	349	287	
Lamu	25	30	30	16	17	24	
Nakuru	103	122	120	116	142	121	
Nyeri	42	59	46	78	83	62	
Eldama Ravine ..	41	34	29	19	19	28	
Eldoret	43	65	73	74	89	69	
Embu	17	16	17	19	18	17	
Fort Hall	26	42	53	42	54	43	
Kacheliba	8	9	8	10	23	12	
Kakamega	47	51	56	47	60	52	
Kapsabet	17	15	20	22	17	18	
Kericho	33	31	25	34	39	32	
Kilifi	21	17	22	25	29	23	
Kipini .. ..	..	..	13	5	15	7	Reopened 1-7-25.
Kisii	49	50	46	48	54	49	
Kismayu	20	34	9	..	..	13	Closed 31-5-25.
Kitale	40	41	61	84	79	61	
Kitui	18	26	31	42	33	30	
Kwale	11	19	17	21	22	18	
Kyambu	30	30	30	30	32	30	
Machakos	40	39	40	55	44	44	
Malindi	25	24	12	15	32	24	
Meru	23	29	24	25	18	24	
Naivasha	23	26	27	24	31	26	
Narok	68	19	23	18	20	30	
Rumuruti	17	14	16	17	27	18	
Voi .. ..	..	..	15	14	14	9	Reopened 1-1-25. Closed 13-4-24.
Sabatia (Special) ..	18	4	..	..	..	4	
TOTAL ..	2,086	2,282	2,135	2,243	2,524	2,257	

APPENDIX IV.

STATEMENT SHOWING OFFENCES FOR WHICH PRISONERS WERE COMMITTED TO SERVE SENTENCES OF IMPRISONMENT DURING THE YEAR 1927 COMPARED WITH 1926 AND 1925.

Class.	Offences for which Received.	1927.	1926.	1925.
	INDIAN PENAL CODE :			
I.	Offences against the State, Public Tranquillity, Health, Safety and Justice (I.P.C., Sections 121 to 294a)	406	282	236
II.	Serious Offences against the Person (I.P.C., Sections 302 to 333, 335, 338, 343 to 348, 353 to 373, 376, 377, 396, 493 to 498)	395	422	348
III.	Serious Offences against the Person and Property, or against Property only (I.P.C., Sections 380 to 402, 407 to 414, 428 to 440, 449 to 452, 454, 455, 457 to 460, 465 to 489)	1,458	1,397	1,222
IV.	Minor Offences against the Person (I.P.C., Sections 323, 334, 336, 337, 341, 342, 352, 374, 490 to 492, 500 to 510)	342	288	280
V.	Minor Offences against Property (I.P.C., Sections 379, 403 to 406, 417 to 427, 447, 448, 453, 456, 461, 462).. .. .	1,036	994	948
	Total under I.P.C.	3,637	3,383	3,034
VI.	Offences under Local Ordinances :			
	1. Master and Servants Ordinances	756	813	778
	2. Native Registration Ordinance	1,022	701	864
	3. Native Hut and Poll Tax Ordinance.. .. .	246	181	212
	4. Native Liquor and Liquor Ordinances	447	208	156
	5. Township Rules	282	177	148
	6. Native Passes	219	278	279
	7. Opiates	153	162	156
	8. Native Authority	519	603	325
	9. Various	836	1,039	784
	Total under Local Ordinances	4,480	4,162	3,702
	GRAND TOTAL OF PERSONS COMMITTED FOR IMPRISONMENT	8,117	7,545	6,736

APPENDIX V.

KENYA PRISONS.

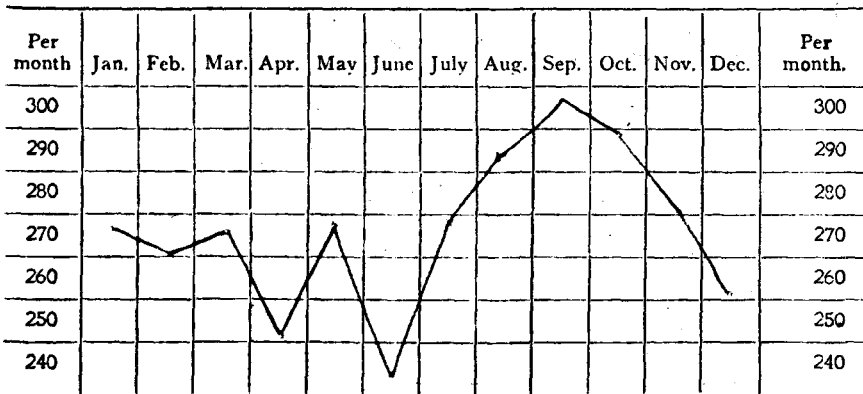
MONTHLY STATEMENT FOR YEARS 1924, 1925, 1926 AND 1927 OF COMMITTEES TO SERVE SENTENCES OF IMPRISONMENT FOR OFFENCES UNDER THE INDIAN PENAL CODE (LOCAL ORDINANCES EXCLUDED).

ALL PRISONS COMBINED.

ACTUAL FIGURES FOR EACH MONTH.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total.
1924..	241	274	248	217	278	250	272	242	275	274	215	217	3,005
1925..	278	237	218	252	253	202	232	257	321	307	260	216	3,003
1926..	258	267	340	259	262	240	291	286	270	277	328	306	3,383
1927..	321	284	296	252	301	274	296	369	344	319	298	283	3,637
Average for 4 years	274	265	274	245	273	241	273	288	302	294	275	255	3,257

DIAGRAM SHOWING AVERAGE MONTHLY TOTAL.



APPENDIX VI.

NATIVE PRISON DIETARY.

The following revised scale of diet for Native Convicts was approved by His Excellency the Governor in Council on the 18th September, 1926.

A.

Diet to be issued to all long-term prisoners and civil prisoners rationed by the Prison Authorities :—

Maize (whole)	..	24	oz.	per diem.	
Beans	..	6	"	"	
Potatoes	..	8	"	"	
Salt	..	$\frac{1}{4}$	"	"	
Meat	..	8	"	on Tuesday, Thursday and Saturday.	
Ghee	..	1	"	on Sunday, Monday Wednesday and Friday.	
Lemons	..	2	per week,	$\frac{1}{2}$ lemon to be issued on Sunday, Monday, Wednesday and Friday.	

B.

Diet to be issued to all short-term prisoners and remand prisoners :—

Maize (whole)	..	2	lbs.	per diem	
Beans	..	5	oz.	"	
Ghee	..	$\frac{1}{2}$	"	"	
Salt	..	$\frac{1}{4}$	"	"	
Lemons	..	2	per week,	$\frac{1}{2}$ lemon to be issued on Sunday, Tuesday, Thursday and Saturday.	

C.

Penal Diet.. .. 1 lb. Maize and Water *ad lib.*

- NOTE :—1. A ration of 8 oz. fresh fish may be issued in lieu of meat.
2. Equivalents of Potatoes: Mohogo, bananas or sugar-cane in equal weights.
3. If lemons are not procurable, an issue of 8 oz. of green vegetables to be made in lieu of half a lemon. If neither lemons nor green vegetables are procurable, the issue of beans shall be germinated beans, *i.e.*, beans which have been allowed to soak from 24 to 48 hours. Germinated beans must not be cooked for a longer time than is necessary to render them soft.

APPENDIX VII.

EXPENDITURE ON PRISONERS' FOOD, INCLUDING DETAINEES,
IN 1927.

PRISON.	DAILY AVERAGE NUMBER.		Total Expenditure on Prisoners' Food.	Average Daily Cost per Head.	Remarks
	Prisoners.	Detainees.			
			<i>Shs.</i>	<i>Cents.</i>	
Embu	18	..	395	6	
Eldama Ravine	19	2	466	6	
Kitale	79	8	1,906	6	
Kakamega	60	2	2,095	9	
Fort Hall	54	..	2,397	12	
Nakuru	142	6	7,092	13	
Kitui	33	13	2,195	13	
Machakos	44	24	3,220	13	
Kisii	54	2	3,017	15	
Kwale	22	4	1,442	15	
Kericho	39	1	2,338	16	
Kapsabet	17	2	1,042	16	
Kacheliba	23	4	1,686	17	
Kisumu	349	..	22,628	18	
Kyambu	32	3	2,329	18	
Meru	13	6	1,544	18	
Narok	20	7	1,850	19	
Nyeri	83	1	6,027	20	
Kilifi	29	..	2,096	20	
Naivasha	31	..	2,231	20	
Rumuruti	27	..	1,957	20	
Eldoret	89	..	7,800	24	No Prison Farm.
Nairobi	847	..	79,556	26	do.
Voi	14	2	1,682	29	do.
Mombasa	317	..	34,505	30	do.
Malindi	32	..	4,200	35	do.
Lamu	17	..	2,326	37	do.
Kipini	15	..	2,305	42	do.
DETENTION CAMPS :					
Nairobi .. ..	..	14	940	..	
Kajiado .. ..	..	3	112	..	
Tambach .. ..	..	4	202	..	
Thika .. ..	..	5	29	..	
Ngong .. ..	..	1	..	..
TOTAL ..	2,524	114	<i>Shs.</i> 203,610	Average 21 Cents	
	2,638				

OTHER PLACES :

Lumbwa, Kabarnet,
etc., and Railway
Warrants

Shs. 4,270

TOTAL *Shs.* 217,880—£10,394.

APPENDIX VIII.

KENYA PRISONS.
ACCOMMODATION, 1927.

PRISON.	Wards.	Cells.	Total Cubic Capacity.	Daily Average Number in Prison 1927.	Cubic feet per Prisoner.
			<i>Cubic ft.</i>		
NAIROBI :					
European .. ..	..	22	18,700	} 847	} 895 c.f. in cells ; 300 c.f. in per- manent wards ; 230 c.f. in tem- porary wards.
Asiatic	1	..	2,800		
Native	56	16	202,246		
Female .. ..	..	6	5,055		
MOMBASA :					
European .. ..	..	4	6,720	} 317	} 450
Asiatic and Native	21	21	91,043		
Female	3	2	11,030		
KISUMU :					
European .. ..	..	1	1,850	} 349	} 339
Native	12	3	96,690		
Female .. ..	..	1	1,600		
LAMU	3	4	23,750	17	1,400
NAKURU :					
European .. ..	..	1	1,000	} 142	} 212
Native	5	2	30,212		
NYERI	2	2	11,228	83	135
ELDAMA RAVINE ..	1	..	7,200	19	379
ELDORET :					
European .. ..	..	2	1,800	} 89	} 155
Native	3	4	13,844		
EMBU	1	2	9,000	18	500
FORT HALL	2	2	8,100	54	150
KACHELIBA	2	..	5,260	23	230
KAKAMEGA	3	..	13,520	60	225
KAPSABET	1	1	4,568	17	270
KERICHO	2	2	5,900	39	151
KILIFI .. ..	..	2	6,280	29	216
KIPINI	1	1	say 2,600	15	175
KISII	2	2	13,832	54	256
KITALE	4	1	19,476	79	247
KITUI	3	..	7,000	33	212
KWALE	1	..	3,200	22	145
KYAMBU	3	1	7,680	32	240
MACHAKOS	1	2	6,874	44	156
MALINDI	1	3	5,284	32	165
MERU	2	1	8,650	18	480
NAIVASHA	4	1	10,687	31	345
NAROK	1	..	3,000	20	150
RUMURUTI	1	2	6,160	27	228
VOI	2	..	3,000	14	214
TOTALS ..	146	129	704,672	2,524	280 c.f.

APPENDIX IX.

COMPARATIVE STATEMENT OF EXPENDITURE FOR YEARS 1926
AND 1927.

	1926.	1927.	Increase.	Decrease.
	£	£	£	£
Personal Emoluments	19,221	20,465	1,244	..
Warders' Uniforms	1,508	1,396	..	112
Prisoners' Food	9,644	10,394	750	..
Prisoners' Clothing	2,441	2,448	7	..
Local Travelling	1,812	1,733	..	79
Travelling Allowance	69	68	..	1
Passages	711	363	..	348
Stores	1,656	1,655	..	1
Contingencies	294	271	..	23
Water Rates	112	151	39	..
Gratuities to Discharged Convicts..	20	10	..	10
Photographs	17	12	..	5
Telephones	92	83	..	9
Telegrams	9	8	..	1
Electric Light .. .. .	..	124	124	..
TOTALS.. £	37,606	39,181	2,164	589

GRAPH SHOWING DAILY AVERAGE POPULATION IN ALL PRISONS COMBINED,
AND THE TOTAL EXPENDITURE OF THE DEPARTMENT FOR THE PAST 6 YEARS
(EXCLUDING EXPENDITURE ON RAW MATERIALS, PRISON INDUSTRIES).

POPULATION.	1922.	1923.	1924.	1925.	1926.	1927.
2,600 ..						
2,500 ..						
2,400 ..						
2,300 ..						
2,200 ..						
2,100 ..						
2,000 ..						
1,900 ..						
Total Expenditure ..	£36,983	£33,339	£34,506	£35,203	£37,606	*£38,831
Cost per head	£18/19/0	£15/19/0	£15/2/0	£16/10/0	£16/15/0	£15/8/0
Daily average population	1,949	2,086	2,282	2,135	2,243	2,524

* Does not include £350 expended on food for detainees in Detention Camps, who averaged 114 daily throughout the year.

APPENDIX X.

RETURN OF SICK AND DEATHS, 1927.

PRISON.	Daily Average in Prison.	Admissions to Hospital	Daily Average Sick.		Deaths (<i>excluding Executions</i>).		Remarks.
			Number	Per cent.	Number	Per 1,000	
Nairobi	847	1,040	51.46	6.1	27	32	
Mombasa	317	219	7.07	3.2	4	13	
Kisumu	349	228	4.45	2.0	8	23	
Lamu	17	12	0.36		..		
Nakuru	142	88	2.12		4		
Nyeri	83	99	3.00		3		
Eldama Ravine..	19	..	0.43		..		
Eldoret	89	52	0.81		4		
Embu	18	..	0.87		2		
Fort Hall	54	..	0.31		1		
Kacheliba	23	35	0.45		2		
Kakamega	60	47	2.96		2		
Kapsabet	17	11	0.29		..		
Kericho	39	..	0.41		..		
Kilifi	29	3	1.60		2		
Kipini	15	1	0.01		..		
Kisii	54	46	1.97	2.0	..	22	
Kitale	79	..	1.06		1		
Kitui	33	14	0.97		..		
Kwale	22	..	0.44		..		
Kyambu	32	2	0.21		..		
Machakos	44	31	0.92		..		
Malindi	32	23	0.28		..		
Meru	18	18	0.35		1		
Naivasha	31	..	0.12		..		
Narok	20	..	0.10		..		
Rumuruti	27	..	0.14		..		
Voi	14	4	0.15		..		
TOTAL 1927 ..	2,524	1,973	83.31	3.3%	61	24	
.. 1926 ..	2,243	2,296	79.8	3.6%	76	34	

APPENDIX XI.

KENYA PRISONS, VAGRANCY ORDINANCE (No 9 of 1920).
 STATISTICAL RETURN OF THE HOUSES OF DETENTION OF KENYA
 COLONY AND PROTECTORATE, 1927.

NATIONALITY.	Remaining on last day of year, 1926.	Total number committed in 1927.	HOW DISPOSED OF.						Remaining on last day of year, 1927.
			Found work.	Repatriated at Govt. expense.	Repatriated by friends or relatives.	Handed over to friends.	Returned to Reserve.	Sent to Lunatic Asylum.		Handed over to Salvation Army.
EUROPEAN :									
Men	3	10	3	8	..	1	..	..	1
Women .. .. .	..	1	..	..	1	..	..	..	..
Juveniles .. .. .	..	..	..	..	..	..	..	..	..
ASIATIC :									
Men .. .. .	..	2	..	1	1	..	..	..	..
Women .. .. .	..	1	..	..	..	1	..	..	..
Juveniles .. .. .	..	..	..	..	..	..	..	..	..
NATIVES OF KENYA :									
Men .. .. .	..	25	2	6	1	..	15	..	1
Women .. .. .	..	2	..	1	..	..	1	..	..
Juveniles .. .. .	..	..	..	..	..	..	..	..	..
NATIVES OF UGANDA, TANGANYIKA, ETC. :									
Men	1	8	1	5	..	..	1	..	2
Women .. .. .	..	..	..	..	..	..	..	..	..
Juveniles .. .. .	..	..	..	..	..	..	..	..	..
TOTAL ..	4	49	6	21	3	2	17	..	4
		53	53						

APPENDIX XII.

INSPECTIONS OF PRISONS, 1927.

PRISON.	DATE OF INSPECTION.
NAIROBI	9th April, 21st May, 2nd July, 27th August, 5th September, 17th September, 12th November, 17th December.
MOMBASA	21st June, 26th October.
KISUMU	17th May, 14th July, 27th November.
LAMU	13th June.
NAKURU	12th February, 17th July, 26th November.
NYERI	7th March, 11th October.
ELDAMA RAVINE ..	1st February.
ELDORET	10th February, 15th July.
EMBU	10th March, 15th October.
FORT HALL	5th March, 10th October.
KAKAMEGA	7th February.
KAPSABET	8th February.
KERICHO	11th July.
KILIFI	19th June.
KISII	12th July.
KITALE	5th February.
KITUI	20th January, 27th May, 19th September.
KWALE	16th June, 28th October.
KYAMBU	2nd June, 23rd September.
MACHAKOS	14th January, 3rd October.
MALINDI	17th June.
MERU	9th March, 14th October.
NAIYASHA	31st January, 18th July.
NAROK	24th February, 27th September.
RUMURUTI	12th October.
VOI	10th June.

APPENDIX XIII.

KENYA DETENTION CAMPS.

ANNUAL REPORT FOR YEAR 1927.

The principle of detention, a milder form of penal custody than imprisonment, for persons convicted of minor or technical offences not involving any great degree of moral turpitude, the adoption of which was advocated by the Native Punishments Commission of 1921-1922, was brought into effect by the enactment, in December, 1925, of the Detention Camps Ordinance, No. 25 of 1925, which was amended in the following March by Ordinance No. 6 of 1926. It was not until the end of 1926, however, that completion of preliminary arrangements made it possible for a beginning to be made in bringing into operation the new measure. Inauguration
of Detention.

2. The preliminary arrangements included the framing of rules for management of Detention Camps, which were published in May, 1926, *vide* Appendix A, the erection of the necessary accommodation and provision of equipment. A sum of £1,800 was provided by Government in 1926, and a further £1,000 in 1927 for the building and equipment of camps, but as these number twenty-seven, it will be seen that an average expenditure of a little over £100 per camp has permitted only of very simple, and in some cases quite primitive, buildings. Preliminary
arrangements.
(Appendix A.)

3. In many districts there has been considerable delay in the construction of camps, in consequence of which the money allocated therefor was not fully expended, and even at the end of the year the number was not quite complete. The dates of institution of Detention Camps in the various districts were as follows :— List of Camps.

<i>Place.</i>	<i>Date instituted.</i>	<i>Period in operation, 1927.</i>
Voi	6-12-26	12 months.
Kajiado	8-12-26	12 „
Nairobi	15-12-26	12 „
Kapsabet	29-12-26	12 „
Tambach	29-12-26	12 „
Kericho	19-1-27	11 „
Kacheliba	26-1-27	11 „
Meru	9-2-27	11 „

<i>Place.</i>	<i>Date instituted.</i>	<i>Period in operation, 1927.</i>
Ngong	9-2-27 ...	11 months.
Narok	9-2-27 ...	11 "
Kitui	9-2-27 ...	11 "
Malindi	16-2-27 ...	10 "
Kakamega	23-2-27 ...	10 "
Kisii	2-3-27 ...	10 "
Kyambu	9-3-27 ...	10 "
Embu	9-3-27 ...	10 "
Kilifi	23-3-27 ...	9 "
Kwale	13-4-27 ...	9 "
Eldama Ravine	4-5-27 ...	8 "
Kitale	18-5-27 ...	7 "
Naivasha	2-8-27 ...	5 "
Machakos	2-8-27 ...	5 "
Thika	16-8-27 ...	5 "
Nakuru	30-8-27 ...	4 "
Nyeri	30-8-27 ...	4 "
Eldoret	15-11-27 ...	1 month.
Kisumu	28-11-27 ...	1 "

Admissions to detention.

4. In the Embu and Kilifi districts, in which detention camps were established in March, 1927, and at Eldoret and Kisumu, where camps were instituted towards the end of the year, there were no admissions of persons to serve detention. In the remaining 23 centres, a total of 1,421 persons were sentenced to detention during 1927, their sentences being as follows :—

6 months or less but over 5 months ...	7 persons.
5 " " " 4 " ...	1 person.
4 " " " 3 " ...	50 persons.
3 " " " 2 " ...	62 "
2 " " " 1 " ...	195 "
1 month or less	1,106 "
Total ...	1,421 "

Committals.
(Appendix B.)

5. The average sentence works out at about 27 days, but the considerable variation in different districts will be seen from the table in Appendix B. In the following districts the average sentence was very short, *viz.* :—

Malindi, average sentence ...	1 day.
Naivasha, average sentence ...	5 days.
Nyeri, average sentence ...	7 days.

whereas in the undernoted districts the average sentence was a comparatively long one, *viz.* :—

Kwale, average sentence ...	60 days.
Machakos, average sentence ...	57 days.
Kacheliba, average sentence ...	50 days.
Kajiado, average sentence ...	47 days.

6. The total daily average number of persons undergoing detention in 23 camps during the year was barely 114, as shown in Appendix C. Nearly one-half of the total detainee population was to be found in three districts of the Ukamba Province, where the figures were :—

Machakos, daily average in detention ...	24 persons.
Nairobi, daily average in detention ...	14 „
Kitui, daily average in detention ...	13 „

7. The number of sentences of detention for offences under each of the various Local Ordinances in the Schedule to the Detention Camps Ordinance was as follows :—

<i>Ordinance.</i>	<i>Number of sentences to detention.</i>
Native Authority	351
Employment of Natives	337
Native Registration	293
Townships	79
Native Liquor	67
Hut and Poll Tax	62
Resident Native Labourers	51
Game	42
Diseases of Animals	34
Sugar	22
Outlying Districts	17
Trespass	14
Vagrancy	9
Gambling	6
Native Authority (Famine Relief)	4
Forest	3
Roads in Native Reserves	2
Adulteration of Produce	1
Other enactments not in Schedule, <i>viz.</i> , I.P.C., Opiates, Native Passes, and Cruelty to Animals	27
Total ...	<u>1,421</u> persons.

Detention
instead of
imprisonment.
(Appendix D.)

8. That Magistrates did not make full use of the new measure appears from the table in Appendix D, from which it will be observed that during 1927 the number of sentences of imprisonment for contraventions of Local Ordinances was more than three times the number of sentences of detention. Particularly noteworthy are the following :—

<i>Ordinance.</i>	<i>Sentences of imprisonment.</i>	<i>Sentences of detention.</i>
Employment of Natives ...	756	337
Native Registration ...	1,022	293

The apparent reluctance on the part of Magistrates to substitute detention for imprisonment seems to be due to a variety of causes, the principal reason being that no provision has been made for any staff and that supervision of the labour of detainees is in many places a matter of some difficulty. The fear that detainees, in the absence of any guard over them would abscond appears to be decreasing.

The limitation of sentence imposed by the amending Ordinance No. 6 of 1926, may have had some effect in discouraging the passing of sentences of detention in place of imprisonment. For example, under Ordinance No. 6 of 1926, non-payment of a year's hut tax is punishable by a maximum of 14 days' detention, whereas a sentence of two months' imprisonment for this offence is quite common.

Escapes.

9. Of the 1,421 persons committed to detention during 1927, nine absconded, of whom six were recaptured. These escapes occurred at the following places : Nairobi, three ; Kitui, two ; and one each from Kacheliba, Kajiado, Kitale, and Kyambu.

Offences
against
discipline.

10. The only punishments recorded during the year for offences against discipline were four transfers from detention to prison, *viz.*, two at Kitui, one at Nairobi, and one at Kacheliba.

Health.

11. The general health of inmates of detention camps appears to have been particularly good. It will be seen from Appendix C, that for all the camps combined the daily average on the sick list was just under one person per diem throughout the year, giving a daily sick rate of less than 1 per cent.

No deaths occurred amongst detainees.

12. The scale of diet adopted for detainees was laid down in the Rules dated 28th May, 1926 (*see* Appendix A), and is practically identical with the dietary for short-term prisoners which was in force in all prisons from 1918 to 1925. The average cost of this diet in 1927 was about 17 cents a head per diem, or Sh. 62 per annum. Dietary.

13. At Nairobi, where the Detention Camp is situated in the Public Works Department Yard, detainees are exclusively employed by the Public Works Department, who find the wages of an Indian overseer. Conditions of employment of detainees in Nairobi are therefore more satisfactory than elsewhere. At Nakuru, detainees are employed by the Public Works Department without any permanent supervision. At Kitui some of the detainees' labour has been given to the Public Works Department. At other stations, detainees are employed as station hands or on township conservancy. Employment.

No payment is made by anyone utilising the labour of the detainees.

In 1927, with a population of 114, less an average of one sick, and reckoning 300 working days at 50 cents a head a day, the value of detainees' labour amounted to £847.

14. The anticipation that the substitution of detention for imprisonment in convictions for minor offences would have the effect of reducing the population of the prisons has proved erroneous. As will be seen from Appendix D, the total of sentences (both imprisonment and detention) for contraventions against local Ordinances rose from 4,175 in 1926 to 5,901, an increase of 41 per cent. Sentences of imprisonment only for such offences rose from 4,162 in 1926 to 4,480 in 1927, an increase of 7½ per cent. Reduction of
prison
population.
(Appendix D.)

15. No provision has been made hitherto in the Colony's Estimates of Expenditure for the cost of detention camps, and except for the allocation of £2,800, referred to in paragraph 2 above, for construction of the camps, all expenditure has had to be met from the Votes of the Prison Department, with the exception of the wages of one Indian overseer at Nairobi paid by the Public Works Department. It is not possible, therefore, to state the annual cost of the Detention Camps Scheme, but the cost of feeding a daily average of 114 detainees was approximately £350, whilst the value of their labour, as stated in paragraph 13, is reckoned to have amounted to £847. Viewed in that way, it can safely be stated that the scheme was financially self-supporting. Expenditure.

Inspections.

16. The Ordinance provides that Detention Camps shall be under the control and direction of the Commissioner of Prisons, and in furtherance of this provision, 22 inspections of 18 camps were carried out by the Commissioner or Acting Commissioner of Prisons during 1927. A comprehensive form of inspection report has been adopted for Detention Camps similar to that in use for inspection of prisons.

General.

17. The progress of the scheme has been somewhat slow, and the support it has received from District Officers and Magistrates has in many cases been tepid, but signs are not wanting that it is gradually being more fully adopted. It would be of advantage if separate provision for Detention Camps were made in the Estimates of Expenditure, to enable employment of overseers where necessary, and that, as a set-off against this expenditure, the value of the labour of detainees be accounted for and credited to revenue.

C. E. SPENCER,
Commissioner of Prisons.

Nairobi,

20th April, 1928.

APPENDIX A.

THE DETENTION CAMPS ORDINANCE, 1925.

RULES.

IN EXERCISE of the powers conferred upon him by the Detention Camps Ordinance, 1925, section 14, and all other powers thereunto enabling him, His Excellency the Governor in Council has been pleased to make the following Rules :—

1. These Rules may be cited as " the Detention Camps Rules, 1926."

2. Entry within the confines of the camp shall be forbidden to any person except detainees and the officer-in-charge or his assistants and those persons who shall have received permission from the officer-in-charge.

3. Detainees when not at work outside the camp shall remain within the confines of the camp. Absence from the camp without permission will be deemed to be escape from lawful custody.

4. Subject to any general or specific instructions from the Commissioner of Prisons, the nature of the work on which detainees are to be employed will be at the discretion of the officer-in-charge of the Detention Camp.

5. Rations will be supplied to detainees on the following scale :—

Four days a week : Maize or maize flour or	
. equivalents	1½ lb.
Beans	½ lb.
Three days a week : Potatoes or equivalents...	3 lb.
Beans	½ lb.
Seven days a week : Salt	¼ oz.

Equivalents of Maize : Mtama, Wimbi or native rice in equal weights.

Equivalents of Potatoes : Sweet potatoes, Muhogo, pumpkins, or plantains in the proportion of 4 lb. of any of these to 3 lb. of potatoes.

In the case of a detainee undergoing more than three months' detention, a daily issue of $\frac{1}{2}$ oz. Ghee may be made, on the recommendation of a medical officer, during any period in excess of three months.

6. Detainees may wear their own clothes throughout their period of detention, provided they are suitable, otherwise they may be provided with clothes. Bedding will be supplied to them.

7. Detainees must display whilst undergoing detention the identity disc which will be issued to them on admission to the detention camp. Loss of the identity disc may be treated as an offence.

8. Detainees may associate together throughout the period of their detention but may be required to maintain silence while at work or after such time at night as shall be ordered by the officer-in-charge.

9. Detainees may receive and send out letters to such number as shall in the case of each detainee be ordered by the officer-in-charge.

10. Detainees may, by permission of the officer-in-charge, receive special visits from their legal advisers or near relations.

11. In the event of any offence against discipline on the part of a detainee, such as refusal to work, idleness at work, quarrelling with other detainees, or any neglect or disobedience of orders, the offender shall be taken before the prescribed authority to be dealt with under section 10 of the Ordinance.

12. No intoxicating liquor or native intoxicating liquor or tobacco may be given to a detainee except on the written authority of the medical officer.

13. The Rules dated 3rd day of July, 1925, made by the Governor in Council under the powers conferred upon him by section 116 of the Prisons Ordinance, 1914, regarding censorship of prisoners' letters, shall apply *mutatis mutandis* to letters to or from detainees.

APPENDIX B.

KENYA DETENTION CAMPS, 1927.

NAME OF CAMP.	Total number committed to detention.	SENTENCES OF DETENTION.							Average length of sentence.
		Over six months.	6 months or less but over five.	5 months or less but over four.	4 months or less but over three.	3 months or less but over two.	2 months or less but over one.	1 month or less.	
Nairobi	334	..	..	1	5	9	29	290	<i>Days.</i> 20
Eldama Ravine .. .	23	..	1	..	..	2	3	17	38
Kacheliba	29	..	..	..	..	..	26	3	50
Kajiado	32	..	..	..	1	4	12	15	47
Kakamega	35	..	..	..	..	..	3	32	20
Kapsabet	22	..	..	..	..	..	4	18	23
Kericho	24	..	..	..	..	..	..	24	11
Kisii	41	..	..	..	..	..	..	41	14
Kitale	111	..	..	..	2	5	5	99	20
Kitui	119	..	2	..	4	17	39	57	40
Kwale	17	..	4	..	..	..	4	9	60
Kyambu	79	..	..	..	..	..	1	78	15
Machakos	104	..	..	..	17	2	54	31	57
Malindi	23	..	..	..	..	..	..	23	1
Meru	79	..	..	..	..	13	3	63	27
Naivasha	5	..	..	..	..	..	..	5	5
Nakuru	46	..	..	..	..	..	..	46	15
Narok	140	..	..	..	..	3	1	136	18
Ngong	8	..	..	..	..	..	..	8	26
Nyeri	18	..	..	..	..	..	..	18	7
Tambach	50	..	..	..	21	4	8	17	27
Thika	46	..	..	..	..	..	2	44	15
Voi	36	..	..	..	..	3	1	32	24
TOTALS..	1,421	..	7	1	50	62	195	1,106	27

The mean average sentence has been calculated to have been one of 27 days' detention.

APPENDIX C

DETENTION CAMPS, 1927.
DAILY AVERAGE POPULATION.

CAMP.	Daily average in detention.	Daily average sick.	Period in operation.
Voi	2	0.08	12 months
Kajiado	3	0.01	12 "
Nairobi	14	0.07	12 "
Kapsabet	2	..	12 "
Tambach	4	..	12 "
Kericho	1	..	12 "
Kacheliba	4	0.20	11 "
Meru	6	..	11 "
Ngong	1	..	11 "
Narok	7	0.05	11 "
Kitui	13	0.20	11 "
Malindi .. .. .	..	..	10 "
Kakamega	2	0.02	10 "
Kisii	2	0.01	10 "
Kyambu	3	0.01	10 "
Embu .. .. .	..	..	10 "
Kilifi .. .. .	..	..	9 "
Kwale	4	0.01	9 "
Eldama Ravine	2	..	8 "
Kitale	8	0.23	7 "
Naivasha .. .. .	..	..	5 "
Machakos	24	0.10	5 "
Thika	5	..	5 "
Nakuru	6	..	4 "
Nyeri	1	..	4 "
Eldoret .. .. .	..	..	2 "
Kisumu .. .. .	..	..	1 month
TOTAL ..	114	0.99	

APPENDIX D.

KENYA PRISONS AND DETENTION CAMPS.
OFFENCES AGAINST LOCAL ORDINANCES—SHOWING
WHETHER IMPRISONMENT OR DETENTION AWARDED.
1927 COMPARED WITH 1926.

ORDINANCE.	1927. Sentences Awarded.		1926. Sentences Awarded.	
	Imprisonment.	Detention	Imprisonment.	Detention
Employment of Natives ..	756	337	813	2
Native Registration	1,022	293	701	5
Hut and Poll Tax	246	62	181	..
Liquor	447	67	203	1
Townships	282	79	177	1
Native Passes	219	Not in schedule	278	..
Opiates	153	ditto	162	..
Native Authority	519	351	603	..
Various	836	232	1,039	4
Total Local Ordinances ..	4,480	1,421	4,162	13
	5,901		4,175	
Under Indian Penal Code ..	3,637	..	3,383	..
	8,117	1,421	7,545	13
GRAND TOTAL ..	9,538		7,558	

INCREASE IN COMMITTALS—1927 OVER 1926.

In Imprisonments under Indian Penal Code	254=7½%
" " " Local Ordinances	318=7½%
In Sentences of Detention	1,408= —
Total increase in Committals 1927 over 1926	1,980=26%

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**NOTES ON ANOPHELINES AND MALARIA
IN KENYA.**

By C. B. SYMES, *Medical Entomologist, Kenya.*

(Submitted in August, 1927.)

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NOTES ON ANOPHELINES AND MALARIA IN KENYA.

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INTRODUCTION.

The following notes are a brief record of mosquito knowledge acquired during the period March, 1926, to April, 1927. An attempt has been made to correlate mosquito findings with malaria incidence and climatic factors. With regard to Nairobi the information obtained is fairly conclusive. In outside districts, however, the information available is totally inadequate to provide any more than working hypotheses, but if it also tends to show our ignorance of essential factors influencing malaria incidence it serves a useful purpose. For a realization of how little we know is a stimulant to greater effort in our search for knowledge: and knowledge precedes application.

The inclusion of the very scrappy records of some outside districts is warranted by the fact that definite figures, however incomplete, are usually more reliable than personal impressions.

It cannot be emphasized too much that the study of malaria, or any insect-borne disease, for purposes of control, *must* include a study of climatic factors; and it is suggested that all medical posts should be able to obtain reliable figures for atmospheric temperatures, humidity and rainfall at least.

The year 1926 was abnormal in that *A. costalis*, Theo. (*A. gambiae*, Giles) appears to have influenced the country to a much greater degree than is usual.

It must be understood therefore that these notes refer to the period mentioned and may not be applicable to any other seasons. Only after study over a series of years can we dare to predict mosquito conditions in any district.

Among the countless factors influencing mosquito larvae the minute physical and chemical changes in the water itself are probably of first importance, not from their direct influence on larvae but rather from their effect on the micro-organisms that make up the food of larvae. Not until we can devote time to an intensive study of waters, and their micro-flora and fauna, can we hope to supersede the present very crude and costly oiling and draining by some more satisfactory method of control, unless indeed a means of attack on the adults may be found. We know practically nothing of the habits of adults in Kenya, beyond their tendency to visit

dwelling and to bite the occupants. That they can and do survive on foods other than blood is certain, and the investigation of their vegetable foods—plant juices, etc.—appears to be a line offering possibilities.

Subtertian is the prevalent type of malaria in all the districts dealt with. Quartan and benign tertian occur to a small extent usually, though there are occasional appreciable increases of the latter, notably at Fort Hall. The present notes apply only to subtertian malaria.

The term "epidemic" used here, has a purely local significance to denote an abnormally high incidence of malaria. Our epidemics as far as we know do not in any way equal the severity of those in such countries as, say, the Punjab.

CONDITIONS REQUIRED FOR BREEDING.

A. rufipes.

This species has been found on a few occasions only in the Nairobi area and nearly always in association with *A. pretoriensis*. It appears to prefer certain clean, open waters of rock pools and seepage streams. The numerous breeding grounds of *A. pretoriensis* in the Fort Hall area produced no specimens of *A. rufipes*. It was once found in clean rainwater in a large cement tank open to sunlight.

A. squamosus.

The main obvious requirements of the larvae of this species are partial shade, clear water and growing vegetation. Breeding places are usually among short-growing grass, reeds or other vegetation on the sides of slow-running rocky streams, and swampy areas. Considerable numbers have been obtained from small fairly open areas of water about six to twelve inches across situated in and on the edge of tall grass swamps, and many were found in water with much floating vegetable debris consisting of leaves and dead grass, but with no other shelter.

In one instance only were larvae of this species found in the muddy water of a grass covered irrigation canal. Good supplies of larvae were obtained from the Juja district along the grassy edge of a stream among floating vegetable debris and short-growing grass, and from Eldoret in clear water of reed swamps arising from seepage. It appears to require clear water, and the presence of suspended matter appears to be almost a constant factor.

Frequently this species and *costalis* have been found breeding together.

A. funestus.

This is essentially a breeder in deep shade. Most frequently in the Nairobi district it inhabits overgrown, clear and slow-running streams, the more permanent drains, and the edges of papyrus and reed swamps.

As frequently as not the *funestus* infested waters along the grassy edges of streams are prevented from running by growing vegetation, though they are kept fresh by continuous contact with the current. Larvae appear to thrive best in clear waters with a certain amount of suspended rather than colloidal substances, beneath shade provided by low overhanging bushes or grass, often supplemented by the higher shade of trees. In several instances the species has occurred in dirty stagnant water beneath a thick surface layer of algae and with no other source of shade. Specimens have also been recorded from clear rock pools, the only shade available being that provided by the rock sides.

In the hills of the Fort Hall District where many tiny springs occur on the hill sides, *funestus* occurs commonly in the small trickling, grass-covered streams arising therefrom.

Similarly in Kitale there are numbers of tiny, almost stagnant, streams arising from hillside seepages. These are well sheltered by grass and jungle and provide excellent conditions for the numerous *funestus* found there.

In Kisumu, where the normal breeding grounds of this species are overgrown drains and canals and shallow water along the Lake shore, an outbreak of *funestus* resulted from the formation of a huge reedy swamp following upon the collapse of a dam across a stream bed. Larvae were present in numbers all along the edges of the swamp and in shallow grass-covered drains leading into it, though the number found in any one spot was not large.

The very large numbers of adults which were present at this time appeared to be due to the wide extent of the breeding grounds rather than to concentrated breeding in any one spot.

Frequently *funestus* has been found in the dirty waters of streams and canals, the contamination being in the nature of suspended solid and colloidal soil particles brought down by rains.

It would appear that *funestus* larvae require a certain relatively large surface area for development, for large concentrations of larvae, such as occur in the case of *costalis* and *christyi* in borrow-pits, are not found. This is most probably dependent on food concentration.

A. transvaalensis.

This appears to frequent the sides of cleaner running streams and rock seepages where good shade is available when required. On several occasions we have taken larvae beneath deep permanent shade, and once from an almost totally exposed position in rocks, the only possible shade being provided by very low and gently sloping rock sides, that could throw a shadow only very early or very late in the day. A muddy shamba canal, completely grass-covered, produced many specimens. Larvae are frequently found along the grassy edges of wide and fairly open streams, and in these positions they are sometimes associated with muddy water resulting from rains or other disturbances. The conditions sought by *funestus* appear to be suitable to *transvaalensis*, except that the latter does not occur to the same extent in swamps. Dying the year this species has not been numerous.

A. maculipalpis.

This species occurs in several places in Nairobi, but only in small numbers. Specimens have been procured from the waters of irrigation canals, seepage waters, and at the edge of swamps. Large collections were obtained at Fort Hall, together with *A. pretoriensis*, in rock pools and spring waters in November and December, 1925, and February, March, September, and October of 1926. The most prolific sources of this species are the tiny streams arising from springs or seepages on the slopes of the narrow grassy valleys so typical of parts of the Kikuyu Reserve. These small collections of water may be clear or very muddy, they are usually moving slowly, and most frequently are provided with shade from grass, which may overhang from the sides or grow recumbent along the surface of the water. In many of such breeding grounds, however, there is no shade. The properties of the spring water itself and its contents appear to be of chief importance here, not the presence or absence of shade and other outside factors.

In Kisumu specimens were taken in drain water and in the grassy swamp areas forming the shore of Lake Victoria.

A. pretoriensis.

Conditions required by this species are apparently more or less open sunlight and clear and fairly still water. It thrives best in the clear waters of seepage streams and rock pools, and though most frequently discovered in the presence of shade of some kind, larvae are usually found lying beyond its influence. It appears in streams whose waters are fairly clear though con-

taining small particles of debris in suspension. Several times larvae have been captured in water completely shaded by grass, and many times in association with numbers of *costalis*. Large numbers were collected in Fort Hall during June to September of 1926, breeding in open springs, seepage streams, rock pools and on several occasions in cattle hoof-marks. Greatest concentration of larvae occurred in both dirty and clean water of open rock pools.

A. costalis.

This species can adapt itself to somewhat varied conditions. It has been found in clear spring water both slowly running and still; in the light shade of high trees, tall grass and growing reeds; and beneath dense grass. Its optimum breeding conditions exist, however, in the open stagnant and sunlit waters of shallow pits, ditches, puddles and stream beds, during and after the rains. The exact climatic conditions required have not been ascertained.

A. costalis, here as elsewhere, is essentially the wet season anopheline: its increase in numbers is related to the increase of shallow open water. During the dry season its numbers decrease in proportion to the drying up of such water surfaces, and though it can be found throughout the year in shallow pools remaining in stream-beds and the larger excavations, there appears to be no appreciable increase at the time of the short rains in November.

In the case of large areas of open, deep water created by excessive rains, or large, more or less permanent, swamps, reduction of the water area through evaporation sometimes coincides with a proportionately large output of *A. costalis*. This seems to be due to the relative increase of shallow water edge and the consequent greater concentration of the aquatic organisms on which the larvae feed.

Sunlit, stagnant and dirty water is more frequently found in townships than in outside areas less influenced by man. In the former, extensive and intensive breeding goes on in borrow-pits and excavations, ditches, drains and canals: in outside areas the species is most frequently found along the edges and backwaters of slow streams where sunlight, stagnancy and contamination are much less intense. The "borrow-pit" conditions are an intensification of the natural conditions under which *costalis* breeds in districts little influenced by man.

A. christyi.

Larvae of this species, like those of *costalis*, can exist under widely varying conditions; but they definitely prefer

waters that are completely exposed to the sun, dirty and stagnant. Such conditions exist in borrow-pits, ditches, shallow pools and irrigation canals. It appears that this species prefers water with more contamination than that favoured by *costalis*. Certain it is, that during its period of highest production (August to December) it is most frequently found in waters that have been stagnant for some months and have thus become extremely filthy. Many of these waters, particularly those of larger pits and excavations, appear to contain much colloidal matter with a dense aquatic micro-fauna and flora. Apart from man-made breeding grounds in the form of pits and ditches, *christyi* occurs in slow-moving or still waters, on the edge of swamps and streams, and in stream-beds. Breeding grounds of the latter types are, in the majority, in districts other than townships. Thus in the Kiambu area, though taking advantage of every possible excavation or ditch, this species occurs most frequently in open or partly open waters of streams arising from springs.

Generally waters in which *A. costalis* breeds during the wet season (March to June) are suitable for *christyi* later in the year.

A. cinereus.

Larvae of this species are most frequently found in the stagnant or slowly running waters at the sides of streams, canals and swamps, and usually in the presence of shade. Irrigation canals in vegetable shambas appear to be particularly suitable. Rock pools, where shade is provided by the rock banks, have yielded specimens on several occasions, and very occasionally borrow-pits. Stagnant, dirty water with partial shade provided by grass appear to be the chief characteristics of the majority of *cinereus* breeding places.

A. mauritianus.

This species likes the edges of slowly running or stagnant but clear waters with shade. The shade is usually provided by grass or aquatic plants lying along the surface of the water, though frequently it is produced by such "top" grass supplemented by high trees. Larvae also occur in large numbers in reed or papyrus swamps. The species is very abundant in the long grass and papyrus swamps on the Victoria Lake front, at Kisumu, often in association with *A. pharoensis*. Shade and relative coolness appear to be required.

On a few occasions larvae were found in water completely exposed to sunlight. The majority of waters inhabited by this

species are clean; where this is not so the contamination is usually in the form of suspended vegetable debris.

A. implexus.

Specimens of larvae were obtained in only one locality at Kitale. They occurred in the somewhat dirty water of a small stream running from a spring. The stream was fairly well covered with leaves and other debris and ran beneath grass, bushes and large trees. Deep shade is obviously a characteristic of this one breeding ground.

This anopheline has not been recorded in Kenya before, as far as I can ascertain.

The majority of waters offer a variety of conditions suitable to two or three species of anophelines. The most prolific breeding grounds in Nairobi were irrigation canals in market gardens. In most cases these were stagnant or nearly so, with open water in the middle and grassy edges. Such waters often produced *costalis*, *christyi* and *cinereus* larvae in one spot. In one instance canals completely covered by grass yielded *costalis*, *christyi*, *cinereus*, *pretoriensis* and *transvaalensis*.

From the somewhat crude observations made, it may be concluded that though the optimum conditions as regards shade, cleanliness and mobility of water are fairly obvious for nearly all species, the majority of anophelines here can and do develop under conditions far removed from the optimum. Thus *costalis* and *christyi*, though breeding most intensively in the stagnant, open and dirty water of borrow-pits kindly provided by man, develop extensively under natural conditions in the more or less dirty and slowly moving waters along the grassy edges of streams. The degree of suitability of any water to a species can be discovered only by recording the times larvae of that species have been found in such water, and the number of larvae found in a standard catch on each occasion.

But it is certain, that very many more factors than those herein mentioned must be determined for each breeding ground before an explanation of "suitability" can be put forward.

It may well be that *funestus* for instance (or the food factor regulating its occurrence in fresh running waters) requires a relatively high oxygen content; that *costalis*, appearing in shallow stagnant waters often with much contamination requires more or less; and that *christyi*, which reaches its breeding maxima in the filthy, stagnant borrow-pits that have retained their water for some months, is directly controlled by albuminoid ammonia content. The whole problem of mosquito waters in Kenya has yet to be tackled. Where malaria is so widespread

and money so relatively scarce, some permanent control measures other than draining and oiling should be sought for, and biological control appears to be within the bounds of possibility.

We know the action on larvae of certain substances added to water in which the larvae are developing. Copper sulphate in quite small quantities kills off the plankton groups of aquatic organisms, and larvae are starved. Common soap added experimentally to infested waters at the rate of 1 oz. to 1,000 c.c. results in the death of all larvae in two or three days. This may be the result of increased alkaline reaction on the larval foods; or, as appears to be the case, a combination of this and mechanical interference with larvae.

The occurrence of larvae in some waters and their absence from others that appear to be identical cannot be explained.

Apart from this there are types of waters in which larvae are never found. In several districts, but notably in the Kisii area, there are streams that contain the brownish-red flocculent material described by Senior-White and others previously. This, consisting of ferric hydroxide, may be deposited on the bottom and on and around any growing reeds or grass, or may occur in suspension in smaller amounts. Whatever the action of this material may be on larvae or larval foods, it appears to be definitely inhibitory. Similarly, waters occur here with an iridescent film like that of oil, and the absence of larvae from such waters in Kenya has still to be explained.

In the following table broad terms are used to describe the three obvious characteristics of breeding grounds.

Complete Exposure refers to a position that as far as can be ascertained is never shaded from the sun except during early morning and late afternoon.

Light and Shade is used to denote water that:—

- (1) is shaded during some part of the day by its banks or surrounding vegetation;
- (2) may be permanently shaded in parts; such as the sides of streams with vegetation on the banks;
- (3) may possess a thin growth of reeds or grass which allows the sunlight to penetrate, though the rays are broken up;
- (4) may have on the surface a sufficient quantity of recumbent grass to afford shelter from sunlight if and when necessary.

There are few waters without shade of some kind; and since in waters other than those completely covered with reeds or other vegetation the shade and the larvae are

usually situated along or near the water edge, it is not always clear whether shade is merely an incidental or a favouring factor.

Complete Shade denotes conditions that are the converse of Complete Exposure.

Dirty Water is a wide term, to include all waters that are not definitely clear, whether the contamination be colloidal or small solid particles in suspension. Waters with very small amounts of suspended matter may however appear quite clear.

Still Waters are those that, for all obvious practical purposes, are not running.

It is not always easy to tell whether a water should be described as "running." Along the edges of fast-flowing streams there are often quite wide margins of *apparently* still water, as the result of lateral blockage by vegetation or protruding banks. But much of this water must seemingly be in movement, however, slow and imperceptible. Many *costalis*, *christyi*, and *funestus* larvae are found in these positions. Similarly, where the water of a stream opens out into a wide papyrus or reed swamp and there appears to be no flow, though there are inlet and outlet streams, such water is described as "still."

FOOD OF LARVAE.

Investigations into the properties and contents of waters should go side by side with enquiry into larval foods. It has not been possible to carry out any intensive study in this direction here. Larvae of all species of anophelines have been watched carefully, under a convenient magnification, whilst feeding, and it seems that of all the qualities of aquatic organisms and substances, size alone determines what shall and what shall not be ingested by larvae. There appears to be no discrimination on the part of any larvae in the matter of articles of food. The larval mouth-fans set up currents in which all small particles are carried to the mouth, and only those that are too big to enter the alimentary canal appear to be discarded.

Examination of larval gut contents, therefore, would appear to be of little use in the enquiry into larval foods, except in so far as it would show what was in the water and what was not digested.

I have fed all larvae kept for emergence of adults on ordinary dried baker's yeast, and in the case of *A. costalis* and *A. christyi* several broods have been reared successfully from egg to adult on this food.

DOMESTIC ANOPHELINES IN NAIROBI.

Unfortunately, other work demanded very much of my time during the early months of 1926, and not until May was it possible to institute work designed to keep in touch with anopheline development in Nairobi.

Where the staff and facilities for investigation are limited, it is necessary to decide on a line of investigation which is likely to yield the most useful results. Though larval surveys are necessary in order to determine breeding grounds for control, organized adult catches are absolutely necessary to provide information on seasonal activity and domestic species. No standard method for larval catches has been devised to provide reliable data on periodical changes in mosquito prevalence over a large area.

Adult catches were made by trained Africans at selected places considered in the aggregate to be representative of the Nairobi area. For this purpose it was considered advisable and convenient to select buildings or dwellings under Government or Municipal control where possible. The following are the sources of our adults.

- (1) Two Lines of K.A.R. askaris' huts, with two huts in the K.A.R. Transport Lines.
- (2) Nine apartments in the boys' quarters of three Government officials on the Hill. Catches here started in August.
- (3) One line each of men's and women's cells at the Gaol.
- (4) Twelve askari huts at the Police Depot.
- (5) Two lines of twenty apartments each in the new Railway landies.
- (6) Six huts in Pumwani native village.
- (7) Six huts occupied by native labourers, in the Nairobi River market garden area.
- (8) Cattle sheds situated near the swamp below the Old Cemetery.

Each place was visited on a certain day of each week between the hours of 8 a.m. and 12 noon. No time limit was given to the catch: the boys simply caught all the mosquitoes they could find.

During the early part of 1927 control measures, consisting mostly of oiling, were instituted in the district. These may have influenced some of the figures slightly but not to a very great extent, since six of the adult localities were situated in areas in which nothing but major works would greatly influence the mosquito output.

Table 2 gives figures of monthly anopheline catches (columns a), malaria incidence, and climatic records.

TABLE 2. CATCHES OF ADULT ANOPHELINES, NAIROBI.

	1926.								1927.															
	May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		March.		April.	
	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.
<i>A. costalis</i> ...	1244.	99.84	1120.	99.32	824.	98.8	229.	92.	98.	50.	8.	33.	9.	56.	3.	33.	3.	50.	6.	100.	6.	54.	57.	96.
<i>A. christyi</i> ...	1.	.08	7.	.6	6.	.7	10.	4.	56.	28.2	10.	41.6	6.	37.	3.	33.	2.	33.			3.	27.		
<i>A. cinereus</i> ...					2.	.2	5.	2.	21.	10.7	4.	16.			3.	33.	1.	16.5				1.	2.	
<i>A. funestus</i> ...	1.	.08	1.	.08	2.	.2	2.	.8	1.	.5												1.	2.	
<i>A. transvaalensis</i> ..							2.	.8	6.	3.	2.	8.	1.	6.										
<i>A. rufipes</i> ...							1.	.4	3.	1.5														
<i>A. preotriensis</i> ...									3.	1.5										2.	19.			
<i>A. mauritanus</i> ...									3.	1.5														
<i>A. maculipalpis</i> ...									4.	2.														
<i>A. squamosus</i> ...																								
<i>A. rhodesiensis</i> ...																								
Malaria (cases) ..	124		220		275		155		110		123		104		98		68		42		41			
Malaria per cent. of total admissions ...	35.		59.7		70.		55.4		48.		42.		39.		33.		22.		18.		17.			
Pneumonia (cases)	41		35		29		31		18		34		38		37		42		34		32			
Temp. m. monthly	67.1		74.5		62.9		62.8		65.75		67.7		66.7		65.8		67.8		69.4		64.7			
Rel. humidity m. monthly	81.8		80.4		81.75		80.75		72.25		76.		78.75		73.25		65.		71.		87.5			
Rainfall (ins.)	4.45		1.42		.95		1.10		2.62		2.93		3.77		.75		.96		1.42		6.71			

All specimens other than anophelines have been omitted from this list.

It is seen that *A. costalis* was at its maximum (1244) in May, at the beginning of the investigations, just after the highest recorded monthly rainfall (April). There is a rapid drop in numbers through August, September, and October, the minimum occurring in December 1926 and January 1927. A very slight rise in February and March is followed by a distinct upward move in April, following the early rains.

A. christyi and *A. cinereus* occurred in very small numbers only during May to August. Their numbers increased appreciably in September, to fall again in October and remain low during the remainder of the year.

A. funestus was present in small numbers during May to October; *A. transvaalensis*, *rufipes*, *pretoriensis*, *squamosus*, *rhodesiensis*, *maculipalpis*, and *mauritanus* appeared during the period June to December, their maxima occurring in September.

These figures represent adult activity in houses, a factor of the greatest importance when considering malaria. They do not, however, give a true picture of the *relative* prevalence of each species over the period under consideration. Columns b of Table 2 are constructed from the monthly index of each species taken. It is seen that:—

- (1) Though *A. costalis* drops in numbers to almost negligible quantities in October it still remains the prevalent anopheline.
- (2) *A. christyi* is present in considerable numbers in the catches made during the period September to March, though its numbers after November were very low.
- (3) *A. cinereus* ranks third as a domestic species, being most apparent from October to January, its relative maximum occurring in December and its actual maximum in September.
- (4) *A. funestus* appears to be of very little importance numerically.
- (5) The relative and actual maxima of *A. transvaalensis* occur in November and September.

As influencing the relative importance of species it is also useful to record the number of selected places in which each species was caught in each month: this helps in the study of local distribution over any one or more months.

Table 3 is a record of these numbers. It does *not* record the number of monthly catches.

TABLE 3.

Showing the number of collecting places in which adults of each species of *Anopheles* was captured in each month.

	<i>A. costalis.</i>	<i>A. christyi.</i>	<i>A. cinereus.</i>	<i>A. funestus.</i>	<i>A. transvaalensis.</i>	<i>A. maculipalpis.</i>	<i>A. mauritanus.</i>	<i>A. rufipes.</i>	<i>A. pretoriensis.</i>	<i>A. rhodesiensis.</i>	<i>A. squamosus.</i>
1926.											
May	7	—	—	1	—	—	—	—	—	—	—
June	7	1	—	1	—	—	—	—	—	—	—
July	7	5	2	2	1	—	—	—	—	1	—
August	8	5	4	2	2	—	—	1	—	—	—
September	8	8	7	1	5	1	1	2	—	—	1
October	1	2	2	—	—	—	—	1	—	—	—
November	2	2	—	—	1	—	—	—	—	—	—
December	2	2	1	—	—	—	—	—	—	—	—
1927.											
January	2	2	1	—	—	—	—	—	—	—	—
February	2	—	—	—	—	—	—	—	—	—	—
March	3	1	—	—	—	—	—	—	—	—	—
April	6	1	1	1	—	—	—	—	—	—	—

It will be seen that the first three species retain their order; but *funestus* and *transvaalensis* both appear over a longer period and are more widely distributed than *rufipes*, and these two facts outweigh the seasonal numerical superiority of the latter.

It would appear then that the domestic anophelines of Nairobi in order of their seasonal distribution and numerical occurrences during the period May, 1926, to April, 1927, are as follows:—

1. *A. costalis*, Theo. (*A. gambiac*, Giles).
2. *A. christyi*, N. & C.
3. *A. cinereus*, Theo.
4. *A. funestus*, Giles.
5. *A. transvaalensis*, Cart.
6. *A. rufipes*, Gough.
7. *A. pretoriensis*, Theo.
8. *A. mauritanus*, Grp.
A. maculipalpis, Giles.
9. *A. squamosus*, Theo.
A. rhodesiensis, Theo.

None but the first three of these species appears to have earned the adjective "domestic" during the period under consideration. *A. funestus* is so well known elsewhere as a carrier of malaria that it cannot be ignored here: and *A. transvaalensis* and *A. rufipes* are both sufficiently in evidence to warrant notice. The remaining five species have appeared in such small numbers that, as far as the data can be relied upon, they would appear to have been of no economic importance.

Though larval collections cannot give a very accurate picture of mosquito development they do provide a very approximate one if carefully planned. The larval catches here were arranged so that as far as possible the Nairobi area was covered every ten to twelve days, and in such a way that the likely breeding grounds of each species received equal attention. When possible, mature larvae were identified, but frequent absence from headquarters made necessary a reliance upon emergences of adults for most of the figures, so that a very considerable error, due to the variable death rate of larvae in captivity, has to be taken into account. Table 4 gives numbers of adults obtained from larval surveys.

The huge drop in *A. costalis* larval numbers occurs from May to July, and continues more gradually on to October, after which breeding is "normal" except for two slight rises in November and January.

During September *christyi* is predominant in the larval catches. This is continued until January; though its adult incidence rises very considerably in September, it does not reach the same relative domestic importance as *costalis* except during a short period in October.

Very low *funestus* and *transvaalensis* larval numbers are recorded throughout the period. This tends to magnify their associations with dwellings, since the proportion of their total output attracted thereto must have been considerably greater than in the case of all other species. The same applies in some measure to *rufipes*.

In the case of *pretoriensis*, *mauritanus* and *maculipalpis* their frequent occurrence as larvae compared with their relatively low incidence in adult catches tends to lessen their small importance as domestic species.

TABLE 4.
ADULTS FROM LARVAL COLLECTIONS, NAIROBI.

(There were no collections during August.)

	1926.								1927.	
	May.	June.	July.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	
<i>A. costalis</i>	584	170	74	30	16	27	23	37	10	
<i>A. christyi</i>	6	2	32	74	42	50	45	34	7	
<i>A. cinereus</i>	19	7	28	42	20	17	19	3	9	
<i>A. funestus</i>	0	0	1	3	4	0	0	22	2	
<i>A. transvaalensis</i>	0	0	3	9	2	1	1	1	0	
<i>A. rufipes</i>	1	1	2	0	2	0	2	0	0	
<i>A. pretoriensis</i> ..	3	10	15	7	3	8	0	0	0	
<i>A. mauritanus</i> ..	3	0	4	13	11	25	12	19	15	
<i>A. maculipalpis</i> ..	0	0	3	4	1	6	0	1	0	
<i>A. squamosus</i>	0	0	0	0	0	0	0	0	0	
<i>A. rhodesiensis</i> ..	0	0	0	0	0	0	0	0	0	

ANOPHELES AND MALARIA IN NAIROBI.

The greatest difficulty encountered by the majority of investigators in Kenya is the lack of reliable data. It is a common occurrence for people in close association with hospitals in this country to gather an impression from daily contact with individuals, which does not correspond to the information afforded by hospital records. Even were such impressions correct they would not help much in the study of the epidemiology of disease.

Past records of malaria in Kenya are most disappointing in that they may include any other fevers bearing clinical resemblance. Microscopical diagnosis is only now becoming general.

The figures shown for malaria in Table 2 were obtained from the Native Civil Hospital, Nairobi, where greater use has been made of the microscope than in most other places. The curve is therefore fairly accurate. Where clinical diagnosis only has been relied upon, that is, where other fevers may have been included in the malaria records, no very great accuracy can be hoped for in the picture presented by such records, but it would seem to be sufficiently true to show the approximate incidence of malaria. It is suggested that of all the cases of fever that might be diagnosed as malaria, from sixty-five to seventy-five per cent. would be malaria in fact. In other words there may be a twenty-five per cent. error in figures of clinically diagnosed malaria. In dealing with endemic malaria such an error would render figures useless, but with epidemic malaria of a sufficiently high incidence, such as we experienced over a large area in Kenya in 1926, figures would give a curve sufficiently accurate to provide working hypotheses if not conclusions.

In connexion with climatic records this same difficulty exists. Where readings are taken they are sometimes inaccurate or insufficient.

In the majority of outside stations only rainfall records are available, so that, assuming these are reliable, the influence on the course of disease of only one of many climatic factors can be studied.

The important influence of climatic conditions on the human organism and its resistance to disease, on the disease organisms themselves and on insect vectors, is not realized by the majority of medical men in this country, and no epidemiological studies can be undertaken until it is.

The year 1925 was drier than usual, and in August malaria in Nairobi reached its low dry season point. There was a good fall of rain in November, and malarial incidence rose appreciably in December. It continued to rise again slightly in February, 1926, though both January and February had been almost dry.

Copious rains fell in March and still more in April, slackening off somewhat in May and June.

In March, 1927, the upward curve of malaria began and continued fairly steeply till July, dropping suddenly in August and September, to rise again slightly in October following the September rise in rainfall.

There seems to be a fairly obvious connexion between rainfall and malaria.

The pneumonia figures have been included in an attempt to guard against the inclusion of relapses in the malaria curve. A rise in pneumonia incidence often coincides with, and results from, a sudden change in climatic conditions which is not shown in curves made up from monthly means: and relapses may also accompany just such a change.

It may be that the rise of malaria in May was influenced by a certain number of relapses, since it coincides with a slight rise in pneumonia which followed the heavy rains, and was perhaps influenced by a drop in temperature. The same may apply to the rise in October.

Among the anophelines the only species that appears to have any connexion at all with the malaria curve is *A. costalis*. It is most unfortunate that catches could not be made before intense activity commenced. The copious rains had filled every pit, ditch, and depression in the district. The species had been favoured by gentle rains during January and February instead of

the usual heavy storms that tend to scour out breeding places, and this perhaps, together with the slight reduction in the daily range of temperature and the rise in humidity, stimulated it to the most intensive breeding and activity. The immense numbers and persistence of *costalis* during May and June cannot be easily forgotten.

The *christyi* and *civereus* peaks appear too late to warrant suspicion: the incidence of the remaining species is in the nature of a tiny trickling stream compared to the *costalis* roaring torrent.

The work of van Someren and de Boer in 1924 (*Kenya Medical Journal*, Vol. 2, No. 10), throws very strong suspicion on *costalis*, their rainfall, *A. costalis* and malaria curves being in close agreement.

The low rainfall of 1925 appears to have exercised no influence on malaria incidence until November; since no mosquito records are available for that year we are unable to include the mosquito factor.

The records for 1924, however, together with those for 1926, would seem to be sufficient to show the very close relationship between *A. costalis* and at least epidemic malaria in Nairobi. Whether or not there is a small under-current of the disease associated normally with such species as *A. funestus* has yet to be investigated, though the prevalence of *A. costalis* during the whole year under review would suggest that the part played by other species was a very minor one.

NATURAL INFECTIVITY OF ADULT ANOPHELINES.

Combined with the adult catches was the search for natural infection in the females captured. All females after being identified and noted were put singly into glass specimen tubes (7ins. x 1½ins.), fitted with muslin covers, and each containing a strip of blotting paper.

They were fed on sugar-water or banana juice delivered from a pipette on to the blotting paper. Each specimen was kept, when possible, for six to eight days before dissection, to allow for the possible production of sporozoites in the glands if infection existed. Specimens that died before that period had elapsed were dissected at once. It is considered that the presence of active sporozoites is the only definite proof of infectivity, and no account was therefore taken of oocysts after June.

The following table gives details of results.

The very low percentage infection in *A. costalis* is perhaps worthy of note. It is, however, consistent with the amount of malaria, for, during the period April to the end of June, the majority of people in Nairobi were bitten probably from six to a dozen times every evening, and had the natural infection been much more than that indicated by the examination of glands malaria would have been still more prevalent.

It is regrettable as far as this part of the work is concerned that so few wild specimens of other species could be obtained. The numbers dissected are quite insufficient. It is hoped that the continuance of routine examinations for sporozoites over some years will yield useful results.

CONTROL.

Van Someren and de Boer provided the first stimulus to the consideration of mosquito control in Nairobi, but the epidemic of 1926 was required to produce a real effort in this direction. The quiescence of mosquitoes and malaria during 1925 had produced a feeling of indifference in most circles, and the small amount of oiling carried out could not possibly have influenced mosquito output to any appreciable extent. Combined with the work of oiling was a certain amount of clearing of drains and ditches.

A year's painful experience combined with much justifiable propaganda has brought a change of attitude, and there appears to exist an inclination to treat malaria and mosquitoes at their true value.

The well organized oiling measures now in use, combined with the filling in of borrow-pits, cannot fail to diminish the output of mosquitoes and particularly of *A. costalis*. It has most certainly done so during the past three months, but to what extent cannot be estimated.

Observations of the effect of the oiling on known breeding grounds—comparisons of their larval contents before and after—warrant this statement regarding oiling.

Oiling will have to be continued until all drains are made to drain, all ditches are made to dispose of their water properly, all pits are filled in, and all stagnant streams and open swampy areas are drained or drained permanently.

After having disposed of the effects of twenty-five years' constructive mosquito production—a very costly affair indeed—it will be essential that mosquito prevention be kept in mind with every step in development.

Not a yard of ditch, drain, road or railway should be constructed except with the knowledge and under the partial supervision of an official whose duty it is to prevent mosquito breeding.

The employment of a sanitary inspector on the control of mosquitoes in Nairobi is a small step in the right direction. Malaria warrants the employment of many more such men, who after undergoing a course of training here can become extremely useful specialists for the smaller townships. These men might be placed under the orders of a senior Malaria or Mosquito Officer, whose duty would be to correlate the work of control in all districts and to study the disease and its vectors. The senior officer should be able to obtain the advice and, if necessary, the supervision in the field of an engineer trained in mosquito prevention measures. This staff with a central "Malaria Board" to direct policy could deal with the problem in an organized manner with every hope of success.

It is probable that seventy-five per cent. of the malaria in Nairobi could be avoided if *A. costalis* were controlled.

The year's work here has not allowed time for devotion to the study of methods of control other than oiling and draining.

The use of larval poisons such as Paris-green and copper sulphate, though much more economical than oiling, has not been recommended because of the great risk involved when handled by our still primitive African staff.

Biological control cannot be studied as it should be until we have facilities for intensive observations on the bionomics of mosquitoes, mosquito larvae and other aquatic organisms.

ANOPHELINES AND MALARIA IN OUTSIDE DISTRICTS.

NGONG.

The valley of the Mbagathi river, situated about nine miles west of Nairobi, was chosen for investigation because of its somewhat peculiar conditions. The river runs through a narrow valley, that has on its eastern bank for some few miles European settlements concerned with coffee production; in the valley itself for a stretch of about half a mile are European owned market gardens. This portion of the valley was only a few years ago a papyrus swamp, the papyrus having been cleared away for the production of vegetables and flowers.

According to information supplied by one of the oldest settlers here, until the year 1926 there had been very little malaria amongst the Europeans and their African labourers along this river settlement; but during that year it was very serious.

Previous to 1925 a considerable amount of papyrus had been eliminated from the valley, and during that year some 20 acres more were cut out.

The main features of papyrus swamps are as follows:—

- (1) Papyrus grows more or less densely over an area of low-lying wet land.
- (2) Swampy conditions are usually provided by a stream or streams which flood the surrounding country. The streams may have their sources miles away, or they may arise from springs or seepages in or near the swamp area.
- (3) Little open water exists except along the edges of the papyrus or the course of the streams where these exist.
- (4) The water in the swamp may or may not be deep enough to cover the bases of the papyrus. During the wet season it sometimes is, but during the dry season, the level gradually sinks below that of the massed bases of vegetation, leaving only small areas of comparatively open water wherever the papyrus is less dense or on the edges of the swamp.

Such conditions are usually suitable for only two or three species of shade-loving anophelines. The typical swamp species is *A. mauritanus*; this may occur anywhere in the swamp. Along the edges may be found *A. funestus* and *A. transvaalensis* in relatively small numbers.

At Ngong, catches were made in and around still-existing portions of untouched papyrus and reed swamp, for purposes of comparison with the reclaimed area. The majority of larvae captured were *A. mauritanus* and *funestus*, with a very occasional *costalis* and *pretoriensis*.

Now the removal of papyrus does not do away with the swampy conditions that give rise to the papyrus, but it *does* deprive standing water of shade.

After the elimination of the papyrus at Ngong, canals were made to drain the soil. Many of these attracted the excess of soil water and held it, so that in place of an expanse of clean water covered with papyrus there existed a series of earth canals holding stagnant water. Some of these—the narrower ones—became overgrown with grass, but many did not. At the top of the valley a dam had been constructed across the river for purposes of irrigation during the dry season; but apparently this did not interfere needlessly with the flow down the main stream,

which was much too fast and clean to afford harbourage for larvae. Catches of larvae in the canals at various times of the year yielded:—

A. costalis,
A. christyi,
A. cinereus,
A. funestus,
A. transvaalensis,
A. mauritanus:

all in much greater numbers than at any time could be found in the untouched portions of papyrus and reeds. *A. costalis*, *christyi*, and *funestus* were particularly numerous.

Other breeding grounds existed, notably a large drain running along the vlei below the hill on which three European houses stand, and a small grassy pool in the forest behind one of these houses. These yielded their quota of *A. costalis*, *christyi* and *mauritanus*.

During June and July, 1926, adult catches in huts near by occupied by Africans yielded the above three species in considerable numbers.

The investigations have not been sufficiently continuous to warrant curves of the results; but it may be pointed out that *A. costalis* occurred in greatest numbers during June and July, when the work was started, being replaced by *A. christyi* from September onwards. *A. funestus* was most numerous during June, 1926, and April, 1927.

1926 rainfall, as recorded on one of the farms, was as follows:—

January	...	...	...	2.45 inches.
February	...	...	...	1.40 ..
March	...	...	...	8.50 ..
April	...	...	...	12.31 ..
May	...	...	...	5.51 ..
June	...	...	...	1.60 ..
July	...	...	...	0.68 ..
August	...	...	...	2.20 ..
September	...	...	...	3.95 ..
October	...	...	...	3.62 ..
November	...	...	...	4.62 ..
December	...	...	...	0.84 ..

No figures are available for malaria, but as far as can be ascertained cases were most numerous during May and June.

Recommendations for mosquito control were mainly:—

- (1) Clearing and regrading of all drains and canals to make their waters run.
- (2) A possible flushing out of all canals once or twice a week by the use of a flood gate in the dam.
- (3) Oiling of all stagnant water that cannot be disposed of.

KIAMBU.

Kiambu is the administrative centre for a large native and settled area, and is situated about ten miles north and slightly west of Nairobi. It is just on the edge of a large stretch of country characterized by small steep hills and narrow valleys.

The Government Station itself stands on a hill bounded on the south by two permanent streams, on the north by narrow valleys through which run tiny streams arising from springs, and on the east by a large swamp.

The area is fairly typical of closely settled portions of the Kikuyu reserve. The steep slopes of the valleys are taken up to a great extent by native shambas, and sugar cane is grown in the lowest spots. Where cultivation does not exist, the hill sides are clothed in dense grass and the valley bottoms in tall grass and reeds.

The large swamp gives rise to a dense growth of tall reeds in the lowest part, grass covering the higher and drier portions. The permanent water of the swamp arises from springs and seepages, but this is greatly augmented during the rains. There is no natural outlet for the water, except perhaps when the water level is at its highest. For most of the year there is no decreasing factor except evaporation.

Mosquito investigations were started here in March, 1926, at the request of the District Commissioner.

Breeding places existed all round the station. The permanent streams yielded *funestus* and *mauritanus* in their more stagnant spots. Most prolific sources were the small seepage streams in the native shambas. These had in places cut for themselves small canals, many of which were quiet uncovered; elsewhere they had produced small grassy or reedy swamps. Species collected from such places included:—

- A. costalis*,
- A. christyi*,
- A. pretoriensis*,
- A. maculipalpis*,
- A. mauritanus*,
- A. cinereus*,
- A. transvaalensis*.

This variety occurred in all shamba areas.

A comparison was made with the sections of valleys further removed from the station and containing no native cultivation. Catches here beneath the long grass that is almost universal, yielded very few *funestus*, *mauritanus*, and an occasional *pretoriensis*.

Invariably it was found that developed areas—that is areas under native cultivation—yielded not only a greater number of species but far more of each species than a similar area in the same valley, containing similar seepage waters, but left *uncultivated*.

The swamp yielded:—

- A. cinereus*,
- A. mauritanus*,
- A. maculipalpis*,
- A. squamosus*,
- A. funestus*,
- A. christyi*,
- A. costalis*.

A. mauritanus occurred fairly generally over the swamp area. *A. maculipalpis* was numerous during December, 1926. *A. costalis* and *A. christyi* bred most freely but not intensely in the open spaces, either in the grassless "cattle-licks" or along the edges of the swamp. The other species were found in small numbers only.

Seasonal incidence of species coincided roughly with that of Nairobi.

When possible, larval surveys were supplemented by adult catches in the huts and houses of the station.

The following table gives the numbers of the several anopheline species captured in representative police lines, Indian dukas, gaol buildings, and the European quarters, at different times of the year:—

Month.	<i>A. costalis.</i>	<i>A. christyi.</i>	<i>A. funestus.</i>	<i>A. trans-vaalensis.</i>	<i>A. cinereus.</i>
April, 1926	22	6	—	—	—
June, 1926	41	—	3	—	1
July, 1926	9	—	—	2	1
October, 1926	—	2	—	2	—
November, 1926 ...	—	1	1	—	2
December, 1926 ...	—	—	—	—	—
January, 1927	—	—	—	—	—

Though these figures are small they suggest however faintly, that *A. costalis* behaved here as elsewhere during the first six

months of 1926—it was the prevalent species in houses and was therefore most closely associated with human beings. The other species are very secondary in importance.

There exist no figures for malaria in the district, but from verbal information supplied by the District Commissioner it appears that there was a high incidence during April, May, and June.

CONTROL.

The very large number of breeding grounds over so small an area made control appear a vastly expensive and troublesome undertaking. But enthusiasm is almost as essential as draining and oiling, and the less the funds available the more enthusiasm is required. There was no actual money to be got, but the District Commissioner was able to convince the Kikuyu population, whose shambas were producing anophelines in large numbers, that proper drains produced no mosquitoes, and that if there were no bad drains there would be very much less malaria. As a result a considerable amount of small draining of native plots was carried out, and very many breeding grounds eliminated. In addition, however, it was considered advisable to start oiling measures to deal with any water that could not be drained away. Lack of funds was again the difficulty: no oiling staff could be employed. It was eventually decided that the District Commissioner should provide two boys to do the actual oiling and that these should be supervised by a trained mosquito-boy from this Branch. Oiling has now been going on for some time: one of our trained Africans is being made responsible for a strict watch on anopheline development by continuous collection of larvae, and also for the application of oil to all breeding grounds thus found. All the oiling is now done by one boy only: he covers an area of about a mile square in a week to ten days.

Judging by the numbers of larvae that can now be found, this experimental work (and it is experimental only) will prove a success, and if it does, we shall then be able to suggest a cheap and efficient organization that any District Commissioner might employ for any Government station.

The expenditure of a few pounds a year, together with a little personal supervision, might do much to render sanitary even the most malarious Government post. But more than that, natives cannot but be influenced by the measures taken by their Commissioner.

INFLUENCE OF DEVELOPMENT ON MOSQUITO FAUNA.

It may be well to emphasize here the effects of man's efforts at development on mosquito output, and it is easiest shown by the study of conditions in untouched areas.

At Ngong we compared the fauna of untouched papyrus and reed swamps with that of an European reclaimed area in the same valley. In the former were found quite few larvae of *funestus*, and *costalis* and rather more *A. mauritanus*. In the latter large numbers of *A. costalis*, *A. christyi*, *A. funestus*, *A. cinereus*, *A. transvaalensis*, and *A. mauritanus*.

At Kiambu a comparison was made of catches in native reclaimed areas with those of an area in the same valley not yet taken for native crops. The shambas produced *A. costalis*, *A. christyi*, *A. pretoriensis*, *A. maculipalpis*, *A. mauritanus*, *A. cinereus*, and *A. transvaalensis*; the first two, fourth and fifth in large numbers. In the grass-covered valleys were found very small numbers of *A. funestus*, *A. mauritanus* and *A. pretoriensis*.

In Nairobi too the same results were obtained: papyrus or reed swamps yielded very small numbers of two or three species and very seldom *A. costalis* or *A. christyi*, whereas the market garden areas would be hard to beat in Africa for variety and numbers of species.

The swamp at Kiambu is to some extent an exception in that its area affords conditions suitable for a variety of mosquitoes and this is not usual. The majority of swamps in this district are covered almost completely either with papyrus and reeds or grass so that the mosquitoes produced therein are limited to quite a few species.

Present methods of agricultural development, particularly market gardens, and small mixed shambas, are responsible for an enormously increased mosquito output.

SISAL ESTATE "A."

This estate is one of many occurring on the right of the Nairobi-Fort Hall road. In the latter part of 1925 mosquito investigations were started through a belt of these estates starting at about ten miles from Nairobi and extending to within five miles of Fort Hall—thirty-five miles of developed area under coffee and sisal. A preliminary survey of this area took several months and for several reasons it was decided to select one estate for closer investigation, as being typical of all sisal estates in the district.

The estate is some miles north of Nairobi, situated in fairly flat open country traversed by a few permanent rivers. The soil is generally rather poor and natural drainage bad.

The estate is bounded on the north and north-east and on the south and south-west by rivers. Other water courses, of a more or less temporary nature, are two gullies, one near the eastern edge of the estate and one southwards of the Manager's house, and a shallow donga that runs eastwards through a great part of the estate just north of the factory. This last appears to be the result of quite recent erosions.

Both rivers are large streams with a good flow all the year, but along their courses are occasional low-lying and swampy areas covered with tall grass, reeds or papyrus.

On or near the south bank of the northern river boundary are the Manager's house, a vegetable shamba and nursery supplied with irrigation, quarters for labourers and further eastwards an old factory site with more labourers' huts and an European Assistant Manager's house. Some two miles of sisal separates these from the Thirika river and the remainder of the estate staff and buildings. Camps for six or seven hundred African labourers, consisting mostly of Jaluos, the dwellings of several European assistants, the estate hospital, church, factory and store are all situated along the north bank of the southern boundary river.

Rainfall is a local variation of that of the Nairobi district. No climatic records are kept on the estate so that the impression one gathers concerning the greater extremes of heat, at least, remains unconfirmed. The lack of all vegetation but sisal over an area of some square miles would lead one to expect temperatures of the extreme type.

ANOPHELINE BREEDING PLACES.

The water courses mentioned are the chief sources of anophelines on the estate. The edges of the rivers have yielded many *A. costalis*, *A. christyi*, *A. mauritanus*, *A. squamosus*, *A. funestus*, *A. transvaalensis*, and *A. pretoriensis*. In canals in the Manager's shamba and in shambas made near the Thirika river by labourers, were numerous *A. costalis* and fewer *A. squamosus*, *A. pretoriensis*, and *A. maculipalpis*. The donga near the factory produced *A. costalis* in very large numbers and in addition many small pits made by the labourers for drinking and washing purposes along the lower slopes below their camps afforded facilities for the intensive breeding of *A. costalis* and *A. christyi*.

The seasonal incidence of species is briefly as follows:—

In January, 1926, during dry hot weather and after a dry year, relatively few *A. costalis*, *squamosus*, and *pretoriensis* occurred. Good heavy rains started in April and during May *A. costalis* became more abundant with the extended breeding in pits and dongas: *A. pretoriensis* and *rufipes* were present in small numbers. During July *A. costalis* was still predominant in larval catches and *A. christyi* was first found. In the September catches *A. costalis* was still first numerically but there was a marked increase of *A. christyi*, *squamosus*, *mauritanus*, *pretoriensis* and the *funestus* group. During November, *A. costalis* became slightly more numerous, but other species remained about the same, whilst in February, 1927, *A. costalis* became very scarce and *A. squamosus* relatively numerous.

In adult catches *A. costalis* was present to the extent of 99% of the anophelines in May, 1926, and 100% in July. In September it had dropped to 14%, the remainder being *A. funestus*, but the total catch for this month was only seven adults. The November catch gave 25 adult *A. costalis* and no other species, and in February no anophelines were found. These adult catches were made in representative houses of European and African labourers.

It seems that here, as elsewhere, *A. costalis* was the predominant domestic anopheline during most of the year, and that other species, with perhaps the exception of *funestus*, have played a very unimportant part in the transmission of malaria during 1926.

Figures for the malaria cannot be obtained: the only data available are from the very small percentage of total cases that were sufficiently serious to be carried to Nairobi Native Hospital. These are given in the table following:

January, 1926	...	...	...	1
February	„	...	...	7
March	„	...	...	23
April	„	...	...	13
May	„	...	...	1
June	„	...	...	4
July	„	...	...	3
August	„	...	...	2
September	„	...	...	1
October	„	...	...	1
November	„	...	...	1
December	„	...	...	2

CONTROL.

Attempts have been made during the period of these investigations to bring the Manager and his chief assistant to a sense of their losses from malaria, but it is quite impossible to do so until we are able to show by true figures the amount of their losses in terms of money, and this will not be done until there is some system whereby the recording of sickness on estates employing large numbers of Africans is made compulsory.

It seems to be necessary for estates to keep books recording their true profits and losses, but how this can be done correctly without a record of sickness in a body of perhaps a thousand African labourers, only the Managers of such estates can tell.

A large supply of crude oil was purchased and some spasmodic oiling was carried out with only the most fleeting influence on mosquito output. No attempts have been made to introduce permanent control measures.

Mosquito trouble on sisal estates starts from the very beginning of development. A permanent water supply is of course necessary and the factory must be placed near this. Large numbers of native labourers have to be employed and for convenience and economy their camps are built along the banks of the river. Europeans must be near their work and their staff and their residences are also placed near the river.

However free a river may be from mosquitoes it cannot possibly remain so for long under the above conditions. The factory itself often requires a dam and waste water bearing sisal wash is discharged down the hill-side; swampy conditions must arise. The water supply for hundreds of natives is the river; holes are made for washing or the better collection of drinking water, small shambas are made and attempts at irrigation started. The whole river side becomes a series of holes and ditches holding stagnant water and the river is frequently blocked by broken banks or accumulations of deposited refuse.

In itself the cultivation of large areas of higher lands in this way at least tends to intensify or to create wet conditions in the uncultivated valleys and lower areas.

The very bad reputation for malaria enjoyed by many sisal estates is the result of a very primitive and short-sighted policy in the early stages of development. On most estates there is no lack of space and there appears to be no economic reason why European dwellings and labour lines should be sited along the banks of streams. The initial expense in laying a proper

water supply from a river to camps say three-quarters of a mile or a mile distant would be probably more than saved in the first few years by the lower sickness rate and greater efficiency amongst the labourers as compared with that existing in lines built along a river.

Fort Hall.

Fort Hall, situated some 60 miles north of Nairobi, is the administrative centre for a large Kikuyu native area. It stands on a hill just inside the edge of the broken hilly country, which seems to start abruptly north of the Maragua river. The hill on which it stands is practically surrounded by small streams with occasional swampy areas, and the slopes are characterized by the presence of many springs or seepages. For the most part the natural water courses have not been interfered with to a very great extent except in so far as they have become in some places the sources of water and washing places for the local population.

The only Europeans are a few Government officials; these with Indian and Goan and African subordinates, and a number of Police Askaris, make up the official community. There is an important native trading centre in the boma with Indian stores and storekeepers. Most of the easier hill slopes and some of the more open river valleys are occupied by native shambas.

Breeding places occurred in the surrounding streams and swampy areas bordering streams. The many small seepage areas formed small grass swamps in which larvae of *funestus* and *maculipalpis* flourished. Borrow-pits were not numerous but those that existed produced the usual *costalis* during its season. This species found favourable conditions also in open or partly shaded swamps and shamba canals. *Pretoriensis* occurred in many places but was particularly obvious in pools in a rocky river bed.

Generally speaking Fort Hall derives its mosquitoes from its many *natural* breeding grounds, rather than from conditions arising from man's influence.

Larval collections have been made in and around Fort Hall since late in the year 1925 under the supervision of the Medical Officer in charge. At first collections were made in as many breeding grounds as possible in the area; later the survey was limited to collections from certain chosen spots only, the selections being made to include all species if possible.

The figures from which the following table was constructed are for adult emergences only since it was impossible to have the larvae sent in monthly for identification. They probably give only a very rough picture of the true state of affairs:—

Column (a) shows actual numbers and column (b) the index of species.

The species obtained from Fort Hall are *A. costalis*, *maculipalpis*, *pretoriensis*, *funestus*, *mauritanus*, *cinereus*, *rhodesiensis*, *rufipes*, and *transvaalensis*.

It will be noticed that the figures for rainfall, *A. costalis* and subtertian malaria are suggestive of a definite inter-relation.

Larvae of *A. maculipalpis* and *A. pretoriensis* were scarce during the wettest period.

The rise in subtertian malaria in November and December, 1926, coincides with a rise in pneumonia and might therefore be due to relapses unless there is some connexion between the malaria and *maculipalpis* or *pretoriensis*. It is probable too that here, as well as in Nairobi, the early cases of malaria in the rainy season are relapses.

Blackwater occurred, whilst subtertian was severe during June, July and August; and two cases in November coincided with a rise in rainfall, subtertian, and pneumonia, but not apparently with a corresponding rise of *A. costalis*.

The measures recommended for control are briefly:—

- (1) Canalization of small streams and drainage of seepage areas.
- (2) Clearing the main channel of the Mathari river and drainage of swamp areas along its banks.
- (3) Clearing out of "drains" and cuttings in native shambas.
- (4) A modification of the use of the dam above the posho mill near the Embu Road to allow the Mathari river full flow for two days a week.
- (5) The application of oil to water that cannot be got rid of, with particular attention to surface water during the rains.

NAKURU.

This town is the centre of a very wide and important maize growing area in the central highlands. It is situated on the slopes of a hill about a mile to the north of Nakuru Lake—one of the large alkaline lakes of the Rift Valley. This natural gradient continues to the Lake.

TABLE 5. FORT HALL.

Column a shows numbers of adults from larvae collected; column b the index of species.

	Nov.		Dec.		Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.	Dec.
	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	a.
<i>A. costalis</i> ...	7	7.7	0		9	23	35	44	0		84	89	167	99	54	64	10	48	62	26	14	9	3	4.3	0	0
<i>A. maculipalpis</i> ...	61	68	13	87	4	10	17	21	31	93	4	4.2	2	1	0		0		8	3.3	38	24	60	85	7	0
<i>A. pretoriensis</i> ...	18	20	2	13	22	59	28	35	2	7	6	6.4	0		29	34	9	43	167	69	85	67	6	9.7	1	1
<i>A. funestus</i> ...	0		0		0		0		0		0		0		0		1	4.5	3	1.1	0		0		1	0
<i>A. mauritanus</i> ...	1	1	0		0		0		0		0		0		0		0		1	.4	0		0		0	0
<i>A. rhodesiensis</i> ...	3	3	0		0		0		0		0		0		1	1.5	0		0		0		0		0	0
<i>A. cinereus</i> ...	0		0		0		0		0		0		0		0		1	4.5	0		0		0		0	0
<i>A. transvaalensis</i> ...	0		0		0		0		0		0		0		0		0		1	.4	0		0		0	0
<i>A. rufipes</i> ...	0		0		0		0		0		0		0		0		0		0		0		0		0	0
Malaria S.T. ...	0		0		28		25		49		43		33		57		90		48		45		21		35	40
Malaria B.T. ...	4		2		16		14		11		14		1		16		4		6		1		7		0	0
Pneumonia ...	0		0		3		7		2		4		8		9		9		3		3		3		0	9
Blackwater ...	0		0		0		0		0		1		0		1		1		1		0		1		2	0
Rainfall (inches) .	4.1		6		3.1		.75		5.6		4.7		5.1		2.2		.9		1.2		.15		2.4		6.5	.7

The nearest permanent waters to the township area are the Njoro river running into the Lake some two miles southwards, the Lake itself and the reservoir on Menengai about a mile to the north. Apart from these the only source of water is rainfall.

Over 16 years precipitation has averaged 37.6 inches. There appears to be a fairly long wet season from March to August, sometimes with a break during June. December, January and February are the dry months. No climatic records other than rainfall are available.

Periodical surveys made here show the chief breeding grounds for anopheline species to be drains, trenches on building sites, pits used for brickmaking near the gaol, cement tanks in the Showgrounds, and a few shallow depressions in various parts of the area. Species found in these include *A. costalis*, *christyi*, *squamosus*, *rufipes* and *cinereus*. The Njoro river near its mouth produces small numbers of *A. mauritanus* and *funestus*. No anophelines have been found in the Lake though certain species of culicines occur there in large numbers.

In adult surveys *A. costalis* was the predominant anopheline. Searches for both larvae and adults during January of this year (1927) produced not a single anopheline in the township area though culicines were fairly abundant.

It is worthy of note that species of *Aedes* (*Stegomyia*) appear to be more numerous in domestic catches here than in other townships, the sources being the many partially covered domestic tanks.

TABLE 6. RAINFALL AND MALARIA—NAKURU.

1925.												
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall (inches)	2.	1.3	5.1	1.15	1.1	2.6	2.6	2.8	3.6	7.4	9.	5.
Malaria (cases)	10.	10.	18.	15.	30.	13.	13.	14.	18.	37.	45.	25.
1926.												
Rainfall (inches)	2.5	1.2	2.6	6.1	1.8	.9	3.4	3.95	5.8	4.6	5.3	.7
Malaria (cases)	14.	28.	34.	27.	29.	26.	31.	33.	16.	15.	10.	8.
Pneumonia	6.	2.	4.	11.	9.	4.	9.	4.	1.	9.	5.	10.

CONTROL.

With the presence of a Medical Officer of Health and a Sanitary Inspector in Nakuru it is hoped that considerable attention will be devoted to the prevention of breeding in the township

area. Up to the present very little has been done beyond spasmodic cleaning of drains.

The township area is very easy to deal with; it has a very good slope lakewards and no water need stand anywhere. The one or two small depressions that hold rain water can be dealt with by draining at very little trouble and expense, and the excavations in the gaol brickfields should be dealt with by the brickmaking gang in the same way.

The drains conveying water down the slope might be continued further with advantage and terminated in or near the lake: there is a tendency at the moment for the formation of swampy conditions where the drains end.

The railway area needs frequent supervision: its drains are somewhat overgrown and silted up. With the very large amount of building in progress there is a danger that excavations made by contractors may produce large numbers of *A. costalis*. This can be avoided only by frequent inspection.

There appears to be no excuse whatever for malarious conditions in Nakuru.

ELDORET.

Eldoret is an important agricultural and railway centre in the Uasin Gishu area, standing at an altitude of 6,677 feet. It is fast increasing in importance not only as the result of its own development but from the influence of its surroundings.

The European population is as yet small, consisting almost entirely of tradesmen and a few professional men.

The township proper stands on the right bank of, and on a slight slope to the Sosiani river, though its area is extending rapidly on the left bank.

There are the usual European stores, Indian Bazaar, Government African lines and north of these and higher up the slope the railway with its station, workshops and staff quarters. European residential areas are mostly to the east and south-east of the commercial area.

Malaria is known to occur in and around the township and the area produces much of the blackwater recorded in Kenya, but no work was possible here before March, 1927, when a brief visit was paid.

The chief anopheline breeding grounds were the drains in and around the railway area, an irrigation canal, a few places along the river and seepage areas along the bases of the slope to the river. These produced *A. christyi*, *A. costalis*, *A. squamosus*, and *A. mauritanus* in small numbers. Adult catches were made at the same time in the hospital quarters, the Government

African lines, the gaol, and the Indian dukas, but no anophelines were found.

Potential breeding places were the roadside drains and a few borrow-pits; the former were very badly in need of repair in many places.

Eldoret suffered in common with other parts of Kenya, from an epidemic of malaria during 1926. The following table ∇ gives the figures of malaria recorded in the Native Civil and European Hospitals, with rainfall correlated. All the figures were supplied by the District Surgeon. Those for malaria refer to cases diagnosed either clinically or microscopically and the remarks made previously regarding possible error in such figures apply here.

TABLE 7.—RAINFALL AND MALARIA: ELDORET.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	.6	2.1	1.6	10.6	3.8	2.2	8.15	3.15	3.4	2.6	2.45	.3
Malaria (cases)	14.	12.	13.	26.	26.	53.	34.	5.	9.	21.	16.	22.
(Africans and Europeans)												

The rainfall and malaria curves show a correlation similar to that seen in figures from other parts of Kenya so that we may assume that the intermediate factor is an anopheline directly or indirectly stimulated to intensive breeding and activity by climatic factors during and just after the rains. From data regarding anopheline activity in other places under similar conditions, it would seem that *A. costalis* might be concerned. Though this species has been found in Eldoret only in small numbers there would appear to be no conditions either climatic or topographic unsuitable for it.

CONTROL.

As the result of the brief survey in March a first step has been taken in control measures. A trained mosquito boy has been posted, to keep a watch on mosquito development by larval and adult catches, and to supervise an oiling boy. This work is directly supervised by a Sanitary Inspector on the staff of the Medical Officer of Health, Nakuru. Other recommendations included attention to roadside drains and ditches, proper supervision of drains in the railway area, the abolition of one bad irrigation canal, the drainage of an area intended for a new native location and of other small seepage areas on the lower slopes near the river.

KITALE.

Kitale, situated about fifty miles north of Eldoret, is the centre of the large and very important Trans Nzoia agricultural district. The township stands on two small hills at an altitude of 6,200 feet, the highest point apparently in a considerable area. The surrounding country is slightly hilly with wide valleys through which run small streams many of which originate in springs. The soil everywhere is intensely fertile and along the stream courses are belts of dense jungle.

From the hills on which the township stands six or seven of these small streams run out, with their belts of bush and trees, into the adjoining country. Some of them are clothed in heavy vegetation from their sources whilst others traverse shallow grassy valleys before reaching their jungle belts.

These streams are the natural and permanent breeding grounds of *A. mauritanus*, *A. funestus* and in one spot at least *A. implexus* Theo. Moreover the open portions of some of the valleys would appear to offer conditions suitable to *A. costalis* and *A. christyi* during their seasons.

But these natural sources of anophelines are dwarfed by man-made breeding grounds in the form of pits in brickfields. The clay in certain parts of the township area is particularly suitable for bricks and the township is developing at an astonishing rate. At the time of my visit in March there were several old abandoned brickfields and a very large one being worked most thoroughly. Nearly every pit held water and larvae of *A. christyi* or *A. costalis*, the latter in very small numbers only.

Roadside earth drains appeared to need attention and the drains from the railway area ended in a swamp. There seemed to be great possibilities for anopheline production here.

CONTROL.

Recommendations were submitted for dealing with these sources in a permanent manner.

In addition it was arranged that for the treatment of standing water during the rainy season, one or two coiling boys should be employed, to be supervised by the Sanitary Inspector, Eldoret, who pays frequent visits to Kitale.

A watch is being kept on mosquito activity by larval and adult catches, the trained mosquito boy at Eldoret being used for this area also.

No records of malaria are available but from verbal information supplied by the Resident Commissioner, the disease

reached epidemic proportions during April, May and June of 1926. Blackwater occurred in the district during June and July.

The only climatic records obtainable are those relating to rainfall and these are as follows:—

January	...	...	...	...	0.50 inches
February	...	...	...	...	4.66 "
March	...	...	...	...	2.30 "
April	...	...	...	...	9.38 "
May	...	...	...	...	7.98 "
June	...	...	...	...	4.12 "
July	...	...	...	...	4.81 "
August	...	...	...	...	5.50 "
September	...	...	...	...	7.06 "
October	...	...	...	...	6.03 "
November	...	...	...	...	2.83 "
December	...	...	...	...	0.00 "

The total, 55.17 inches, is rather higher than normal.

The rainfall and malaria maxima appear to have had some relation.

A. implexus has not previously been recorded in Kenya.

KISUMU.

Mosquito investigations and control have been carried out here by the Medical Officer of Health at the suggestion of this branch, and visits have been made to the area when possible, since the conditions are peculiar and not found elsewhere in Kenya.

Kisumu is the Kenya port for Uganda and has a long frontage on Lake Victoria Nyanza. It is backed partly by a high escarpment and partly by low-lying plain. The township is divided essentially into two areas: the European residential area situated on a low hill but quite close to the lake; the Asiatic, commercial and native areas situated on lower land adjoining the European hill and stretching round behind on to the plains. In the latter are included the docks and railway quarters. The European population numbers about 150; the Asiatics and Africans amount to 7,515.

The chief sources of mosquitoes during the period under consideration have been drains, borrow-pits and similar excavations, stagnant surface water during rains, the lake shore, and during the latter part of 1926, a large swamp that had resulted from the collapse of a river dam. Of these the first, second and third were of chief importance since they produced very large

numbers of *A. costalis* and *funestus*. The lake shore which was for a long time considered to be the chief source of mosquitoes, was found to be of secondary importance. Along its grassy and reedy edges were found many *A. mauritanus*, fewer *pharænsis* Theo. and *funestus*. In the papyrus swamp too at the north end of the gulf these species were predominant in the *untouched* portions, but so soon as drains occurred, the majority of which held open stagnant water in some portion of their length, then appeared *A. costalis* in large numbers. *A. costalis* occurred too in some open water at the back of the swamp. *A. maculipalpis* also occurred in a few places and in small numbers.

The year 1926 was remarkable in Kisumu for two mosquito outbreaks. The first, consisting of *A. costalis*, coincided more or less with the phenomenal occurrence of that species over most of Kenya during April to July. With the abating of *costalis*, however, *A. funestus* became more and more evident, ultimately, during October and November, reaching a peak as high as that of *costalis* in June and July. Both species were so numerous at the height of their season that catches of some 200 females were made in single native huts. *A. costalis* bred as usual in the stagnant surface water in pits and drains during and after the rains. *A. funestus* occurred in overgrown drains and other grass-covered water, but the large numbers were chiefly due to the formation of the large swamp mentioned. In the previous 15—20 years there had been no swamp in this locality nearer than three or four miles, but the heavy rains had broken down a series of dams which had been constructed many years before, about four or five miles out of the township, and this had resulted in the re-creation of an old swamp, covering several square miles and only a little over a mile from Kisumu. *A. funestus* was found breeding along the edges of this in large numbers. Furthermore the presence of the swamp interfered greatly with the proper functioning of a series of drains in that area and *A. funestus* was being produced in them in much more than normal numbers.

Table 8 gives figures of malaria, adult anophelines and rainfall, all the data having been collected by the Medical Officer of Health.

The adults were obtained from a number of selected huts in certain areas, catches being made each week on the same day. This work was started in April, 1926, so that data are not available for months previous to this.

Malaria figures are for in-patients microscopically diagnosed at the Native Hospital.

TABLE 8.—RAINFALL, MALARIA AND ADULT CATCHES : KISUMU.

		Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.		
		1926.												1927.				
40	Rainfall (inches)	...	.6	4.3	5.6	9.9	13.	.3	1.4	2.4	7.	1.05	3.17	1.05	2.21	3.59	7.02	
	*Malaria	...	...	102.	143.	111.	108.	176.	201.	154.	83.	87.	84.	78.	62.	44.	43.	29.
	Africans and Asiatics																	
	Pneumonia	...	...	11.	8.	17.	8.	5.	7.	6.	8.	12.	8.	6.	4.	4.	2.	6.
	<i>A. costalis</i> av. per hut					23.	38.	23.	15.									
	<i>A. funestus</i> av. per hut										18.	29.	42.	25.	12.	12.	11.	

* All microscopically diagnosed.

When comparing the rainfall and malaria figures it must be pointed out that during September, October, November and December of 1925 there was an average of over 3 inches of rainfall and malaria started the year at a good height: probably *A. costalis* did also. The sharp rise in rainfall from January, therefore, if associated with malaria, would merely increase the numbers of carriers in an already heavily infected area. This is what appears to have happened. The peak of *A. costalis* as shown, coincides with that of rainfall, and malaria reaches its maximum a month or so later. The equally high incidence of *A. funestus* in November appears not to have influenced the malaria curve at all.

During August the change-over from *A. costalis* to *A. funestus* took place.

An interesting point in the adult catches was that huts situated on the north and south lake-shore areas yielded numbers that were always very much below those of the Partington's Dyke and Disposal Areas. In the hut figures selected for discussion here the highest average catches of *A. costalis* and *A. funestus* on the south lake-shore area were 15 and 8 and on the north lake-shore area 10 and 8 respectively. Comparative figures for the Partington's Dyke and Disposal Areas are 93 and 43; and 45 and 122 respectively. The secondary importance of the lake-shore areas suggested by the larval catches is shown again in this evidence of adult activity.

Though there were undoubtedly small periodical fluctuations in malaria incidence that are not shown in a figure made up from monthly figures—there was actually a slight increase among the European population during November and December, coinciding roughly with the rise of *A. funestus* during that month—the enormous production of *A. funestus* seems to have had no great influence on the disease during the period under consideration. That *funestus* is responsible for endemic malaria is extremely probable but not yet proved.

Control measures have been carried out by the Medical Officer of Health during the whole year, the orthodox oiling and clearing of drains being the chief feature.

KISII.

In many respects Kisii is quite unlike any of the other districts studied both in topography and climate. It is situated among hills at an altitude of between 5,000 and 6,000 feet and some 30 miles from Lake Victoria. The boma itself is situated on a hill side and is surrounded by fairly high hills.

Population consists of a few European officials and their families, Indian Storekeepers, African officials and Police and a large general native population.

The main topographical features are three streams that run westwardly, one on the south and two on the north of the station. These join about half a mile west of the bazaar. The stream to the south is quite small except during rains, and almost dries up in places. On all the lower slopes near the streams are occasional small seepage areas which give rise in some places to tiny subsidiary streams. Along the stream banks there is long grass or reeds and in places thick scrub overhanging, and for long stretches completely covering, the stream channels. A few native shambas with bananas and sugar-cane exist on the banks.

The streams are the chief sources of anophelines, the species most prevalent being *A. funestus* and *A. transvaalensis* as one might expect. *A. maculipalpis* and *A. squamosus* also occur in small numbers.

Other breeding grounds exist in the form of small canals in native shambas and stagnant open puddles at or near cattle drinking places. These produce a few *A. christyi*. The collections in this district have been too small and too infrequent to form any conclusions as to the mosquito fauna, but it is still remarkable that *A. costalis* which is so obvious in most of the other areas dealt with, has not yet been found.

On occasions it has been found impossible in a two or three days search to discover more than about half a dozen anopheline larvae. In March of 1927 such a search was made over two days and a fortnight later another and more prolonged survey was undertaken, resulting in a catch of five *funestus* larvae.

The rainfall is relatively heavy, averaging nearly 70 inches during the last 15 years. There are usually two distinct and high maxima—in April or May, and in September, October or November. It is peculiar too in that most of the precipitation occurs in heavy storms, so heavy that the stream beds get a very thorough flushing during nearly every storm. A few hours after any storms practically no standing water is to be seen, so good is the natural drainage. It may be, that since breeding grounds are mainly the streams and seepages, there being very few pits and drains, this type of rainfall is actually a check on mosquitoes.

Table 9 shows curves of rainfall, microscopically diagnosed malaria, and pneumonia, for the years 1925 and 1926.

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Table 9 shows curves of rainfall, microscopically diagnosed malaria, and pneumonia, for the years 1925 and 1926.

During 1925 malaria incidence was very low and the majority of cases were reported to be of the Benign Tertian type. Rainfall was rather higher than normal. No definite information can be got from the figures for that year.

TABLE 9.—RAINFALL AND MALARIA: KISII.

1925

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Oct.	Sept.	Nov.	Dec.
Rainfall (inches)	5.4	2.4	6.3	4.6	1.2	6.2	5.3	4.	3.7	2.5	16.	6.6
*Malaria	2.	6.	5.	2.	3.	3.	5.	4.	3.	5.	6.	2.

1926

*Malaria	5.	16.	20.	11.	4.	12.	15.	12.	4.	5.	7.	13.
Rainfall (inches)	3.4	6.1	7.2	12.	7.1	8.8	6.7	7.8	13.	10.1	7.2	4.
Pneumonia	2.	2.	1.	0.	1.	4.	3.	2.	2.	2.	3.	5.

*Including ST. BT. and Q.: microscopically diagnosed.

In November and December of 1925 there were 16 and 6 inches of rain respectively and at the end of December malaria reached its lowest point for the year. In January, 1926, rainfall was lower (3.4 inches) and malaria went up. In February and March they continued to rise but with the excessive rains of April there is a sharp drop in malaria continuing till the end of May, when both curves take an upward turn again. This malaria rise may be partly influenced by relapses, since it coincides with an increase of pneumonia. The rather lower rainfall of July coincides with a second peak in the malaria figures and the second rainfall maximum occurs at the same time as the malaria minimum. The third rise in malaria incidence, probably due to relapses in part, takes place after the abatement of rains in September.

Is *A. funestus* responsible for Kisii malaria? If so then it is also responsible for something approaching an epidemic, for the 1926 numbers are abnormally high and it might be that they were not higher because the development of this species was checked periodically by the heavy rainfall.

NATIVE RESERVES AND OTHER AREAS.

NATIVE RESERVES.

It has not been possible to devote much time to the study of mosquitoes in localities uninfluenced by Europeans in Native reserves. When possible however, observations have been made in purely native areas in Kavirondo near Lake Victoria.

Apart from the Lake itself and the relatively few rivers, there are many large areas of low-lying land on which water

stands during the rains for periods sufficiently long to allow of the production of anophelines. Moreover the inhabitants in many districts construct mud dams across shallow watercourses and in fact almost anywhere that may provide storm water, to collect water for domestic requirements and for their cattle. Many of these crude dams hold filthy muddy water for three and four months during and after the rains and provide excellent breeding grounds for *A. costalis*.

The lake shore itself with its patches of papyrus, reeds, and bush produces large numbers of *A. funestus*, *A. mauritanus* and *A. pharoensis*. This fauna occurs along the rivers also.

DOMESTIC ANOPHELINES.

Domestic species vary with the seasons. In the Aloach Valley in Southern Karachonya, *A. pharoensis* was very prevalent during May of 1925 after a very dry period, whilst in April of 1926 *A. costalis* was the only anopheline found.

Generally *A. funestus* occurs over the whole year, its number varying according to the seasons. *A. costalis* becomes prominent where surface water is abundant. *A. pharoensis* and *A. mauritanus* occur in small numbers normally, the former becoming very numerous under certain conditions of climate.

It is worthy of note that *Mansonioides* species (*africanus* and *uniformis*) are by far the most prevalent mosquitoes in the lake shore areas at all times of the year.

The greater numbers of mosquitoes found in native huts without fires than in huts with fires is a constant observation. In the lake-shore villages there are huts set apart for unmarried boys and girls, in which no cooking is done and no fires are made. The occupants of these huts take their meals in the huts of the elder married members, where fires are almost continuously burning. Babies remain with their mothers until they reach the age of about five or six years when they sleep in the fireless huts with the other youths and unmarried members of the village. The protection afforded by the smoke of fires therefore is not available for any children after they leave their mothers' huts. It would be interesting to know what are the parasite and spleen rates of boys and girls between the ages of five and ten years, for it would seem that at this period of their lives they are exposed day and night to intense infection. Daily they spend their time with goats and cattle or in play along river banks and lake shore in almost continuous contact with hordes of mosquitoes and other biting insects, and at night they retire to huts inhabited by swarms of anophelines. The apparent immunity acquired by these people in later life must be extraordinarily complex.

Control of malaria in such areas must first take the form of personal protection and perhaps prophylaxis. But any measures at all, will necessarily follow upon education and general sanitary progress.

ARCHER'S POST.

This spot, an old military outpost now inhabited by two or three traders only, is situated on the north bank of the Uaso-Nyero river, the southern boundary of the Northern Frontier District. The surroundings are semi-desert with vegetation of scattered thorn bush only. The river's course is marked by a growth of tall ivory-nut trees with a certain amount of bush. Though the banks are well cut generally, there are a few small swampy grass areas. No larvae were seen here but the camp was visited by considerable numbers of *A. costalis* and *A. funestus* during three days in August 1926.

Normally these mosquitoes must obtain food from game of which there is an abundance, for there are no local inhabitants other than the traders on the opposite bank, and the spot is very rarely visited except by traffic to and from the Northern Frontier.

SUMMARY.

1. The breeding conditions suitable for various species have been noted. Though in many species there appears to be a high degree of adaptability to widely varying conditions, the optimum breeding conditions for the majority of species appear to be well defined.

2. Where adult catches could be carried out *A. costalis* has been the prevalent domestic species during the period of investigation, its greatest number coinciding with the period of long rains. Natural infection of *A. costalis* in Nairobi was 0.5%. This species occurs in all districts visited except Kisii. It appears to have been responsible for the high incidence of malaria in Nairobi during 1926 and was probably associated with similar outbreaks in other districts.

3. *A. funestus* occurs in all districts, generally in relatively small numbers, except in Kisumu, where it became very abundant during the latter half of 1926, and in Kisii where its proportion of the larval catches is rather higher than elsewhere.

This species is probably partly responsible for the endemic form of malaria in most places and it may be the chief vector of the disease in Kisii. Its appearance in very large numbers in Kisumu does not coincide with any recorded increase of malaria.

4. The influence, if any, of the other 'domestic' species on malaria incidence, has been very weak.

5. A very brief account of mosquito findings in districts other than Nairobi is given.

6. Attention should be devoted *now* to mosquito prevention in small townships, to avoid the creation of conditions similar to those now existing in Nairobi the dealing with which is likely to cost many thousands of pounds.

7. Administrative posts in outside districts can be rendered relatively healthy and comfortable at very little trouble and expense.

8. The prevention and control of mosquitoes in Kenya must follow the orthodox lines—draining and oiling—until further research opens up new and cheaper methods of attack.

9. It is certain that the control of *A. costalis* only, in Nairobi at least, will result in a very great decrease of malar

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Table VI.—FINANCIAL.
TUITION COSTS.

Serial No.	NAME OF SCHOOL.	Grade of School.	Number of children.	REGULAR TEACHING STAFF.						Menials.	Passages.	Local Transport and Travelling and Travelling Allowance.	Books, Stationery and Equipment	Maintenance.	Contingencies.	Total.	Average cost per Child.	Tuition Revenue.	Average Revenue per Head.	Total Profit.	Total Loss.	Cost per Head to Government	Profit per Head to Government.	
				European.	Indian.	Arab or African.	Clerical.	Reliefs.	Total.															
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	
				£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh.	£ sh. cts.	£ sh.	£ sh. cts.	£ sh.	£ sh.	£ sh. cts.	£ sh. cts.	
A.—EUROPEAN EDUCATION.																								
1	European School, Nairobi ..	Senior Secondary	295	9,360 19	..	..	49 16	1,168 12	10,579 7	78 3	866 1	179 2	630 11	190 11	56 10	12,580 5	42 12 90	1,287 9	4 7 28	Nil.	11,292 16	38 5 62	Nil.	
2	Central School, Eldoret ..	Junior Secondary	163	3,230 0	..	..	147 2	1,090 19	4,468 1	35 6	97 10	90 9	289 19	38 13	19 1	5,036 19	30 18 03	405 8	2 9 74	..	4,631 11	28 8 29	..	
3	European School, Nakuru ..	" "	93	2,702 12	..	..	120 0	60 0	2,882 12	30 9	18 12	18 3	487 3	45 16	13 15	3,496 10	37 11 94	477 5	5 2 63	..	3,019 5	32 9 31	..	
4	" " Kitale ..	Elementary C ..	37	1,289 9	..	..	..	..	1,289 9	13 4	3 0	7 10	21 12	8 11	2 12	1,345 18	36 7 51	99 5	2 13 65	..	1,246 13	33 13 86	..	
5	" " Nanyuki ..	" ..	36	162 10	..	..	..	90 0	252 10	3 10	..	5 6	159 19	26 9	14 2	461 16	12 16 56	38 14	1 1 50	..	423 2	11 15 06	..	
6	" " Mombasa ..	" B ..	11	92 10	..	..	..	..	92 10	1 6	..	6 10	144 11	3 13	2 0	250 10	22 15 45	13 5	1 4 09	..	237 5	21 11 36	..	
7	" " Thika ..	" ..	9	240 0	..	..	..	..	240 0	8 0	..	..	7 9	25 5	..	280 14	31 3 77	28 10	3 3 33	..	252 4	28 0 44	..	
B.—INDIAN EDUCATION.																								
1	Indians Boys' School, Nairobi ..	Senior Secondary	647	801 2	5,055 3	..	50 0	168 18	6,025 3	55 9	197 12	94 4	1,352 16	123 9	..	7,848 13	12 2 62	1,384 5	2 2 79	..	6,464 8	9 19 83	..	
2	Allidina Visram High School, Mombasa ..	" "	352	..	3,161 17	..	..	17 15	3,179 12	92 9	41 9	11 17	499 19	50 14	1 10	3,877 10	11 0 31	769 5	2 3 71	..	3,108 5	8 16 60	..	
3	Indian Girls' School, Mombasa ..	Elementary C ..	142	..	908 9	..	..	..	908 9	34 10	16 16	..	52 19	30 2	..	1,042 16	7 6 87	169 6	1 3 84	..	823 10	6 3 03	..	
4	Indian School, Kisumu ..	" B ..	119	..	655 0	..	..	..	655 0	12 15	..	9 8	134 12	16 12	..	828 7	6 19 22	158 2	1 6 57	..	670 5	5 12 65	..	
5	" " Machakos ..	" ..	77	..	603 0	..	..	..	603 0	7 19	..	..	17 8	9 13	..	638 0	8 5 71	162 14	2 2 26	..	475 6	6 3 45	..	
6	" " Lamu ..	" ..	44	..	336 0	..	..	..	336 0	18 15	..	19 5	39 6	5 8	..	418 14	9 10 32	59 12	1 7 09	..	359 2	8 3 23	..	
7	" " Thika ..	" A ..	41	..	237 10	..	..	..	237 10	14 3	..	..	6 5	..	..	257 18	6 5 80	53 14	1 6 19	..	204 4	4 19 61	..	
8	" " Fort Hall ..	" B ..	35	..	126 17	..	..	..	126 17	5 5	..	..	9 1	0 2	..	141 5	4 0 71	81 6	2 6 46	..	59 19	1 14 25	..	
C.—ARAB AND AFRICAN EDUCATION																								
1	Arab School, Mombasa ..	Junior Secondary	293	1,634 1	..	840 19	..	..	2,475 0	47 12	337 16	19 7	170 11	36 18	26 18	3,114 2	10 12 57	..	..	..	3,114 2	10 12 57	..	
2	" " Malindi ..	Elementary C ..	121	700 19	..	425 5	..	..	1,126 4	36 8	59 6	43 3	59 13	23 1	37 14	1,385 9	11 9 0	1,348 0*	11 2 81	..	37 9	0 6 19	..	
3	Government African School, Narok	" A ..	53	477 13	..	83 5	..	..	560 18	..	73 19	31 2	645 13	411 15	6 0	1,729 7	32 12 58	..	..	..	1,729 7	32 12 58	..	
4	" " " Kajiado	" B ..	88	480 0	..	65 12	..	..	545 12	..	..	5 9	40 5	65 6	1 13	678 5	7 14 15	..	..	..	678 5	7 14 15	..	
																								* Endowment.

From August, 1927
From October, 1927

From June, 1927.

(2).—Subcutaneous inoculation of washings collected in 0.5 per cent. citrate solution and filtered through a Berkefeld and Seitz filter, respectively.

1623 inoculated subcutaneously with 10 c.c. of a Berkefeld filtrate; the washings were collected in equal parts of 0.5 per cent. citrate and prior to filtration shaken for half-an-hour with beads.

Result.—Temperature reaction to rinderpest commencing on the 5th day after inoculation.

Animal was subsequently bled to death for virus.

1621 inoculated with 35 c.c. of a Seitz filtrate of a mixture of equal parts of washings and 0.5 per cent. citrate solution, the mixture was shaken with beads for half-an-hour prior to filtering.

Result.—Temperature reaction to rinderpest commencing on the 6th day. Animal died of rinderpest on the 11th day.

1418 inoculated with 5 c.c. of a Berkefeld filtrate of a mixture of washings 25 parts, and 75 parts of 0.5 per cent. citrate solution. The mixture was shaken with beads for half-an-hour prior to filtering.

Result.—Temperature reaction to rinderpest from the 5th day. Animal died of rinderpest on the 13th day.

Summary.—Berkefeld and Seitz filtrates, respectively, of washings collected in 0.5 per cent. citrate solution and shaken with beads prior to filtering, produced rinderpest.

Total in experiment 3.

NOTE.—The inoculation of fresh virulent blood produces a temperature reaction which commences usually on the 2nd or 3rd day after inoculation, but the commencement of the temperature reaction to the filtrate was delayed until the 5th, 6th and 5th days, respectively, after inoculation.

(3).—Subcutaneous inoculation of washings collected in equal parts of a mixture of 0.5 per cent. citrate solution and bouillon Martin and filtered through a Berkefeld and Seitz filter, respectively.

1650 inoculated with 2 c.c. of washings collected in equal parts of a mixture of 0.5 per cent. citrate solution 25 parts and bouillon Martin 25 parts, and shaken with beads for half-an-hour prior to filtering through a Berkefeld.

Result.—No reaction to rinderpest. Animal proved to be susceptible when subsequently tested on its susceptibility.

1628 inoculated with 2 c.c. of washings collected in equal parts of 0.5 per cent. citrate solution 25 parts, and bouillon Martin 25 parts, and shaken with beads for $\frac{1}{2}$ an hour prior to filtering through a Seitz filter.

Result.—No reaction to rinderpest. Animal proved to be susceptible when subsequently tested on its susceptibility.

Summary.—Filtrate of washings collected in equal parts of a mixture of 0.5 per cent. citrate solution 25 parts, and bouillon Martin 25 parts, and shaken with beads for half-an-hour prior to filtering, did not produce rinderpest.

(e).—*Subcutaneous inoculation of fresh filtrate and simultaneously anti-rinderpest serum :—*

1413 ; 1441 ; 1416, inoculated with washings collected in 0.5 per cent. citrate solution, 25 parts of washings in 75 parts, 0.5 per cent. citrate solution shaken with beads and filtered through a Berkefeld filter.

Dose 5 c.c.'s of the filtrate, and simultaneously anti-rinderpest serum at the rate of 20, 30 and 45 c.c., respectively, per 100 kilos, body weight.

Result.—No reaction to rinderpest. All proved to be susceptible when subsequently tested on their susceptibility with virulent bovine blood.

Summary.—Inoculation of fresh filtrate of peritoneal washings and simultaneously anti-rinderpest serum at the rate of 20, 30 and 45 c.c. per 100 kilos, body weight, did not transmit rinderpest.

(f).—*Subcutaneous inoculation of other than fresh filtrate of washings and simultaneously anti-serum :—*

1425 ; 1678 ; and 1431, inoculated with 5 c.c. peritoneal washings collected in equal parts of 0.5 per cent. citrate solution and filtered through a Berkefeld filter and simultaneously with anti-rinderpest serum at the rate of 20 ; 30 and 45 c.c. respectively, per 100 kilos, body weight.

The filtrate was stored at room temperature for 18 hours prior to injection.

Result.—No reaction to rinderpest ; when tested on their susceptibility with virulent bovine blood all found susceptible.

NOTE.—1438 control for the virulence of the filtrate was inoculated with 5 c.c. of the filtrate alone.

Result.—No reaction to rinderpest; when tested on its susceptibility with virulent bovine blood, 1438 reacted to rinderpest.

Summary.—Washings collected in equal parts of 0.5 per cent. citrate solution and filtered through a Berkefeld filter and stored for 18 hours at room temperature prior to injection, inoculated alone or simultaneously with anti-rinderpest serum did not produce rinderpest.

Resumé of Results: Inoculation of.

- (a).—Fresh peritoneal washings produced rinderpest.
- (b).—Fresh peritoneal washings and simultaneously anti-rinderpest serum produced rinderpest.
- (c).—Other than fresh peritoneal washings produced rinderpest with sometimes a delay in the commencement of the temperature reaction.
- (d).—Fresh Berkefeld filtrate of fresh washings diluted 1-100 in normal saline did not produce rinderpest. Washings collected in 0.5 per cent. citrate solution, equal parts, or in 75 parts of 0.5 per cent citrate solution and shaken with beads for half-an-hour and filtered through a Berkefeld or Seitz filter transmitted rinderpest.

(The commencement of the temperature reaction was delayed).

Washings collected in equal parts of a mixture of 0.5 per cent. citrate solution 25 parts, and bouillon Martin 25 parts, and shaken with beads for half-an-hour and filtered fresh through a Berkefeld and Seitz, respectively, did not transmit rinderpest.

- (e).—Washings collected in 0.5 per cent. citrate solution, 25 parts of washings to 75 parts of citrate solution, shaken with beads and filtered fresh through a Berkefeld filter and simultaneously anti-rinderpest serum, did not transmit rinderpest. Filtrate of other than fresh washings collected in 0.5 per cent. citrate solution, equal parts and shaken for 5 hours in a mechanical shaker did not transmit rinderpest.
- (f).—Other than fresh Berkefeld filtrate of washings in 0.5 per cent. citrate solution, equal parts, alone or simultaneously with anti-rinderpest serum, did not produce rinderpest.

APPENDIX P.

METEOROLOGICAL OBSERVATIONS TAKEN AT CERTAIN STATIONS IN THE COLONY AND PROTECTORATE OF KENYA FOR THE YEAR, 1927.

Registered Number.	STATION.	Latitude.	Longitude.	Height above sea level.	Air pressure at Station level.	Attached Thermometer.	Dry Bulb.	TEMPERATURE.						EARTH HUMIDITY.					RAINFALL.										
								Mean.		Max. and Min. combined.	Extreme		Minimum on grass.	Maximum in sun.	One foot.	Four feet.	Departure of wet Bulb.	Vapour pressure.	Percentage.	Wind Force.	Amount of Cloud.	Total amount.	Greatest fall.	Date.	No. of days of rain.	Average.	Period of years.		
								Maximum.	Minimum.		Maximum.	Minimum.																Wet Bulb.	ins.
COAST PROVINCE.																													
LAMU DISTRICT:																													
52.	Lamu 2°16'20"S.	40°49'40"E.	10	—	—	80.1	78.1	84	75	79.5	93	68	—	—	—	—	2.0	919	90	1.6	4.0	47.42	3.40	5th May	102	36.93	19	
KERIO PROVINCE.																													
RAVINE DISTRICT:																													
11.	Eldama Ravine 0° 3'00"N.	35°43'00"E.	—	—	—	—	—	90	37	63.5	101	30	—	—	—	—	—	—	—	—	—	30.53	1.73	15th Aug.	108	44.52	24	
	Ettrick Estate 0° 2'54"S.	35°43'00"E.	7,140	—	—	—	—	77	46	61.5	87	31	—	—	—	—	—	—	—	—	—	35.97	1.44	31st July	151	47.91	4	
KIKUYU PROVINCE.																													
KIAMBU DISTRICT:																													
63.	Kabete Reformatory 1°14'18"S.	36°44'00"E.	6,050	—	—	63.1	58.7	75	52	63.5	91	39	47	140	67	71	4.4	434	76	2.2	6.7	35.66	3.45	7th Apr.	115	46.94	7	
53.	Limuru, Karangi, Caineville..	.. 1°06'38"S.	36°39'15"E.	7,300	—	—	59.5	55.1	71	50	60.5	83	39	—	—	—	—	4.4	377	76	—	—	43.00	3.48	8th May	187	54.32	19	
NYANZA PROVINCE.																													
KERICHO DISTRICT:																													
58.	Buret, Jamji River Estate 0°29'00"S.	35°12'00"E.	—	—	—	65.7	60.0	82	48	65.0	92	40	—	—	—	—	5.7	440	69	—	3.5	48.03	1.50	31st Jan.	174	65.55	4	
33.	Karabwet 0°20'00"S.	35°19'40"E.	7,000	—	—	67.3	58.7	77	48	62.5	89	41	—	—	—	—	8.6	386	58	—	2.2	53.34	1.65	25th Apr.	185	74.27	14	
34.	Lumbwa Industrial Mission..	.. 8°20'00"S.	35°21'40"E.	7,500	—	—	—	—	81	49	65.0	93	40	—	—	—	—	—	—	—	—	—	51.12	1.76	4th May	193	73.21	14	
KISUMU-LONDIANI DISTRICT:																													
189.	Lumbwa-Kipkelia 0°13'00"S.	35°30'00"E.	—	23.737	—	66.9	59.4	76	51	63.5	87	41	49	—	66.8	65.8	7.5	408	62	1.5	2.1	34.71	1.45	23rd Apr.	145	41.36	8	
NANDI DISTRICT:																													
102.	Kapsabet 0°12'00"N.	35°06'00"E.	6,500	—	—	62.7	59.5	72	41	56.5	90	31	—	—	—	—	3.2	463	82	—	—	45.99	1.53	20th Sep.	152	64.86	21	
NORTH KAVIRONDO DISTRICT:																													
45.	Bukura 0°13'00"N.	34°34'00"E.	—	—	—	71.9	62.7	82	59	70.5	92	50	—	—	—	—	9.2	444	57	—	—	39.43	1.70	7th Aug.	120	55.29	3	
UKAMBA PROVINCE.																													
MACHAKOS DISTRICT:																													
64.	Machakos 1°31'00"S.	37°16'10"E.	5,200	—	—	65.4	62.8	75	64	69.5	87	52	—	—	—	—	2.6	531	85	—	—	57.99	4.68	12th Dec.	49	36.43	32	
NAIROBI DISTRICT:																													
232.	Loreto Convent 1°16'00"S.	36°46'00"E.	5,700	—	—	60.9	57.7	76	55	65.5	90	36	—	—	—	—	3.2	435	81	1.8	7.0	30.27	4.05	7th Apr.	76	38.24	4	
27.	Scott Agricultural Laboratory	.. 1°16'00"S.	36°46'00"E.	—	—	—	63.4	57.8	75	54	64.5	85	41	52	147	70	71	5.6	403	70	1.1	6.8	31.57	3.29	12th May	102	32.12	3	
91.	Town, Dept of Agriculture 1°16'43"S.	36°50'00"E.	5,495	24.454	66	65.6	61.4	78	54	66.0	99	41	—	—	—	—	4.2	484	77	1.8	6.2	25.66	1.66	12th Mar.	92	35.90	11	
EXTRA PROVINCIAL DISTRICTS.																													
MOMBASA:																													
76.	Mombasa 4°03'30"S.	39°40'20"E.	50	30.011	79	79.1	74.6	85	73	79.0	94	61	—	—	—	—	4.5	773	78	2.5	4.3	42.30	2.41	20th June	77	46.74	36	
NAKURU:																													
111.	Njoro, Shura 0°20'00"S.	36° 0' 0"E.	—	—	—	—	—	76	55	65.4	86	44	—	—	—	—	—	—	—	—	—	—	23.94	2.31	15th Mar.	145	38.52	20
161.	Subukia, Manyatta —	—	—	—	—	—	—	80	54	67.0	90	46	—	—	—	—	—	—	—	—	—	—	26.25	1.58	17th Apr.	111	42.85	4

APPENDIX Q.

	Unit of Quantity	QUANTITY.									VALUE.								
		1927	1926	1925	1924	1923	1922	1921	1920	1914	1927	1926	1925	1924	1923	1922	1921	1920	1914
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	
ANIMALS LIVING :																			
Cattle	No.	1,388	1,373	3,258	4,195	2,052	70	7	1	183	7,488	6,103	10,660	15,364	8,278	405	42	7	1,051
Sheep and Goats ..	"	7,144	6,614	13,524	19,530	15,777	438	553	609	1,521	4,780	4,789	7,273	9,919	7,820	482	536	712	850
Horses, Mules, Donkeys, Camels ..	"	..	1	..	23	6	3	7	1	6	..	150	..	715	182	112	73	147	97
Miscellaneous ..	"	75	119	185	66	255	118	207	57	42	652	975	1,452	2,764	1,387	467	567	145	332
Bacon and Ham ..	cwt.	157	139	83	204	660	925	736	..	1	1,515	1,367	816	1,415	3,835	5,849	8,250	..	7
Butter	lb.	56,840	88,760	62,748	111,588	55,888	18,768	2,634	..	..	4,938	7,389	2,084	6,287	2,885	886	235	..	..
Cheese	"	16,688	20,188	18,144	39,210	44,128	22,314	7,462	..	..	1,304	1,456	909	2,145	2,269	1,941	713	..	..
Coconuts	cwt.	865	1,820	1,110	1,080	574	620	716	950	1,086	314	595	362	373	243	254	486	472	419
Coffee	"	209,843	140,964	135,207	160,880	139,060	77,902	98,987	106,386	4,452	1,140,549	747,453	723,180	799,420	491,416	279,722	379,107	392,507	13,049
Copra	"	14,725	22,085	31,295	30,271	14,457	13,960	4,702	10,250	19,685	14,070	25,763	35,915	46,473	13,521	14,252	5,301	12,187	19,535
Cotton	"	4,400	7,309	8,260	2,190	605	500	..	..	..	15,030	32,750	41,000	11,860	3,026	2,650	..	..	..
FIBRES :																			
Sisal	"	305,985	294,568	287,260	228,305	176,400	179,400	134,722	108,094	20,267	468,974	579,499	531,129	396,777	236,044	259,344	202,083	147,569	27,625
Flax	"	1,285	2,525	6,412	14,577	21,270	38,550	8,818	6,029	..	3,050	5,966	15,633	40,887	44,861	60,491	13,221	9,304	..
Fodder and Offals ..	"	16,848	17,441	12,700	11,470	..	..	..	..	..	4,279	4,888	3,309	3,000	..	..	..	..	..
Ghee	"	116	53	62	1,167	..	..	..	..	..	786	436	414	5,972	..	..	..	..	..
GRAINS :																			
Beans and Peas ..	"	<i>See Pulse</i>	..	<i>See Pulse</i>	..	..	7,545	6,756	62,546	12,314	<i>See Pulse</i>	..	<i>See Pulse</i>	..	..	4,145	2,193	34,786	3,799
Groundnuts	"	24,960	37,062	18,238	30,977	39,160	21,403	4,204	1,790	916	22,564	30,941	19,184	26,826	32,924	22,091	3,263	2,489	599
Miaze	"	1,787,665	929,178	1,172,560	1,144,050	870,701	387,718	52,363	335,408	32,434	505,893	280,596	406,276	381,144	249,545	146,106	14,762	113,973	6,880
Maize Meal	"	91,425	70,240	35,376	..	..	..	..	..	..	38,430	38,056	18,232	..	..	..	..	..	..
Millet	"	7,368	4,573	1,609	773	13,573	2,537	1,693	8,152	7	3,380	2,752	865	327	4,351	1,157	941	3,369	2
Pulse	"	36,780	28,370	23,632	56,281	30,024	3,942	2,042	13,062	3,259	19,903	20,396	16,228	24,499	21,860	4,303	1,742	11,706	1,934
Simsim	"	66,580	72,103	60,590	80,404	52,660	2,033	17,611	35,777	22,976	67,377	76,559	64,849	84,605	37,552	4,826	16,000	36,390	18,298
Wheat	"	278	34	646	1,925	93	386	121	908	..	200	22	482	1,520	73	424	102	928	..
Wheat Flour	"	5,495	3,308	1,829	..	..	..	..	..	..	6,038	3,385	1,588	..	..	..	..	..	..
Miscellaneous ..	"	3,016	5,774	2,851	1,263	1,451	1,931	3	141	342	1,497	..	2,333	2,160	554	1,311	11	87	157
Hides	"	47,834	51,631	62,063	47,854	35,301	20,279	10,878	24,787	17,180	163,096	180,423	260,866	177,888	90,840	49,429	22,875	96,872	84,170
OIL :																			
Simsim	Gal.	13,900	18,757	11,016	10,057	12,829	..	7,242	2,469	1,408	3,560	5,534	3,013	2,387	2,790	..	1,830	892	267
Potatoes	cwt.	43,105	49,019	33,803	36,521	22,349	16,061	22,517	30,889	18,088	10,036	10,994	7,726	8,342	6,482	7,030	6,305	9,041	4,370
SEEDS :																			
Castor	"	555	362	1,520	4,656	200	..	1,205	..	126	427	399	1,560	5,130	180	..	675	..	59
Flax	"	80	1,728	4,830	8,036	5,840	8,020	2,816	280	342	55	1,244	3,776	7,254	3,883	7,772	2,149	70	156
SKINS :																			
Sheep and Goats ..	No.	1,164,520	990,185	825,424	716,726	568,609	194,656	571,648	515,536	265,902	61,625	55,480	54,605	35,919	27,233	13,246	18,677	44,214	13,342
Miscellaneous ..	"	35,545	3,790	3,617	6,474	593	4,011	9,269	11,289	4,158	21,510	3,893	2,483	858	502	2,531	4,741	3,093	2,050
Sugar	cwt.	25,329	22,312	5,549	2,972	..	..	..	..	..	37,052	29,553	9,614	6,268	..	..	..	..	..
Tobacco	"	158	184	87	157	32	69	32	95	9	335	274	142	317	51	95	132	297	10
Wattle Bark	"	44,082	36,537	89,964	71,416	17,794	9,414	..	9,025	1,535	17,338	13,702	28,991	17,901	5,836	2,708	..	6,780	509
Wattle Extract ..	"	21,229	12,396	9,203	..	..	..	..	..	..	19,188	11,156	2,966	..	..	..	..	..	..
Wool	"	7,423	7,454	4,948	4,409	4,387	5,660	1,807	3,351	1,965	64,561	62,450	37,776	24,498	24,567	30,111	12,919	21,110	9,044
TOTAL .. ..	..	..	..	..	..	..	..	..	..	..	2,731,794	2,249,721	2,317,518	2,149,776	1,325,440	924,140	719,930	948,737	208,611

SCHEDULE III.

TABLE SHOWING NATIONALITIES OF OFFENDERS.

		EUROPEANS.		ASIATICS.		NATIVES.		TOTAL.	
		Ac- quitted.	Con- victed.	Ac- quitted.	Con- victed.	Ac- quitted.	Con- victed.	Ac- quitted.	Con- victed.
Offences against the Person.									
Provinces	Kikuyu	5	8	7	5	138	210	150	223
	Nyanza	3	1	18	11	94	182	115	194
	Kerio .. ..	..	..	1	1	27	34	28	35
	Coast	9	3	52	24	141	169	202	196
	Masai .. ..	..	..	6	2	7	14	13	16
	Ukamba	8	3	22	7	84	90	114	110
	N.F.P. and Turkana .. ..	..	..	..	..	8	13	8	13
Districts	Uasin Gishu ..	4	1	4	4	17	41	25	46
	Trans Nzoia ..	3	..	1	1	41	34	45	35
	Kacheliba .. ..	..	..	..	..	1	15	1	15
	Naivasha	5	..	2	..	13	9	20	9
	Nakuru	9	5	2	3	49	30	60	38
	Laikipia .. ..	..	..	..	..	1	7	1	7
	Moyale .. ..	..	..	..	..	4	11	4	11
Offences against Property.									
Provinces	Kikuyu	2	1	4	2	154	474	160	477
	Nyanza	4	..	7	7	119	406	130	413
	Kerio .. ..	..	..	1	..	17	37	18	37
	Coast	2	1	13	10	117	317	132	328
	Masai .. ..	..	..	..	..	16	25	16	25
	Ukamba	9	13	21	44	135	544	165	601
	N.F.P. and Turkana .. ..	..	..	1	..	1	28	2	28
Districts	Uasin Gishu ..	2	6	8	3	70	212	80	221
	Trans Nzoia ..	1	3	..	1	38	120	39	124
	Kacheliba .. ..	..	..	..	..	5	8	5	8
	Naivasha	5	..	..	..	17	74	22	74
	Nakuru	2	4	2	3	57	226	61	233
	Laikipia	5	..	..	..	5	33	10	33
	Moyale .. ..	..	..	..	..	3	3	3	3
Offences against Stock and Produce.									
Provinces	Kikuyu .. ..	..	..	..	..	50	98	50	98
	Nyanza .. ..	..	1	..	..	97	247	97	248
	Kerio .. ..	..	..	..	..	10	31	10	31
	Coast .. ..	..	..	..	..	4	47	4	47
	Masai .. ..	..	..	..	..	3	20	3	20
	Ukamba .. ..	..	..	..	..	13	11	13	11
	N.F.P. and Turkana .. ..	..	..	..	..	..	8	..	8
Districts	Uasin Gishu ..	..	..	..	..	16	63	16	63
	Trans Nzoia ..	1	..	..	..	16	68	17	68
	Kacheliba .. ..	..	..	..	..	..	2	..	2
	Naivasha .. ..	..	..	..	2	..	16	..	18
	Nakuru .. ..	..	..	..	..	21	84	21	84
	Laikipia .. ..	..	..	..	..	4	11	4	11
	Moyale .. ..	..	..	..	..	1	3	1	3
Other offences.									
Provinces	Kikuyu	12	76	22	74	380	2,555	414	2,705
	Nyanza	30	158	43	106	252	2,034	325	2,298
	Kerio .. ..	..	..	1	5	42	295	43	300
	Coast	37	83	123	413	448	4,346	608	4,842
	Masai	6	4	1	7	11	301	18	312
	Ukamba	112	406	134	533	559	5,791	805	6,730
	N.F.P. and Turkana .. ..	..	..	..	..	18	179	18	179
Districts	Uasin Gishu ..	21	105	7	48	130	877	158	1,030
	Trans Nzoia ..	33	61	10	30	104	678	147	769
	Kacheliba .. ..	..	..	..	1	18	200	18	201
	Naivasha	4	6	1	13	204	300	209	319
	Nakuru	14	79	13	33	145	1,125	172	1,237
	Laikipia	1	9	..	..	20	315	21	324
	Moyale .. ..	..	..	..	..	4	41	4	41
TOTAL ..		349	1,037	527	1,393	3,949	23,112	4,825	25,542

Nationalities.	Acquitted.	Convicted.	Total.
Europeans	349	1,037	1,386
Asiatics	527	1,393	1,920
Natives	3,949	23,112	27,061
TOTAL ..	4,825	25,542	30,367

SCHEDULE IV.

RETURN OF CAPITAL SENTENCES, EXECUTIONS AND COMMUTATIONS DURING THE YEAR 1927.

Serial No. of Case.	Name of Convict.	Nationality.	Date of Sentence.	If Appeal Filed, Date of Hearing.	Date of confirmation by His Excellency.	Manner and Date of Execution.	REMARKS.
82/26	Berenzi s/o Abdulla	Native	18- 9-1926	Dismissed 13-12-1926	.. .. .	Hanged 15- 2-1927	
105/26	Kipsorigol s/o Chesagas	"	24-11-1926	" 17-12-1926	15- 1-1927	" 24- 1-1927	
120/26	(2) Kibagendi s/o Nyakaso	"	4-12-1926	" 18-12-1926	15- 1-1927	" 31- 1-1927	
127/26	Ojuang (<i>alias</i> Obonyo) s/o Ogol	"	16- 3-1927	" 21- 6-1927	.. .. .	.. .. .	The sentence of accused commuted to imprisonment for 10 years, <i>vide</i> H.E.'s Orders of 19-7-1927.
24/27	Margerina wa Kori (woman)	"	31- 3-1927	.. .. .	27- 5-1927	" 2- 6-1927	
45/27	Omar bin Mahomed	"	16- 3-1927	" 14- 6-1927	.. .. .	.. .. .	The sentence of accused commuted to imprisonment for life, <i>vide</i> H.E.'s Orders of 19-7-1927.
68/27	Muthaka s/o Ngui	"	23- 7-1927	" 17- 9-1927	14-10-1927	" 29-10-1927	
79/27	(2) M'Thambu wa Shambuka	"	1- 7-1927	" 17- 9-1927	14-10-1927	" 29-10-1927	
84/27	Ndirangu s/o Gichuki	"	28- 6-1927	" 17- 9-1927	14-10-1927	" 29-10-1927	
88/27	Ajakait s/o Makaidu	"	26- 7-1927	" 17- 9-1927	.. .. .	.. .. .	The sentence of accused commuted to imprisonment for life, <i>vide</i> H.E.'s Order of 29-10-1927.
92/27	Daudi s/o Watoka	"	10- 9-1927	" 15-12-1927	.. .. .	.. .. .	Pending receipt of H.E.'s Orders.
100/27	Chepkwain s/o Tirop	"	28-10-1927	Appeal lodged 21-12-1927	.. .. .	.. .. .	Appeal pending.
107/27	(2) Tuboo bin Ndoro	"	9- 9-1927	.. .. .	.. .. .	.. .. .	Appeal allowed by Court of Appeal, and appellant released.
118/27	Mwangi wa Kanyoni	"	9-11-1927	Dismissed 12-12-1927	.. .. .	.. .. .	Pending receipt of H.E.'s Orders.
131/27	Wasonga s/o Oloo	"	9-11-1927	" 12-12-1927	.. .. .	.. .. .	Ditto.
144/27	Denge wa Dadi	"	20-12-1927	Appeal lodged 14-1-1928	.. .. .	.. .. .	Appeal pending.
RETURN OF DEATH SENTENCES AND EXECUTIONS FOR THE YEAR 1927, BY SPECIAL SUBORDINATE COURTS APPOINTED BY HIS EXCELLENCY THE GOVERNOR UNDER SECTION 3 OF THE CRIMINAL PROCEDURE AMENDMENT ORDINANCE, 1918 (ORDINANCE NO. 25/18).							
1/22	Lengewa	Native	26-2-1922	.. .. .	.. .. .	.. .. .	Escaped from custody prior to execution; has not been re-captured.

SCHEDULE VIII.

ANALYSIS OF CONFIRMATION CASES.

CONFIRMED WITHOUT ALTERATION.			REDUCED.			RETRIAL ORDERED.			ACQUITTAL ORDERED			SENTENCES INCREASED BY SUPREME COURT.			REMARKS.
Offences against person.	Offences against property.	Other Offences.	Offences against person.	Offences against property.	Other Offences.	Offences against person.	Offences against property.	Other Offences.	Offences against person.	Offences against property.	Other Offences.	Offences against person.	Offences against property.	Other Offences.	
69	839	109	4	58	13	10*	7	2	1	36	14	..	2	..	* The fir ^s and sentences were reversed against 6 persons (5 cases) and the accused were committed for trial by the Supreme Court.
						1,164									

number of persons, the reason being that in certain instances more than one offence was committed by the accused and in respect of which multiple

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I regret to have to record the death of Mr. H. M. Jones, Overseer, on June 18th, 1927. The Department thereby lost a hardworking and reliable officer whose decease was greatly deplored.

H. L. SIKES,

Director of Public Works.

28th May, 1928.

APPENDIX I—(Contd.).

Promotions.

W. Browning from <i>Junior Clerk to Accounts Clerk</i>	1/11/1927
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Resignations.

Nil.

Termination of Appointments.

J. A. Knott, <i>Foreman</i>	11/12/1927
P. G. Harding, <i>Overseer</i>	31/10/1927

Deaths.

H. M. Jones, <i>Overseer</i>	18/6/1927
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II.—STAFF CHARGED TO LOAN.

New Appointments.

W. E. Green, <i>Record Clerk</i>	1/1/1927
F. Montague, <i>Clerk of Works</i>	1/1/1927
W. R. Grant, <i>Clerk of Works</i>	... ..	21/1/1927
A. E. R. Margerison, <i>Clerk of Works</i>	... ..	2/1/1927
L. Jones, <i>Accounts Clerk</i>	... ..	31/1/1927
G. Jones, <i>Foreman</i>	... ..	1/2/1927
E. J. Haines, <i>Foreman, Joinery Shop</i>	... ..	18/2/1927
A. H. Manger, <i>Foreman, Building</i>	... ..	18/2/1927
J. A. Young, <i>Clerk</i>	... ..	14/2/1927
W. K. Squires, <i>Foreman, Roads</i>	... ..	19/2/1927
J. B. Witherick, <i>Assistant Accountant</i>	... ..	14/2/1927
R. S. Brown, <i>Chief Storekeeper</i>	... ..	2/3/1927
J. P. Purnell-Edwards, <i>Assistant Engineer</i>	... ..	18/3/1927
J. White, <i>Foreman, Roads</i>	... ..	16/3/1927
R. O. Barnes, <i>Assistant Engineer</i>	... ..	7/3/1927
B. M. Fuller, <i>Records Clerk</i>	... ..	9/3/1927
H. H. Bate, <i>Stores Clerk</i>	... ..	25/3/1927
S. R. Boyd, <i>Assistant Engineer</i>	... ..	25/3/1927
S. L. Blackburne, <i>Draughtsman</i>	... ..	25/3/1927
G. D. Graham, <i>Assistant Engineer</i>	... ..	7/4/1927
R. K. Robertson, <i>Yard Foreman</i>	... ..	1/4/1927
J. F. M. Fowles, <i>Stores Clerk</i>	19/4/1927
J. Macintyre, <i>Assistant Engineer</i>	13/4/1927

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APPENDIX II.

COMPARISON BETWEEN 1927 AND 1926.

PRISONS.	Total number of persons committed.	COMMITTED.			PREVIOUSLY CONVICTED.			SENTENCES.				Daily average number in prison.	No. of admissions to hospital.	Daily average on sick list.	Number of deaths (excluding executions).
		For debt.	For safe custody	For imprisonment.	Once.	Twice.	Thrice or more.	5 years or more.	1 to 5 years.	Over 3 months but less than 1 year.	3 months or less.				
All Prisons 1927.. ..	11,732	166	3,449	8,117	472	169	213	70	652	1,595	5,800	2,524	2,037	83.4	61
						854				8,117					
All Prisons 1926.. ..	10,905	183	3,177	7,545	439	139	148	76	606	1,306	5,557	2,243	2,296	79.8	76
						726				7,545					
Men 1927.. ..	11,332	162	3,356	7,834	463	163	207	62	611	1,586	5,575	..	..	..	..
1926.. ..	10,495	161	3,063	7,251	429	131	141	72	581	1,290	5,308	..	..	..	..
Women 1927	163	3	67	93	7	6	6	2	5	9	77	..	..	..	..
1926	133	2	54	77	7	8	7	..	1	10	66	..	..	..	..
Juveniles 1927	217	1	26	190	2	..	..	6	36	..	148	..	..	..	..
1926	277	..	60	217	3	..	..	4	24	6	183	..	..	..	..

SENTENCED TO IMPRISONMENT.

	1927.	1926.	Increase.	Decrease.
EUROPEANS	12	22	..	10
ASIATICS (including Arabs)	127	131	..	4
AFRICANS	7,978	7,392	586	..
TOTAL ..	8,117	7,545	586	14