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FOREWORD

Africa, with an area of 11,605,000 square miles, is the second largest continent in the world, but its road mileage (262,920 miles) is smaller than that of any other continent. Yet Africa is a rich rehouse of natural resources, and its development is exercising an important influence upon industry and commerce throughout the world. The vast distances to be covered and the inadequacy of rail facilities in many parts of Africa have emphasized the urgent need for good roads to accommodate the motor transportation which is already playing so important a part in the development of many areas.

The commercial importance of Africa is increasing rapidly, and American manufacturers are finding new markets there for their products. More roads will mean an expansion of these markets. Thus, the development of African highways is a subject of interest to every exporter to that part of the world.

The growing recognition of the need of highways is reflected in road construction programs in many parts of the continent. In Senegal, Senegal, the Ivory Coast, Fez, and other places whose names once meant little but tales of travel and adventure, the advent of the automobile has been followed by the provision of roads to accommodate the new traffic. A road which now links the Nile and the Congo is developing the Sudan and eastern Africa and making possible a regular motor mail service. Over this route a car can now be driven from Port Sudan on the Red Sea to the mouth of the Congo in 40 days. A 613-mile highway is projected from Alexandria to Luxor in the land of the Pharaohs. A highway is to be built to Timbaktu. All over Africa roads are being thrust into the angle, the desert, and the veldt, to expedite the movement of raw products and of men.

But the African roads movement is only in its initial stages. More roads are needed to tap the palm-oil resources in the interior of Liberia, to gain access to the store of natural resources in Ethiopia, and to solve kindred transportation problems in hundreds of other regions.

The matter of roads being directly related to the demand for automobiles, it is interesting to observe the growing demand for American automotive products during the few years for which figures are available. The United States exported to Africa in 1928 \$11,027,303 worth of automobiles and allied products, and \$10,551,658 worth in 1929. It is significant that even with small road mileage, there is in many countries of Africa a definite demand for motor vehicles. The development and improvement of highways obviously presages excellent opportunities for the sale of more American goods—not only automotive products but a wide range of other commodities.

The economic potentialities of the countries of Africa are great, but the extent to which these possibilities will be realized depends to no small degree on adequate transportation facilities. Most of Africa has witnessed only the beginning of road construction. At the present much good could be accomplished by extending the mileage of dirt and graveled roads—which types, of course, predominate. Highway traffic is still in the embryo, and the needs of the continent will, for the most part, be adequately served by low-cost roads, and improvements can be effected as funds become available.

The countries of Africa present such a wide variety of climate and topography, and their economic resources cover such a wide range of raw materials, that each country presents its own peculiar problems as to the types of roads most needed. It is obvious that roads suitable for northern Africa and the desert areas would not be adequate for the countries of central Africa, where there are heavy rainfalls and vast forests with dense tropical undergrowth. However, to these great undeveloped countries are now available the results of the experiences in road building in American and European countries through many years.

The main problems henceforth should be those of finance and administration. The demand for motor vehicles is becoming so insistent, even in the most backward countries of the world, that road development must proceed at a much more rapid rate than it has in the past, and by systematically planning for both present and future needs, African countries will be providing themselves with good systems of highways—the very basis of national prosperity.

The present brief survey of highway construction and finance in the various countries and possessions of Africa does not include the Union of South Africa, as the road system of that part of the continent has already been analyzed in Trade Promotion Series No. 70, *Motor Roads in South Africa*. The roads in some sections of Africa are not discussed to the extent that might be desired, but this is due to the lack of authentic data.

The automotive division of this bureau invites those interested in motor highways in various parts of the world to inquire for further information.

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Bureau of Foreign and Domestic Commerce.

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MOTOR ROADS IN AFRICA

(EXCEPT UNION OF SOUTH AFRICA)

Compiled by Irving Freidson, Automotive Division

ALGERIA

Algeria, a French colony in North Africa, comprises an area of 22,206 miles (exclusive of a vast desert area) and a population of 5,064,865, according to the 1926 census (5,000,000 Mohammedans, the remainder mostly French, Spaniards, and Italians). The three departments or principal towns are Algiers, Oran, and Constantine.

Physically the country includes littoral, high plateau, and desert regions. The climate is mild in winter and hot in summer, dry in the interior and somewhat damp on the coast.

TRANSPORTATION

There are 2,853 miles of railways on various gages (1927), of which 1,965 miles are Government owned. The Algerian State system comprises a large network in the east between the Tunisian frontier and Algiers, and another in the west centering at Oran and extending southward. The three divisions are the eastern, the Oran, and the Bone.

The main ports of the country are Algiers, Oran, Bone, and Tunis.

HIGHWAY SYSTEM

Algeria has a good system of roads for a colony in its present state of development, but the road system must be greatly enlarged to provide for the growth of such an extensive area. There are large areas which can not be adequately colonized because of lack of highways. Not only in the development of agriculture but in the exploitation of mines and forest, further progress awaits to a large degree the construction of additional means of transportation.

The Algerian highway system comprises 21,571 miles of roads divided as follows: (1) National roads, 3,325 miles; (2) departmental roads, 41 miles; (3) high roads, 6,066 miles; (4) by roads, 332 miles; (5) country roads, 7,207 miles. The road mileage by construction classes is as follows:

	Miles		Miles
earth, sand-clay, gravel, etc.	12,139	Concrete	17
macadam	8,718	Granite block	89
asphalt and other bituminous surfaces	600	All other types	3

Roads come under the administration of the Public Works Department. The amount expended on national roads during 1928 was 2,556,888. Ordinary upkeep cost was \$1,667,450; the cost per mile

for upkeep is estimated to be \$537. In addition, \$1,020,235 (expended in repairing the heavy damage done to the national ro in 1927-28.

The Government contributes 50 per cent of the expenditure curred on roads other than national—that is, local roads. The sum called for in 1928 was \$447,059, involving a total expenditure of \$894,118 on local roads. The national Government also made a grant of \$196,078 to local authorities for the repair of damage done by floods.

There is no specific road fund. The Algerian Financial Delegations settle annually the amount of expenditure. All receipts are centralized, recognition being made only as to their origin. The taxes on gasoline and tires are regarded as a contribution to the upkeep of the roads, but since there is no surplus, the question of special allocation does not arise. In 1928, \$703,045 was realized from such taxes.

It is interesting to note the steady increase in the amounts of money placed at the disposal of the engineer in chief to be used on roads. The average per kilometer was \$368 in 1928, \$516 in 1929, and \$740 in 1930. The total credits used on working roads (which includes new construction, upkeep, and repairs) amounted to \$260,000 in 1928, \$4,400,000 in 1929, and \$6,000,000 in 1930. These increases are indicative of the progressive attitude of the Government toward the country's road system.

Algeria plans to carry out a progressive 4-year road developmental program from 1930 to 1933, inclusive. The Commission of Public Works adopted the motion for realizing in four years the general program for repairing 12,000 kilometers (7,456 miles) of national and departmental roads and highways. Allowances cover each of the years 1930, 1931, 1932, and 1933. A sum of 40,000,000 francs (\$1,600,000) is provided, of which 10,000,000 francs (\$400,000) is to be used for widening the roads and 30,000,000 francs (\$1,200,000) for actual repairs. It is expected that this program will restore the national system of roads to first-class condition.

AUTOMOBILE REGISTRATIONS

Motor-vehicle registration in Algeria is shown in the following table. Only a small percentage of the automobiles in use are of American manufacture.

AUTOMOBILE REGISTRATIONS IN ALGERIA, 1925-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1925	15,300		2,100	17,400	900
1926	17,700	600	2,500	20,800	700
1927	24,242	721	2,808	27,831	738
1928	25,750	800	4,000	30,550	1,000
1929	33,000	850	5,200	39,050	2,100
1930	37,500	1,300	6,300	45,100	2,650

ANGLO-EGYPTIAN SUDAN

The Anglo-Egyptian Sudan, with an area of 1,008,100 square miles, is over ten times the size of Great Britain. It extends southward from the frontier of Egypt to Uganda and the Belgian Congo,

stance of about 1,650 miles, and stretches from the Red Sea to Jai in central Africa. The territory consists very largely of deserts which are practically uninhabited. The total population is estimated at 6,469,041.

The Sudan has rich and productive regions along the valley of the Nile River and its southern tributaries. The extension of rail and motor facilities and improvements in highway construction and irrigation works will aid in the development of the Sudan, popularly known as the chief source of the world's supply of gum arabic and ivory.

TRANSPORTATION FACILITIES

Railways.—The railway system of the Sudan Government comprises an extension of about 2,000 miles of line. Important lines are from Wadi Halfa to Khartoum, with connections to the Red Sea at Port Sudan, to Kareima in Dongola Province, and to Sennar and El Obeid; an important line also extends from Kassala to Haiya.

Supplementing the railway service, a fleet of Government steamships serves the Nile and its navigable tributaries between Assuan (Egypt) and Rejaf.

Roads.—The macadam roads with bituminous or asphalt surfaces aggregate only 30 miles. These roads are only in the townships of Khartoum, Omdurman, Wad Medani, and Port Sudan.

In the southern Provinces of the Sudan and in the Red Sea Province there is a total length of 160 miles of road. These roads are properly formed and graded, and are surfaced with laterite or quartz gravel. They can be traversed throughout the year by motor vehicles not exceeding 4 tons.

There are also about 14,000 miles of roads which are open during the dry season to light motor traffic. Some of these roads can be kept open throughout the year except during the very heavy rains; others are suitable for motor traffic in the dry winter months only.

During 1928, \$107,356 was expended on roads. Of this sum, \$47,388 was allocated for maintenance and \$59,718 for construction. The expenditures were met from the Sudan Government funds.

AUTOMOBILE REGISTRATIONS

Motor-vehicle registrations in the Anglo-Egyptian Sudan are shown in the following table. It is significant to note that 82 per cent of the automobiles in operation during 1930 were of American make. The Anglo-Egyptian Sudan is fortunate in possessing many productive regions, whose usefulness may be considerably enhanced through the extension of roads and an increased use of motor vehicles.

AUTOMOBILE REGISTRATIONS IN ANGLO-EGYPTIAN SUDAN, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926.....	600		300	900	33
1927.....	605		171	776	219
1928.....	1,473	(7) 78	(7)	1,551	220
1929.....	838		1,256	2,094	322
1930.....	1,441		1,379	2,820	337

¹ Includes busses and trucks.

² Included with passenger cars.

³ Includes trucks.

ANGOLA

Angola in southwestern Africa, has belonged to Portugal ^{abroad} continuously since 1575. The colony covers an area of about 300,000 square miles and has a population of approximately 4,000,000. It is divided into three zones of varying elevations roughly paralleling the coast. The third zone is a plateau, fertile and comparatively well watered.

Angola is characterized by two seasons—a dry period from May to October and a rainy season from October to May. The climate ranges from equatorial at Cabinda to quasi-temperate in South Angola. There is also a similar range in temperature according to elevation. The coastal temperature is semiarid.

TRANSPORTATION

Inland transportation is provided in part by short railway lines, of which there are about 800 miles open to traffic, as follows: Loanda to Lucalla, 226 miles; Lucalla to Malanje, 149 miles; Canhoca to Golungo Alto, 9 miles; Lobito to Chinguar, 323 miles; and Mossamedes to Chela Mountains, 111 miles.

The rivers are navigable for short distances only.

Transportation by means of motor vehicles is becoming popular, as evidenced by the 2,115 automobiles in use.

Highways.—No figures are available as to the total road mileage of Angola. A late official report of the Angola Government (January, 1927) places the mileage at 15,258. This network of highways is regarded locally as fairly adequate to meet the needs of the colony for some years. The principal difficulty is the lack of bridges, but the Government is building bridges and concrete culverts as fast as available funds will permit.

The roads are practically all of earth, sand-clay, and gravel construction. The most widely used are those that parallel the two important railways. One of these connects Loanda with Malanje, and the other is the road from Lobito along the Benguela Railway through Huambo to Vila Silva Porto and the Cuanza River. Another road of importance is that through the interior plateau section connecting Huambo on the Benguela Railway, through Dondo on the Loanda and Malanje road, and to Cassoalala on the Loanda and Malanje Railway.

The budget for the fiscal year ended June 30, 1927, provided for the expenditure of \$92,000,000 for construction and maintenance of highways (exclusive of separate appropriations for the construction of large bridges), and the budget for the year ended June 30, 1928, called for the expenditure of a like amount. The appropriation is made by the colonial government and is divided among the various administrative districts.

In addition to the allotment of funds from the budget for carrying on road work, considerable road construction is done by the natives who are unable to pay the annual head tax of 80 escudos (\$3.20). This tax, with few exceptions, is assessed on all native male adults, and those who are unable to pay are obliged to do a sufficient amount of work on the roads to cancel their tax. The proportion of the work carried on in this manner is not known, but it is believed to be high.

No special taxes are levied on automobiles, vehicles in general, gasoline, or driving permits, as such taxes would tend to defeat the objective of increasing automotive transportation.

Increasing interest may be expected in the construction and maintenance of roads as the financial condition of the colony improves. The use of automobiles in Angola is a development of recent years, and wider employment of this form of transportation may be expected as more ample road facilities are provided.

AUTOMOBILE REGISTRATIONS

The registration of automobiles in Angola has fluctuated in recent years. There seems little doubt that the automobile has established itself as a means of transportation, and its development in this market will be watched with interest.

AUTOMOBILE REGISTRATIONS IN ANGOLA, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	1,350		625	1,975	165
1927	700	2	750	1,452	100
1928	800		350	1,154	100
1929	953	(1) 4	*1,157	2,115	57
1930	950		1,050	2,000	1,500

* Included with trucks.

† Includes busses.

BELGIAN CONGO

Belgian Congo extends north and south of the Equator in central Africa, covers an area estimated at 918,000 square miles, and has a population of more than 8,500,000.

The climate of the greater part of the colony is distinctly tropical; the elevated southeastern section is more temperate and is suited to European colonization. The rainy and dry seasons are not sharply divided.

TRANSPORTATION

The Congo is navigable for 95 miles from its mouth, to Matadi, and on this section 15 steamers belonging to the State ply. Matadi is the principal port. The colony is served by a total of about 9,000 miles of navigable waterways. The total length of railways on January 1, 1928, was 2,187 miles. There are 4,214 automobiles in use, according to the latest reports.

The need of the Congo to-day is for an extension of internal transportation facilities. The network of rivers, of which the Congo and its branches are the main arteries, furnish excellent means of transportation, but because of rapids and falls none of these rivers are navigable throughout their entire course.

Highways.—The Government of the Belgian Congo is alive to the importance of an adequate network of roads as a means of developing the agricultural and mining possibilities of the region. The latest available statistics indicate a total road mileage of 8,886, distributed among the four Congo Provinces as follows: Congo Kasai, 1,553; Equator, 684; Katanga, 1,678; Eastern Province, 4,971.

The Eastern Province has not only the most extensive system but also the best constructed roads, most of them being made on solid foundation and very suitable for automobile traffic. The large relative proportion of roads in the Eastern Province is due, it is thought, to the fact that it has few waterways which might serve as important arteries of commerce, and only short sections of railway. Roads, therefore, provide about the only means of transportation. While the roads are not hard surfaced throughout, they are quite good and permit of the use of motor trucks over long distances. In the other districts no comparable network exists, even though there is great need for such roads.

It is probable that the attitude of the Government in discouraging the construction of a road which parallels an existing railroad or navigable river has had a deterring effect on road building. It must be borne in mind that a tropical country such as the Belgian Congo, presents certain definite difficulties to be contended with. A major obstacle is the difficulty of maintaining the roads during the rainy season. While it may be that this condition could be corrected, at least in part, by the construction of a more substantial base, it is said that the cost would be prohibitive.

In a published report by the chief engineer of the Ministry of the Colonies in 1929, the roads are classified and the Government policy is set forth. It is pointed out that the most important type comprises stone-surfaced roads which are provided with permanent bridges. Roads which are regarded as being of secondary importance lack these improvements. The third category includes roads along railroads which permit of expeditious movement of passengers. The bridges on these roads are permanent but very light for loads exceeding 1 ton per axle. The opinion of the chief engineer follows: "As far as concerns the first category of roads, it will suffice to build a stone surface at the places where a necessity for them exists. Culverts should be provided also at points where there is water alongside the road." The third class of roads has reference to those located close to railroads. These are to be provided with permanent bridges and they are to have a capacity not exceeding 2 tons. This class of roads is designed solely to accommodate passenger vehicles. The chief engineer states:

The location of roads must be given the attention of specialists. It should not be a question only of improving the existing roads; very often these serve only to join two native villages by a line more or less direct and they include grades exceeding 5 per cent, the maximum allowable. * * * The first thing to be considered should be the construction of a good road capable of being connected with existing industrial centers. In the majority of cases, branch roads should be made and kept up at the expense of the interested persons, at least until such time as the amount of private traffic justifies the intervention of the colony.

A significant phase of the policy is reflected further in his following comment: "Henceforth our policy must be to construct fewer roads but better ones. A badly laid out road can not develop the country, since the resulting cost of transportation is too high."

Paving work is done at the expense of the municipalities without the levy of a special tax on property frontage. Outside of urban districts, road making is done at the expense of the Province. Although the provincial budgets for road building are not published,

safe to say that only small sums are available for that purpose, but native labor and local materials must be employed.

A notable achievement in the economic development of the Sudan in eastern Africa is their connection by a motor road (which is completed) linking the Nile and Congo Rivers. It runs from Rejaf, on the Nile terminus of the navigation from Khartum, to Stanleyville, on the Congo, terminus of navigation from Leopoldville, on the Stanley Pool. There is a regular service of cars for mails and passengers maintained on this route by the Messageries Automobiles de Congo Orientale. The entire journey can be made in five days on one of the best roads in Africa, and, in consequence, it is now possible to go from Port Sudan, on the Red Sea, to Matadi, at the mouth of the Congo, in 40 days. Furthermore, only 30 miles in the precipitous mountains west of Lake Edward stand between the completion of the Belgian motor road from the Nile to Lake Kivu and from the south of that lake to Lake Tanganyika.

On the motor section from the Congo to the Nile fares are about 10 Belgian francs per kilometer for passengers and 5 francs per kilometer for baggage.

AUTOMOBILE REGISTRATIONS

The use of automobiles has increased steadily during the past four years. There were 1,104 vehicles registered in 1926, and the total for 1930 is 4,850—more than a 400 per cent increase in the use of this type of transportation. The percentage of American makes is not available.

AUTOMOBILE REGISTRATIONS IN BELGIAN CONGO

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	844	4	456	1,104	848
1927	828		750	1,578	852
1928	1,008		1,000	2,008	1,500
1929	2,264	1,950	(?)	4,214	1,870
1930	2,400		2,450	4,850	1,500

¹ Includes trucks.

² Included with busses.

BRITISH EAST AFRICA

TANGANYIKA

Tanganyika, a British mandate, comprises an area of about 373,500 square miles and a population of 25,000.

TRANSPORTATION

Rail communication is provided by the Tanga Railway, from Tanga to Moshi (219 miles) with a branch line to Sanya River (21 miles) toward Arusha, and a connecting line between Moshi and Voi on the Uganda Railway (92 miles); the Central Railway from Dar-es-Salaam to Kigoma (77½ miles), with a branch line from Tabora to Shinyanga (123 miles) toward Mwanza.

The principal ports are Dar-es-Salaam, Tanga, Bagamoyo, Pangani, Kilwa, Lindi, and Mikindani.

Highways.—The roads in the Tanganyika territory are not in very good condition. The Tanganyika Blue Book gives the total

road mileage at 14,656, of which 14,584 miles are classed as ear roads and 72 as metaled roads. Of the entire mileage, a total of 10,683 miles is passable for light motor traffic during the dry season.

The authorized expenditure for road maintenance for the year ended December 31, 1928, was £30,525, or approximately \$148,550. The resources of the roads department were taxed in maintaining in serviceable condition over 3,000 miles of earth road carrying an increasing volume of motor traffic. Machinery is being used to a limited extent in place of unskilled labor. However, the extent to which machinery will be used depends on the availability of funds. Considerable sums of money from the maintenance fund are devoted to the replacing and repairing of timber bridges and on improved culverts. The total expenditure on new road construction during 1928 was £27,045 (\$131,614.49), or approximately \$131,615.

KENYA

The Kenya Colony and Protectorate extends on the Indian Ocean from the Uмба River to Dick's Head, and inland as far as Lake Victoria and Uganda. The territory has an area of 224,690 square miles and a population in 1928 estimated at 2,891,691.

The physical features of the colony are widely diversified. There is a region less than 3,000 feet in height which comprises about three-fifths of the total area. Another section, a volcanic plateau, ranges in elevation from 3,000 to 10,000 feet. The Great Rift Valley forms the third general physical division.

There are two rainy seasons, one from March until the end of May and a later season from October to the end of December. The intervening periods are somewhat dry. At the coast and in the lowlands there is considerable humidity during the summer months, but for a great part of the year the temperature is equable.

TRANSPORTATION

Railroad service is supplied by the Kenya and Uganda Railway, a State railway, consisting of the main line from Mombasa Island to Mbulamuti on the Nile, 782 miles; Voi-Kahe branch, 92 miles, with running power over the Tanganyika Railway to Moshi; Lake Magadi branch, 91 miles; Nyeri branch, 127 miles; Nakuru-Kisumu line, 131 miles; Solai branch, 27 miles; Kitali branch, 41 miles. Railways under construction or under survey are Tororo to Soroti (Uganda), 100½ miles; North Kavirondo branch, 32½ miles; Gilgil to Thomson's Falls, 48 miles.

The Kenya and Uganda Railway also controls steamer services on Lakes Victoria and Kioga (Uganda).

Roads.—On December 31, 1928, the mileage of roads in Kenya Colony and Protectorate was 8,825 of which 2,578 miles represented main roads and 6,247 miles roads of less importance. These latter roads are in reality mere tracks, but are quite passable for wheeled traffic except during the periods of heavy rain. Considerable improvements have been carried out in the way of construction and alignment of the main traffic lines. Kenya has been giving increasing attention in recent years to road improvement.

Expenditures on roads during 1928 totaled £155,034 (\$754,173). Of this expense £38,282 was incurred on the maintenance and minor

improvement of the public road system, and £66,752 either by construction of new roads of importance or reconstruction of existing roads and bridges.

UGANDA

The territories comprising the Uganda Protectorate lie between the Belgian Congo, the Anglo-Egyptian Sudan, Kenya, and Tanganyika. Uganda covers an area of 94,204 square miles and includes a population estimated at 3,255,367.

With few exceptions the temperature is moderate. The climate is characterized by two rainy seasons, one from March through June and a period from September through October.

TRANSPORTATION

There are steamer services on Lakes Victoria, Kioga, and Albert. Railway transportation is furnished by the main line of the Kenya and Uganda Railway, which now extends to Jinja on Lake Victoria. There are also feeder lines from Jinja to Namasaghi and from Tororo to Soroti. There is a railway from Port Bell to Kampala, 7¾ miles in length, and a new track is under construction between Kampala and Jinja.

Roads.—Uganda has a total of 4,429 miles of roads. About 3,000 miles are of the unimproved earth type and 1,429 miles of earth, sand-clay, and gravel. These roads are divided into three classes. The first-class roads are those limited to loads of 6 tons gross on old rubber tires, and 7 tons on pneumatic tires; this applies to 4-wheel vehicles. The second-class roads are limited to trucks weighing 2½ tons gross on solid rubber tires and 5 tons gross on pneumatic tires. These roads are graveled and have permanent bridges. The third-class roads are limited to 3 tons gross for 4-wheel vehicles and 4½ tons gross for 6-wheel vehicles; all vehicles must be fitted with pneumatic tires.

The expenditures during 1928 on the maintenance and improvement of existing roads was £36,687 (\$178,537), and the expenditure on new road work or on roads taken over by the Public Works Department from the native administrations amounted to £10,442 (\$50,816), including a sum of £2,586 (\$12,585) spent on permanent ridges and culverts on second-class and third-class roads.

It is reported that Uganda proposes to spend about £150,000 (\$729,975) from surplus balances for the building of a system of feeder roads in the southwestern district, with the object of facilitating the movement of produce from the Kivu district of the Belgian Congo via Uganda and the Kenya and Uganda Railway system.

As soon as possible the Government intends to construct a road from Mbarara to Fort Portal via Lake Edward, and two short roads to connect up the Uganda and Belgian Congo road systems. The two latter roads are of great importance in view of the present absolute lack of roads across this border.

ZANZIBAR AND PEMBA

Zanzibar is the largest coralline island on the African coast, being 8 miles long by 24 broad and having an area of 640 square miles. To the northeast lies the little-known island of Pemba. Its length

is about 42 miles and width 14 miles, and it has an area of 380 square miles.

Several British and foreign steamship companies have regular services to Zanzibar, and connections are also maintained with Pemba.

There are 152 miles of road in Zanzibar, 126 miles being of macadam and 26 miles earth, sand-clay, and gravel. About 100 miles are in Zanzibar and 52 in Pemba.

AUTOMOBILE REGISTRATIONS IN BRITISH EAST AFRICA

Considering the lack of adequate highways, motor transportation has made very gratifying progress in the British East African colonies. The acceptance of the American automobile is evidenced by the fact that 90 per cent of the passenger cars and 95 per cent of the trucks are of American makes.

AUTOMOBILE REGISTRATIONS IN KENYA, UGANDA, AND ZANZIBAR, 1926-1930

Year	Passenger cars	Busses	Trucks	Total automobiles	Motor cycles
1926	4,108	45	1,306	5,549	3,568
1927	5,500		2,000	7,500	3,500
1928	6,522		2,489	9,011	3,907
1929	8,085		4,415	12,500	4,159
1930	9,487		5,737	15,224	4,772

¹ Includes Tanganyika.

BRITISH WEST AFRICA

The four British colonies in West Africa are Gambia, Sierra Leone, Gold Coast, and Nigeria. Each territory consists of a colony and a protectorate and is governed independently of the other areas. The total area is about equal to that included in the States of Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas, but it has almost twice the combined population of these States.

NIGERIA

Nigeria, with an area of 335,700 square miles, is the largest and most important of the British West African possessions. This protectorate is nearly three times as large as the United Kingdom. The population of Nigeria totals 18,765,690, including a European population of 5,200.

The equatorial climate is considered unhealthful for the white population. The seasons depend on rainfall rather than on temperature. In the north the dry season lasts from October to April and in the south from November to March. Tornadoes often occur at the beginning of the rainy season.

TRANSPORTATION FACILITIES

The principal ports are Lagos and Port Harcourt. Others of importance are Warri, Burutu, Forcados, Sapele, Koko, Akassa, Degema, Bonny, Opobo, Calabar, and Victoria. Numerous rivers and creeks form the chief routes for transport.

The railway system comprises (1) a western line from Lagos to Kano (704½ miles), crossing the Niger by bridge at Jebba, with branches from Minna to Baro (111 miles), from Zaria to the Bauchi in fields (133 miles, light railway), from Zaria to Gusau (108 miles), and extension to Kaura Namoda (34 miles from Gusau) is nearing completion; the following branches will also be completed shortly—Kanno to N'Guru (144 miles), Ifo to Idogo (24 miles); (2) an eastern line (569 miles) from Port Harcourt to Kaduna on the Western Railway, crossing the Benue by train ferry at Makurdi with a branch line connecting from Kaffanchan junction (458¼ miles) with the tin fields (Jos)—62¾ miles.

Road system.—The fundamental importance of roads to Nigeria, and to British West Africa as a whole, is strikingly reflected in a report made by the Honorable Ormsby-Gore, Undersecretary of State for the Colonies, after his visit to the British West African Colonies in 1926:

The road more than anything else tends to break down the narrowness and the circumscribed life of the African native. Only those who have felt the isolation and the almost menacing atmosphere of the forests of tropical Africa can realize just what a symbol of freedom and progress is presented by a road.

The Public Works Department of Nigeria, Gold Coast, Sierra Leone, and Gambia handle the matter of road building and maintenance in each of the Colonies mentioned.

Nigeria has over 14,000 miles of road, of which about 100 (outside town limits) are either of asphalt or macadam; the remainder are of earth, sand-clay or gravel. There are said to be no roads of concrete, brick, granite block, or other such material. Of the 14,000 miles of highways, 3,500 miles are classed as main roads; 4,500 miles have been constructed by the native administrations and are passable for automobiles in all weather. The remaining 6,000 miles have been constructed by the native administrations and are passable for automobiles in dry weather.

The road budget of the Nigerian National Government (Public Works Department) for the fiscal year April, 1929, to March, 1930, provides £214,000 (\$1,040,040) for construction work and £152,000 (\$738,720) for maintenance, making a total of £366,000 (\$1,778,760) for road work.

No statistics are available showing the proportion of the budgets of the provincial administrations used for roads.

The expenditures of the Public Works Department are derived from the general revenue of the Nigerian Government. No taxes are separately intended for national road work. In the provincial administrations, revenue is mostly from land (or rather head) taxes.

While most of the road construction and maintenance is handled directly by the Public Works Department, a considerable amount is done by the provincial administrations and by important chiefs and native tribes.

Nigeria, recognizing the importance of developing a progressive road program, created a road board with the chief secretary of the colony as chairman. The duty of the board is to advise on all new roads, whether built by the Public Works Department or by the native administrations. The general policy is for the Public Works Department to construct the main trunk roads and the native admin-

istrations to build the side roads, after they have been located by a trained surveyor and approved by the board.

The development of Nigeria is dependent on the opening of communications between the interior and the coast. The extension of the road system will undoubtedly prove a potent factor in providing a means of transportation and thereby contributing to the development of the country.

GOLD COAST

The Gold Coast, the second largest British possession in West Africa, consists of the Gold Coast Colony, Ashanti and the Northern Territories, and the mandated sphere of British Togoland, which is attached to the Gold Coast for administrative purposes. The total area of the Gold Coast is approximately 94,600 miles, a little larger than Great Britain, with a total population of 2,299,961. Of the total area the colony itself comprises 24,000 square miles; Ashanti, 26,900 square miles; the Northern Territories, 31,100 square miles, and British Togoland, 12,600 square miles.

Along the coast the climate is hot and moist. In the interior, where the country is more open and the elevation greater, the humidity is less and conditions are more livable, especially for Europeans.

The Gold Coast is rich in resources. It is an important world source for cocoa, production of which is the principal business. The area is rich in mineral resources, especially bauxite and gold, as well as in agricultural products. The United States ranks second as a supplier and customer for the Gold Coast, being exceeded only by United Kingdom.

TRANSPORTATION

The principal city, Accra, is the chief seaport of the colony. Shipping connections with the Gold Coast are good, though vessels must anchor offshore because of the lack of natural harbors, but harbor facilities are being constantly improved. A deep-sea harbor costing £1,500,000 (\$7,299,750) has been constructed at Takoradi.

There is a Government railway from Sekondi on the coast to Kumasi (168 miles), with branches from Tarkwa to Prestea (19 miles), and from Inchaban Junction to Inchaban (5 miles). A new line is under construction between Huni Valley in the Western Province, and Kade in the Eastern Province, a distance of about 100 miles. There are now 394 miles of railway open to traffic, and 98 miles under construction. Railway development has been somewhat backward, but many surveys have been made and extensions to new areas are planned.

Highway system.—The construction and the improvement of roads are directed by the Public Works Department. Most of the roads in the colony have been constructed during the past eight years. In a country like West Africa, where railway construction is necessarily slow and costly, the development of a system of first-class roads both as main lines of communication and as feeders to the railways is of paramount importance. According to the most recent report of the director of public works, there are in the Gold Coast 4,184 miles of roads of earth, clay, and gravel construction; 360 miles of macadam, and 800 yards of concrete roads.

In contrast to many sections of the world, very little machinery is used in the Gold Coast, and aside from a few steam rollers, little mechanical equipment of any kind is employed. The work is done largely by prison labor. It is customary for the Public Works Department to purchase its supplies through the Crown agents in London.

During the past year £203,173 (\$988,741) was expended on construction of roads and £138,939 (\$676,150) on maintenance. In keeping with the policy of the colonial government, British goods are generally used.

The only means of transportation 40 years ago was by carriers, who placed loads on their heads as they followed along narrow tracks through the bush. Even at the beginning of the present century there was not a single motor vehicle in the country. To-day there are about 7,000 automobiles in operation. The rapid commercial development of the Gold Coast is acknowledged to be due in a large measure to the use of motor transportation and the expansion of motor roads.

Although it may be true that the road building which the Government has been carrying on has been primarily designed to meet the needs of the cocoa industry, there is no doubt that such improvements have reacted to the benefit of the other industries by furthering the exploitation of the country's natural resources.

Heavy rains in the Gold Coast make road maintenance expensive. The following summary is from the Gold Coast Handbook, 1928:

The climatic conditions and scarcity of suitable metalling are such that the maintenance of roads in good repair is a matter entailing heavy cost and constant attention and care. The heavy rains, apart from causing damage to ridges and washing out culverts, soften the roads so much that during the rainy season occasions arise when roads have to be closed to traffic until they dry and harden. * * * All sections of the community are alive to the necessity of extending the roads to act as feeders to the railways and as main lines of communication. The Government has constructed many miles of first-class roads through the efforts of the Public Works Department and the military service. It encourages the chiefs to make pioneer roads and to repair and maintain roads running through their divisions. Improved irrigation and drainage facilities should alleviate the unfavorable consequences of the hard rains.

The road system of the Gold Coast is being constructed with a view to its use by passenger cars and trucks. The benefits to be derived from the development of roads in the Gold Coast are being increasingly appreciated and it is recognized that highways are a means of promoting the economic welfare of the colony.

GAMBIA

Gambia, which was discovered by the early Portuguese navigators, is the oldest and most northerly of the British possessions in Africa. The area of the colony proper is only 4 square miles, and the population is 10,000. The protectorate has an area of 4,130 square miles and a population of about 200,000.

Bathurst, the principal city and the only ocean port of Gambia, lies close to the trade routes from Europe to West and South Africa and from Europe to South America.

COMMUNICATIONS

Internal communications in Gambia depend almost wholly of waterways, and the excellent water facilities apparently serve the present needs.

The Gambia Blue Book, 1927, states that the road mileage consists of 3 miles of macadamized road in Bathurst and a macadam road $9\frac{1}{2}$ miles in length from Bathurst via Denton Bridge to the reservoir at Cape St. Mary.

A few miles outside of Bathurst the roads degenerate into bush paths. Railway facilities are negligible.

The prosperity of Gambia depends on agriculture, and roads, although construction is expensive in this section, would serve as valuable feeders and transport agencies.

SIERRA LEONE

Sierra Leone, which is composed of the colony and the protectorate of Sierra Leone, covers a total area of about 31,000 square miles and supports a population of 1,600,000. It is bounded on the north and west by French Guiana and on the east by Liberia.

Sierra Leone, like the other British West African colonies, is tropical, with a heavy rainfall and high atmospheric humidity during the greater part of the year. The single rainy season lasts from May to the end of October.

Sierra Leone is well known for its oil palm, which is found in abundance in most all parts of the colony and protectorate.

TRANSPORTATION

Although there is a considerable extent of waterways, the navigable mileage is small. A number of streams are navigable for short stretches, but rapids and falls impede progress for any great distance.

The Government has been making progressive extensions in its railway line. At the end of 1927 the total railway mileage was about 338. The main line, extending over a distance of $227\frac{1}{2}$ miles, with a branch line of more than 100 miles, connects Freetown with Pendembu and Kamabai.

Highway transportation.—Exportation of palm kernels and palm oil, the principal products, was retarded for a long time because of the lack of adequate transport facilities, but the promotion of rail and motor transportation and the extension of the road system have materially aided the development of trade in the commodities mentioned.

According to the Sierra Leone Blue Book of 1927, there are $492\frac{1}{2}$ miles of road completed and $205\frac{1}{2}$ miles under construction.

The roads of Freetown, the capital of the colony, are for the most part wide, well laid out, and drained. Of the mileage open for traffic, a total of approximately 13 miles has been surfaced with laterite, and about 7 miles drained on modern lines. The main arterial roads are in general use for motor traffic and the majority of the more important streets are passable for motor vehicles. The total open for traffic is 50 miles.

The majority of the roads of the peninsula (180 miles open for traffic) are narrow earth roads with steep gradients, and most of bridges are suitable for foot traffic only. First-class roads which

have been widened, drained, surfaced with laterite, and provided with permanent bridges, are now open for motor traffic for 33 miles. In addition, there are 5½ miles of roads of steeper grade passable for light motors but unsuitable for general traffic.

The roads in the protectorate are divided into three classes. First-class roads are of a general width of 16 feet, and are provided with permanent bridges. Second-class roads are of a width of 10 feet, but are provided with temporary bridges only, although in most cases they are being brought up to the same width as first-class roads. Third-class roads are constructed and maintained by the local chiefs.

Practically all the first-class roads are open to traffic. The second-class roads are intended for motor traffic later. The third-class roads are maintained for foot traffic by the various chiefs.

AUTOMOBILES IN BRITISH WEST AFRICA

The automobile has already established a reputation for service in British West Africa, as is evidenced by the 14,000 motor vehicles in operation. An increase in automobile registration will no doubt follow the further development of roads, and such transportation will effect a closer relation between these colonies.

The improvement of the road system of Sierra Leone has encouraged the use of motor transportation. On January 1, 1929, there were in operation 663 automobiles, of which 363 were passenger cars, 292 trucks, and 8 busses. Registrations for 1926 to 1930 are shown in the following table:

AUTOMOBILE REGISTRATIONS IN BRITISH WEST AFRICA, 1926-1930

Colony	Passenger cars	Busses	Trucks	Total	Motor cycles
1926					
Gambia.....					
Gold Coast.....					
Nigeria.....	2,372		4,404	6,776	2,500
Sierra Leone.....					
1927					
Gambia.....					
Gold Coast.....					
Nigeria.....	3,332		6,003	9,335	3,407
Sierra Leone.....					
1928					
British West Africa except Sierra Leone and Gold Coast.....	12,654			12,654	728
Nigeria.....	1,608		2,634	4,242	2,021
Total.....	14,457		2,634	17,081	2,749
1929					
Gambia.....	76	1	142	219	24
Gold Coast.....	1,604	14	5,110	6,728	396
Nigeria.....	2,193	4	3,383	5,580	2,311
Sierra Leone.....	353	6	292	651	289
Total.....	4,226	21	8,527	12,774	3,020
1930					
Gambia.....	64	4	194	262	38
Gold Coast.....	1,943	9	4,833	6,785	997
Nigeria.....	2,774	1,647	1,331	5,752	2,160
Sierra Leone.....	430	10	310	750	310
Total.....	5,211	1,670	7,338	14,139	3,143

The representation of American cars on the British West African market is revealed in the following figures showing percentage of the total:

AMERICAN CARS IN BRITISH WEST AFRICA

[Per cent of total]

Colony	Passenger cars	Busses	Trucks
Gambia.....	89	50	73
Gold Coast.....	80	89	89
Nigeria.....	42	90	90
Sierra Leone.....	41	20	79

CANARY ISLANDS (LAS PALMAS)

The Spanish Province of Las Palmas, generally known as the Eastern Canary Islands, comprises the islands of Grand Canary, Lanzarote, and Fuerteventura, and also embraces the small barren islets of Roque del Est, Roque del Oeste, Alegranza, Graciosa, Montana Clara, and Lobos. The total area of the entire district is about 1,482 square miles, and the total population, according to the census of 1920, the last taken, is 206,088 inhabitants.

Grand Canary is the most important island of the entire Province. It has an area of 531 square miles and a population of about 170,000. On this island is situated the city of Las Palmas, the capital of the Province and the importing, exporting, and distributing center for the entire district. Second in importance is the island of Lanzarote, which covers an area of 286 square miles and has 56 miles of highways. Its population numbers some 20,000. The island of Fuerteventura, the largest island of the Province, ranks third in importance, with an area of 665 square miles and a population of 14,000. It has 49 miles of highways.

The six islets named above are uninhabited, with the exception of Alegranza and Lobos, each of which has a lighthouse and a few inhabitants. There are no highways on any of the islets.

ROAD MILEAGE BY CONSTRUCTION TYPES

At the end of 1929 there was a total of 283 miles of highways throughout the Province—229 miles of macadam and 54 miles of bituminous surface.

In addition, there are approximately 48 miles of vicinal roads within the district, but they are not considered highways in the strict sense. Most of these roads are constructed with a rock base and earth surface. Lanzarote has 25 miles of vicinal roads, Grand Canary about 12 miles, and Fuerteventura about 10.5 miles.

HIGHWAY MILEAGE OF CANARY ISLANDS

Type	Grand Canary	Lanzarote	Fuerteventura	Total
Constructed:				
Macadam.....	124	56	49	229
Bituminous surface.....	54			54
Total.....	178	56	49	283
Planned construction: Macadam.....	155	12	6	173
Vicinal roads:				
Constructed.....	12	25	11	48
Planned construction.....	373	62	62	497
Total.....	385	87	73	545

The island of Grand Canary will have a system of 333 miles of highways when completed; Lanzarote will have 68 miles; and Fuerteventura will have 55 miles. Grand Canary will also have 385 miles of vicinal roads when the system is completed, Lanzarote will have 87 miles, and Fuerteventura 73 miles. (Figures relative to vicinal roads are merely approximates.)

The present 56-mile highway system of the island of Lanzarote is divided into the following main highways:

(1) Arrecife to Yaiza via Tias and Macher, (2) Arrecife to Tinajo via San Bartolome, (3) Arrecife to Haria via Teguisse, (4) Tahiche to Haria via Guatiza.

There is in project a highway from Teguisse to Yaiza via San Bartolome. It is estimated that about 12 miles of additional highways will complete the highway system of this island, giving it a total of about 68 miles.

The present 49-mile highway system of the island of Fuerteventura is composed of the following highways: (1) Puerto de Cabras to Oliva via Tetir, (2) Puerto de Cabras to Tuineje via Casillas del Angel and Antiqua, (3) Puerto de Gran Tarajal to Rio Palma.

In addition to these, there is under construction a highway from Puerto de Gran Tarajal to Bentancuria via Tuineje and Pajara. It is estimated that the highway system for this island when completed will total 55 miles.

The contract for the reconstruction of the Las Palmas-Puerto de la Luz highroad—about 4 miles in length and subject to the heaviest traffic of all the highroads of Grand Canary—was given in 1926 to the French firm L'Omnium d'Entreprises of Paris. In 1923, after having executed the reconstruction (which involved asphaltting and construction of a sewer system) of seven-tenths of a mile of this road, the company was forced by the municipality of Las Palmas to abandon the contract. Since that time the municipality of Las Palmas itself has been carrying on slowly the reconstruction of an additional stretch of four-tenths of a mile of this road. This stretch was finally finished. The type of construction employed was macadam with tar surface treatment. A drainage for the removal of surface water was also provided for.

During 1929 the Spanish Government at Madrid appropriated for the Province of Las Palmas \$187,110 for the construction, conservation, and reparation of highways. In addition to this sum,

\$14,850 was received from the "patente nacional," and \$59,400 a special tax on gasoline within the Province. According to foregoing figures the total was \$261,360.

The returns from the "patente nacional," which is the sole tax imposed upon the automobile owner in Spain, amounted to \$59,400 during 1929 in this Province. Of this sum, \$44,550 was remitted to the Spanish Government at Madrid, while \$14,850 was allowed to be retained within the Province to be used for administrative or highway purposes. Thus, the \$187,110 appropriated for local highways in 1929, less the \$44,550 accruing from the returns of the "patente nacional," which were returned, leaves a clear outlay of \$142,560 by the Spanish Government for this Province during 1929.

A special tax of 0.01188 cent per liter of gasoline sold, which was instituted in 1927, during 1929 gave an approximate return of \$59,400. This tax is levied for the purpose of obtaining funds for the improvement of old highways by the system of tar-macadamizing. During 1929, \$59,400 was expended in the improvement of 43 miles of old highways.

The cost of construction of highways is said to be from \$7,425 to \$11,880 per kilometer for completed macadamized highway. It is estimated that the 283 miles of highways of the Province cost upwards of approximately \$10,395 annually for conservation and repair.

During the first six months of 1930, an extent of 4 miles of highway was constructed in the island of Fuerteventura and 26 miles in the island of Grand Canary, thus completing 30 miles. This appears to be a record for road construction within this Province and has been accomplished through the "Junta Administrativa de Obras Publicas" (Administrative Board of Public Works), the new Government office under whose jurisdiction the construction and maintenance of highways was placed in June, 1929.

AUTOMOBILES IN CANARY ISLANDS

The use of automobiles is spreading more rapidly in the Canary Islands than in many other parts of Africa. Since 1926 the number of automobiles in operation each year has definitely increased. The preponderance of American cars on the islands is strikingly manifested, in that 87 per cent of the passenger cars, 98 per cent of the busses, and 92 per cent of the trucks are of United States origin.

MOTOR VEHICLE REGISTRATIONS IN THE CANARY ISLANDS, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	2,300	65	903	2,338	94
1927	2,906	125	1,091	4,122	88
1928	3,354	220	1,189	4,763	106
1929	3,783	274	1,460	5,517	136
1930	3,792	260	1,718	5,790

EGYPT

Egypt has an area of about 386,000 square miles, most of which is desert land. The cultivated and settled area—the Nile Valley, Delta and oases—covers only about 13,600 square miles.

The 1927 census estimated the population at 14,213,379, consisting mainly of Moslems, Orthodox, Protestants, Latins, Uniats, and Jews.

TRANSPORTATION

On March 31, 1927, there were 2,842 miles of railway line in Egypt of which 1,988 belonged to the Government. The Egyptian State railway system comprises trunk lines from Alexandria, Port Said, Ismailia, and Suez, to Cairo, and from Cairo to Shellal, together with a network of branch and connecting lines, chiefly in the Nile Delta north of Cairo. A policy of progressive extension and improvements of railways is being carried forward steadily.

Egypt is provided with favorable water facilities. The principal ports are at Alexandria, Port Said, Port Sudan, and the Suez Canal.

The automobile is becoming increasingly popular as a medium of transportation supplementing the railroads. Automobile registrations rose from 10,300 in 1925 to a total of 27,675 for 1930. With the improvement in highway facilities motor transportation may be expected to show a steady increase.

Egypt possesses many natural advantages in the matter of road construction, according to F. G. Royal Dawson, professor of road and railway construction at the School of Engineering in Cairo. Egypt is an almost rainless country, the average annual rainfall amounting to only 2 or 3 inches, and it is comparatively level, the only hills being occasional ridges of rock. The dual problem of heat and cold is not a factor to be contended with as in other countries, since the climate is warm and the temperature rarely reaches the freezing point. Finally, the soil of Egypt contains in abundance materials suited for road making (sand—either pure or with a moderate admixture of clay—gravel, sandstone, limestone, and basalt), and a petroleum refinery at Suez produces practically as much bitumen as is required for surface work.

An additional feature tending to simplify the problem is the Nile, the natural waterway of the country. As the general field of traffic is within an irrigated zone parallel to the Nile and the channels of the Delta, and the greater part of this traffic is carried either by the Nile or by a parallel railway throughout the zone, it will be understood that until the advent of the motor car there was no road problem of any importance in the modern understanding of the term.

The general type of district road is a plain earth embankment, very often running alongside a canal, the excavation from which has provided the material for the road. The surface is sprinkled periodically with water as a binding. Owing to the absence of rain and the presence of a suitable proportion of clay, these roads are more efficient than might be expected for ordinary light traffic.

It should not be long before there is a considerable improvement in the roadways of Egypt, but the laying of good roads is useless unless they are properly kept up. The highway problem in Egypt

is not so much the construction of new roads as it is the repair of hundreds of already existing highways and the proper apportionment of funds for maintenance work. Much work remains to be done in widening and surfacing highways.

The total road mileage of Egypt is 3,346, consisting of 3,259 miles of earth roads and 87 miles of macadam roads.

The budget grant for road work during the year 1927-28 was \$1,863,930, derived from the general receipts of the Government. For 1928-29 the budget grant for roads was \$1,879,730.

The construction and maintenance of streets within the limits of Cairo and its environs are under the jurisdiction of the Ministry of Public Works. All other cities and villages of the country come under the supervision of the Ministry of the Interior. The Ministry of Communications undertakes the construction of agricultural roads and of streets outside city and municipal boundaries.

The Egyptian road program for 1929-30 was ambitious. The Roads and Bridges Department of the Ministry of Communications submitted to the Council of Ministers estimates for the fiscal year beginning May 1, 1929, which included the following items: (1) \$50,000 for enlargement and improvement of the Abukir road near Alexandria; (2) \$125,000 for improving the Suez road; (3) \$40,000 for repair to the road from Benha to Mit Ghamr; (4) \$70,000 for enlarging the road between Cairo and Luxor; (5) \$30,000 for repairing the road from Cairo to the Fayoum; (6) \$55,000 for repairing the road from Cairo to Zaiet Abou Mesalem; (7) \$100,000 for widening the Cairo-Alexandria road, the eventual cost to be about \$3,500,000; (8) \$125,000 for macadamizing the road from Alexandria to Damanhur; and (9) \$65,000 for macadamizing the road from Giza to Badrashen.

Among recent proposals for road construction of importance are the new agricultural road in Gharbieh Province and the proposed construction of the Port Said-Damietta road. The Egyptian Ministry of Communications presented a note to the Council of Ministers requesting the issue of the necessary royal decree for the creation of seven new agricultural roads in Gharbieh Province. The expenditure required is estimated at £E65,800 (\$329,000) which, in accordance with the law concerning agricultural roads, have to be borne by the owners of neighboring lands. The sum concerned will be collected in the form of a tax in a period of four years as from the present financial year.

The project to join Port Said and Damietta by a road which could be traversed in two or three hours by automobile, has been the subject of discussions in the Egyptian Senate for several years, and it is now reported that work will commence and that the road will be finished during the year 1931. People of Port Said as well as those in the Damietta Province are much interested in this project, which they would gladly see executed as soon as possible, as the new road will permit vegetables, fruits, and other food products from Damietta to find an outlet via this route, since the transportation charges on merchandise from Damietta to Port Said are somewhat heavy, because of indirect railroad connections. Produce from the rich Province of Damietta is also transported by sailing boats, and while the transportation charges are low, the merchandise often deteriorates in transit and at times is damaged by sea water.

AUTOMOBILES IN EGYPT

The automobile has become very popular in Egypt. This popularity is probably due in no small degree to the attention which Egypt has given its roads. The favorable standing of American cars is manifested by the fact that 53 per cent of the passenger cars, 83 per cent of the busses, and 82 per cent of the trucks are of American origin.

MOTOR-VEHICLE REGISTRATIONS IN EGYPT, 1925-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	9,100	1,200	10,300	3,300
1926	13,494	936	1,995	16,425	4,280
1927	14,842	1,947	1,851	17,740	3,500
1928	16,342	1,170	2,378	21,890	3,245
1929	20,933	1,193	2,871	24,997	2,493
1930	23,189	3,291	1,195	27,675	3,203

ERITREA

The Italian colony of Eritrea borders on the Red Sea and is bounded by the Anglo-Egyptian Sudan, Ethiopia, and the French Somaliland. It covers an area of 45,754 square miles and has a population of 393,000.

Along the sea coast and on the lowlands the climate is tropical and the rains fall in winter; on the uplands the climate is cool and sometimes cold, and the rains fall in summer.

Massaua is the chief seaport of the colony's 500 miles of coast. An important development which is expected to promote the economic life of Eritrea has been the granting, by the Italian Government, of free port facilities to the Ethiopian Government at Assab. In compensation for the use of this port, which is located at the extreme southern end of Eritrea, the Ethiopian Government granted to an Italian syndicate the concession for the construction of a motor highway from Assab via Dessie to Addis Ababa, the capital of Ethiopia, a distance of about 500 miles.

There are 75 miles of railway from Massaua to Asmara; 101 miles from Asmara to Mai Adarte; and now the line from Cheren has nearly reached Agordat (62 miles).

Eritrea is provided with a network of highways aggregating 1,208 miles, of which 958 are earth, sand-clay, or gravel, graded and drained, and 250 miles are waterbound macadam. Within the last few years the Government of Eritrea has appropriated and spent a considerable sum of money in the construction of highways suitable for motor traffic.

There are eight important highways, most of which radiate from the capital, Asmara. These total about 650 miles, as follows:

	Miles
Massaua to Asmara	75
Asmara to Tessenit	213
Tessenit to Kom Ager	75
Tessenit to Sabderat	25
Azordat to Sabderat	80
Agordat to Barentu	47
Barentu to Asmara	93
Asmara to Adi Quala	56

One of the most important of these highways is that extending from Amara to Tesseni, located in the southwestern part of the country and near the boundary between Eritrea and Sudan. There are also local roads, partly suitable for vehicles. The total mileage suited to vehicular traffic is about 348, and of this total about 152 miles can be used for military vehicles.

The construction of the highway from Assab via Dessie to Addis Ababa will open up a rich region in northwestern Ethiopia to agricultural development and will provide a base route from which future roads may be constructed to open now inaccessible regions that are potentially rich but lack transportation facilities.

When the road is completed for through motor traffic, there should be a rapid expansion in the market for automotive vehicles and other products that follow the opening of new regions to foreign trade.

AUTOMOBILE REGISTRATIONS

The total automobile registration for 1930—346 vehicles—may not seem impressive, but it indicates that Eritrea has some interest in motor transportation. The opening up of rich areas and the furtherance of road construction should lead to a demand for automotive vehicles. Of those now in use, 46 per cent of the passenger cars, 68 per cent of the busses, and 58 per cent of the trucks are of American origin.

MOTOR-VEHICLE REGISTRATIONS IN ERITREA, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	20	16	10	55	12
1927	35	6	6	101	12
1928	97	11	11	108	26
1929	139	11	58	208	46
1930	198	30	123	346	53

ETHIOPIA

Ethiopia, the only independent state in Africa besides Liberia, covers an area of 350,000 square miles. It has a population of about 10,000,000 made up of varied races and religions, principally Africans with Semitic blood, of whom about one-third are Christians (the ruling class), and about two-thirds are Moslems and pagans.

The country is very mountainous, having high but fertile plateaus cut with deep canyons. To the east and south is a fringe of barren lowlands. The lowlands are hot and dry, but the uplands have a temperate climate and there is usually a heavy rainfall from June to October.

Addis Ababa, located near the center of the country, is the capital and principal city.

TRANSPORTATION FACILITIES

Ethiopia lacks adequate facilities for transportation. The only transportation route from Djibouti (the main port for Ethiopian trade) to Addis Ababa is the Franco-Ethiopian Railway, 500 miles long.

Highways.—Only during the past six years, with the introduction of motor vehicles, has interest developed in the construction of highways. There are about 402 passenger cars, 46 trucks, and 26 motorcycles in operation in the country. Before the introduction of the motor vehicle practically all travel was by mule trail.

The total extent of roads to date is 2,000 miles, consisting of 1,000 miles of unimproved earth roads and 1,000 miles of earth, sand-clay, or gravel roads, graded and drained. It is expected that in the next few years there will be a considerable increase in the road mileage.

The Ethiopian Government does not have a road budget, all national income going into the hands of the ruler, who allots funds according to his estimate of needs at the particular time. However, a rough estimate places the 1928 road expenditure (both official and private) at \$100,000.

Plans for trunk roads, for which an urgent need exists, are being formulated. Construction work in Ethiopia moves forward slowly and uncertainly. There are definite evidences, nevertheless, that the country is becoming increasingly impressed with the desirability of good roads, and time should bring about a gratifying extension in the highway system. A good highway system will be a potent influence in the development of Ethiopia's rich resources.

Announcement has just been made of a new motor-transport service between Addis Ababa and the Djihour Ridge, about 97 miles northward in the direction of Dessie. This road, though quite ordinary and incomplete, is still a passage, and as such is expected to become popular. It is the first road of considerable length out of Addis Ababa and the longest continuous motor route thus far. It forms the initial link in the route contemplated in a treaty between Italy and Ethiopia, concluded on August 2, 1928, for the cession of Italian Assab (Eritrea), as an Ethiopian port, and the construction of a road from Assab to Dessie and thence to Addis Ababa.

The new motor highway from Assab via Dessie to Addis Ababa is of vast importance. Freight rates on the French-owned railway operating between Djibouti and Addis Ababa are very high, owing to lack of competition, and it is believed that the new motor highway will give rise to a considerable amount of import and export traffic between Ethiopia and the port of Assab, in Italian territory. The greatest economic effect of this road on Ethiopia, however, will be the opening of a rich northeastern region to agricultural development and the providing of a base route from which roads may be constructed to penetrate now inaccessible regions. Once this road is completed for motor traffic, there should be a rapid extension of the market for automobiles and other manufactured products that follow the opening of new regions to foreign trade.

A commercially important road project is the announced intention of the governor of Wollega Province to build a road from Sayu to Gambela, an estimated distance of 60 miles.

A wealthy local firm has under consideration a plan to build five roads radiating from Jigjiga, in the rich Harrar Province, the chief source of Abyssinian coffee. The total mileage of this projected system would be 565 miles.

An important enterprise is the road under construction from Gambela to Gore. This road is expected to provide a valuable outlet

via the Sudan for the great quantities of produce from southwestern Ethiopia which would require weeks of expensive caravan travel to send via Addis Ababa. The concessionaries for this road, a Greek firm, have made such good progress and see such encouraging future that they have applied for and have received a concession to continue their road from Gambela to the Sudan frontier, a distance of about 60 miles. The concession indicates a railway for this stretch, but the prevailing opinion is that a motor road will probably be built as the cheaper and more practical method.

The blazing of motor trails, which will in all probability stimulate motor transportation, was very popular during 1929. Among the ventures reported were (1) Traversing a 180-mile stretch from Addis Ababa to Jimma; (2) a trip from Addis Ababa to Nekempti (240 miles) by two cars; (3) the driving of two Renaults from Cairo to Addis Ababa via Roseires; and (4) the report of a 1,000-mile caravan trip of a British explorer and his subsequent statement concerning the feasibility of roads at \$150 per mile (not including bridges) through western districts represented by Jimma, Kaffa, Wollega, Sayu, Golisso, and Nekempti.

A factor which is calculated to stimulate road building is the timely dissemination of educational articles concerning roads. The central Government itself has encouraged these efforts by repeatedly emphasizing its interest in roads on several public occasions. The leading merchants of Addis Ababa were formally received by the King on November 18, 1929, for the express object of requesting road extension. Articles on roads appeared frequently during the year in the Government's Official Gazette and in the one local French weekly newspaper.

AUTOMOBILE REGISTRATIONS

That Ethiopia is becoming accustomed to motor transportation is evidenced by the gradual replacement of the mule by the modern automobile with its more effective and economical service. A glance at the registration figures shows that there has been a satisfactory increase in the use of motor vehicles. While the total number registered was but 76 in 1926, in 1930 automobiles in use numbered 568. Of the total number of cars in use, 57 per cent of the passenger cars and 46 per cent of the trucks are of American origin.

The dirt road connecting the Franco-Ethiopian Railway station of Arba with the Belgian coffee plantations at Minneh is 100 miles in length and cost about \$40,000. This road in particular is regarded as having important future potentialities as a motor highway.

AUTOMOBILE REGISTRATIONS IN ETHIOPIA, 1926-1930

Year	Passenger cars	Trucks	Total	Motor cycles
1926	76		76	
1927	100		100	
1928	67	42	109	47
1929	402	46	448	28
1930	502	66	568	39

FRENCH WEST AFRICA

French West Africa includes the colonies of Senegal, French Guinea, Ivory Coast, Dahomey, French Sudan, Upper Volta, Mauritania, Niger, and Dakar and its dependencies. The area of French West Africa in 1926 was 1,247,191 square miles and the total population, 13,514,611. The principal products and exports of these colonies are fruits, oils, oil seeds, rubber, cotton, cocoa, and timber. Their chief imports consist of foodstuffs, textiles, mechanical implements, and manufactured goods.

TRANSPORTATION FACILITIES

In December, 1927, it was estimated that there were only about 2,100 miles of railway in French West Africa. The first railways were built to facilitate the military occupation of the areas concerned, but with the pacification of these countries there has been some extension of railway lines. In general, however, the railroads are still struggling, disconnected lines running out from coastal points, although projects are being considered for consolidating these lines into a unified system.

Shipping facilities in general are lacking. Goods are usually discharged by means of lighters.

Highways.—Prior to 1914 the highways of French West Africa were in reality nothing more than trails. The camel served as the chief means of transportation, and in some districts native labor (or "head loads") was used to transport goods.

The introduction of automotive transportation, with the importation of 57 motor vehicles in 1917, brought to the attention of the people the great need for highways. It was realized that the economic advancement of the country, especially in those districts where there were no railways, was dependent upon the construction of more satisfactory communicating routes. The scarcity of other means of transportation has given impetus to motor traffic and to the development of the road system.

In 1923 it was estimated that there were about 15,000 kilometers (9,321 miles) of trail over which motor vehicles could travel during the dry season, but it was not until 1924 that the first real stretch of properly constructed roadway, a distance of 29 kilometers (18 miles) between Dakar and Rufisque, in Senegal, was completed. Work is now under way to extend this road from Rufisque to Thies, a distance of 42 kilometers, or 26 miles. From the Dakar end about a third of the road to Rufisque is paved with asphalt, and it is hoped to surface the entire road in this way.

Highways of French West Africa have been estimated at 50,000 kilometers (31,068 miles), with about 24,000 kilometers (14,913 miles) open to motor traffic during the dry season. Rains which last from three and one-half to four months cause much damage to the roads.

The total budget of French West Africa for the construction and maintenance of highways was 27,000,000 francs (\$1,059,413). During the period from 1923 to 1928 it is estimated that 56,000,000

francs (\$2,197,300) was spent on roads, and in addition to this amount the cost of native labor amounted to about 258,000,000 francs (\$10,123,395).

The heads of the villages are required, in lieu of taxes, to furnish laborers for public works during the year. The number of men called upon for this work varies according to the size of the villages and the amount of work to be done. The following figures show the number of days of labor which several of the communes in Senegal are required to furnish during the year 1929:

	Days of labor per year		Days of labor per year
Thies.....	4,984	Rufisque (Bargny).....	472
Khombole.....	1,560	Pout.....	1,264
Kaolack.....	7,704	Sebikotane.....	156
Ziguinchor.....	564	Diaganias.....	36
Subdivision of Thies.....	412		

Owners of vehicles are required either to lend their automobiles or carts to the Government for four days during the year for the use of public works or to pay the following taxes per year (in francs, equivalent to approximately 4 cents, United States currency): Trucks, 90; passenger cars, 60; 4-wheel vehicles, 40; 2-wheel vehicles, 20.

SENEGAL

Senegal is the most important of the French West African colonies. Although there are trails connecting the various towns and villages, there is a noticeable lack of roads. With the exception of that from Dakar to Rufisque, which is being continued to Thies, it is doubtful if there are any well-constructed roads.

The soil of the colony is sandy, and during the rainy season many of the roads throughout the colony are rendered unfit for motor traffic. During the dry season, which extends from November to about the middle of June, automobiles can travel from Dakar to St. Louis, a distance of 263 kilometers (163 miles); but after leaving Thies the route leads over a sandy soil, where it is frequently necessary to cut down brush and place it along the road to enable the automobile to pass. A part of the way is over a river bed which is dry until the rains start. At another point the motor car has to run on the railway track for some distance.

The necessity of constructing highways in Senegal is realized, but the difficult problems involved and the present high cost of carrying on this work, together with the lack of funds, prevent any plans for extensive road building in the colony.

At the end of 1920 there was completed 20 kilometers (12 miles) of the highway between Dakar and Rufisque. The cost of building this stretch of road was 69,500 francs (\$2,723) a kilometer, or a total of 1,390,000 francs (\$54,450). At that time the crushed stone used was valued at 20 francs (\$0.78) a cubic meter and the rough stones at 10 francs (\$0.39); the wages of a native laborer were 5 francs (\$0.20) a day. At the present time crushed stone would cost 125 francs (\$4.90) and rough stone 100 francs (\$3.92) a cubic meter, and the native labor 10 francs (\$0.39) a day.

The development of the resources of the colonies is very largely dependent on the construction of the following highways:

	Miles		Miles
Dakar to St. Louis.....	183	Guinguines to Kaolack.....	14
Thies to Tambacounaa.....	245	Dourbel to Yangyang.....	86
St. Louis to Podor.....	109	Kaolack to Saboya.....	84
Dourbel to Foundiougne, by way of Fatick.....	37	Joal to Fatick.....	30
Thies to Joal, by way of M'Bour.....	46	Total.....	764

It is estimated that the construction of these routes would require an expenditure of about 513,327,000 francs (\$20,112,152), or more than a third of the total loan of French West Africa. At the present time, as far as can be learned, the only road which is being constructed is the 42 kilometers (26 miles) between Rufisque and Thies.

There are two railway lines in Senegal. One extends from Dakar to St. Louis and the other from Dakar to the middle of the colony, touching the important trading centers, and on to Bamako, French Sudan. There are trails from interior points which connect with the railroads.

FRENCH GUINEA

French Guinea lies on the coast between Portuguese Guinea and the British colony of Sierra Leone. It has an area of about 92,640 square miles and a population (1928) of 2,185,697.

The climate is similar to that of Senegal. There is a wet season between May and October and a dry season between November and April. The rainfall is heaviest along the coast and decreases in the interior.

Conakry is the capital and the chief city of the colony.

Transportation facilities.—The French Guinea Railway was begun in 1911 and completed in 1914. This line extends from Conakry to Kankan, a distance of 412 miles, and is being continued to connect with the railways of Upper Senegal at Buguni and those of the Ivory Coast of Dimbokro.

The rivers are navigable for a part of their course.

On January 1, 1928, there were 291 automobiles in French Guinea, which is provided with a relatively good network of highways. There are about 1,031 kilometers (641 miles) of gravel highways which are open to motor traffic during the entire year, and 313 kilometers (194 miles) of dirt roads and 844 kilometers (524 miles) of trails open during the dry season.

A good highway from Conakry to Kankan (a distance of 622 kilometers, or 411 miles), built prior to the construction of the Guinea railroad, has been abandoned. At the present time there are no highways in this part of French Guinea, with the exception of short stretches of road leading off from the railways into the banana plantations.

Extending south from Conakry is a 120-kilometer (75-mile) gravel highway, open all the year to motor traffic to Forecaria. Other highways are as follows: Kindia to Telimele, 100 kilometers (62 miles); Mamou through Pita to Labe, 150 kilometers (93 miles); Dabola to Dinguiraye, 75 kilometers (124 miles). These roads lead into the plantations and are open to motor traffic during the entire year.

Extending east from Kankan is a motor road running through to Bougouni, French Sudan, about 250 kilometers (155 miles).

IVORY COAST

The Ivory Coast is located between Liberia and the British Gold Coast. It has an area of about 121,976 square miles and a population of 1,724,545. The climate is tropical. There are two dry seasons (December to March and August and September) and two rainy seasons (April to July and October and November). The seat of government is at Bingerville.

Transportation facilities.—A railway has been constructed between Abidjan and Tafié (304 miles). Extensions are planned to the north to the Niger and Upper Volta.

The principal ports are Grand Bassam, Assinie, Grand Lahou, and Sassandra.

There is a network of roads suitable for motor traffic, and on January 1, 1928, there were 964 automobiles in use in the Ivory Coast.

A main highway connects Firkessedougou with Bobo-Dioulasso, Upper Volta, and it is stated that there is a good road leading from Firkessedougou to Sikasso, French Sudan. From Firkessedougou, the highway makes possible a direct route through from Bobo-Dioulasso of 487 kilometers (303 miles). Due west from Firkessedougou is another highway leading to Odiénne, about 300 kilometers (186 miles).

A road about 75 kilometers (47 miles) in length connects Grand Bassam and Abidjan. It is also said to be possible to go from Grand Bassam to Bouaké by motor car at all times of the year over a network of highways and trails.

Some of the highways of the Ivory Coast are said to be constructed with a crushed-rock foundation covered with sand and clay.

DAHOMÉY

The colony of Dahomey borders on the coast of the Gulf of Guinea and lies between Togoland on the west and the British possessions of Lagos and Nigeria on the east. The colony has but 70 miles of coast but opens out to the north in a wide hinterland extending on the northeast to the Niger River, and on the northwest to the Upper Volta colony.

Transportation facilities.—There are two railways running inland, with short lines along the coast. At Kotonu an iron pier has been erected, and from that port a railway runs into the interior to Savé (162 miles) with a branch line to Whydah and Segborue on Lake Ahémé (36 miles). The line is intended to run to Chaoru (400 miles). A meter-gauge railway has been constructed from Porto Novo to Pobe (50 miles) along the Lagos frontier. A new railway linking the capital with the port of Kotonu is in course of construction (22 miles).

From Savé, the point at which the Dahomey railway ends, a main highway of the colony runs east through Savé, Parakou, Bimbereke, Kandi, Gueme, and to the Niger River, a total distance of about 450 kilometers (280 miles). Motor transport service over this highway

connects with the boats on the Niger River, by which means freight is carried to and from that part of Dahomey and the Niger, also to the northeast of Nigeria.

FRENCH SUDAN

The French Sudan is bounded on the north by the Algerian sphere; on the west by Mauritania, the Faleme River, and the frontier of French Guinea; on the south by the frontiers of the Ivory Coast and the Upper Volta; and on the east by the colony of the Niger. The area is given at 360,331 square miles and the population at 1,632,618 in 1927.

French Sudan has a climate between the Sahara and the equatorial type. There is a dry season beginning in November and a rainy season beginning in June.

Transportation facilities.—The completion of the section from Thies to Kayes in January, 1924, provided French Sudan with connections to the coast by a railway 760 miles in length, stretching from Dakar to Koulikoro by way of Thies, Kayes, and Bamako. For about seven months in the year small steamboats perform the service from Koulikoro to Timbuktu, and from Bamako to Kouroussa. On January 1, 1923, there were 413 automobiles in French Sudan.

Southeast of the Niger River in the French Sudan there are networks of trails, and the principal centers are connected by properly constructed highways, surfaced with laterite, which are open to motor traffic during the entire year. This part of the Sudan has a clay soil and an abundant supply of stone suitable for road building. The main highways extend into the Upper Volta and the Niger and connect with the railways in French Guinea, the Ivory Coast, and Dahomey.

A laterite road extends from Bamako, the capital of the colony, through Bougouni to Sikasso for a distance of 287 kilometers (178 miles). This road continues to Bobo Dioulasso, Upper Volta, a distance of 167 kilometers (104 miles). Leading out of Bamako is another road 217 miles long, which passes through Siguiri and ends at Kankan, French Guinea, the end of the French Guinea Railway. Northeast from Bamako, on the south side of the Niger River, a highway leads through Segou and ends at Mopti, about 500 kilometers (311 miles). The Government may eventually construct a road from Mopti to Timbuktu, a distance of about 300 kilometers (186 miles).

All the above-mentioned roads, with the exception of the route from Siguiri to Kankan, are said to be surfaced with laterite and open to motor traffic throughout the year. In addition to these highways there are networks of connecting trails which can be used during the dry season.

UPPER VOLTA

The colony of the Upper Volta lies within the great bend of the Niger River, which with the territory of the Niger forms its eastern boundary. Its southern boundary is formed by the Mekrou River and the frontiers of Dahomey, Togoland, the Gold Coast, and the Ivory Coast. Its boundary line then runs northeast from the Bago

River to the Niger, just below Asongo. The total area is about 142,000 square miles and the population is more than 3,000,000 (1926 census).

The climate is similar to that of the southern portion of French Sudan.

Roads.—Conditions in the Upper Volta as regards highways are somewhat similar to those of the Sudan. Starting at Bobo Dioulasso, to which point the road from Bamako has already been traced, a main highway leads to Ouagadougou, the capital of the Upper Volta, over a stretch of 360 kilometers (224 miles). Continuing south from Ouagadougou the road passes through Fada-Ngourma on to Botou (283 miles) on the border of the Niger. West from Bobo Dioulasso one of the principal highways passes through Banfora and connects with the Ivory Coast Railway at Firkessedougou, Ivory Coast (137 miles). All these highways are made of laterite and are said to be in very good condition during the entire year.

NIGER COLONY

The colony of the Niger, with an area of 404,914 square miles and a population (1928) of 1,427,536, lies east of the Upper Volta and French Sudan, north of British Nigeria, extending northward to the Algerian sphere and eastward to an artificial line in the Sahara Desert running northwest from Lake Chad along the border of the Tibesti district.

The climate is similar to that obtaining in northern French Sudan.

Highways.—One of the main roads runs from Botou, Upper Volta, to Niamey, the capital of the colony (77 miles). From Niamey the highway extends to Dosso (75 miles) and on to Gaya (93 miles) on the Niger River at the border of Dahomey.

A military road surfaced with laterite leads out of Dosso and extends along the Nigerian border as far as Zinder (541 miles). At Maradu a branch of this road connects with the highway to Kano, Nigeria.

MAURITANIA

Mauritania is bounded on the west by the Atlantic Ocean, on the south by Senegal and French Sudan, and on the east by French Sudan. Its total area is 347,400 square miles, and the population numbers about 289,000.

The climate is extremely damp in the southern section, but is drier in the north and near the desert.

Mauritania is practically a desert. There are no real highways in the colony. Motor vehicles have traveled over a trail from St. Louis, Senegal, to Amoukrouz, Maritania, about 217 miles. The trail from this point follows the coast to Port Etienne, about 311 miles. From Amoukrouz a branch trail leads to Atar, a military post (342 miles).

AUTOMOBILES IN FRENCH WEST AFRICA

The number of automobiles in use in French West Africa has increased from 1,900 in 1926 to 7,038. The demand for trucks has been especially active. The automobile has been a major contribution in the development of French West Africa and its popularity

may be expected to increase as new and improved roads are provided. Of the total number in use 30 per cent of the passenger cars and 65 per cent of the trucks are American made.

AUTOMOBILE REGISTRATIONS IN FRENCH WEST AFRICA, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926.....	1,200		700	1,900	120
1927.....	2,101		1,719	3,820	250
1928.....	2,349		3,273	5,622	393
1929.....	2,385		3,676	6,061	526
1930.....	2,897	2	4,139	7,038	

ITALIAN SOMALILAND

Italian Somaliland, extending along the east coast of Africa from British Somaliland to Kenya Colony, has an area of about 190,000 square miles and a population of approximately 1,200,000.

TRANSPORTATION

In 1929 there were 71 miles of railways open to traffic. A railway is in the course of construction that will connect several important coast cities in Djubaland. Steamship service is conducted on the Juba River from Kismayu to Bardera.

Roads.—There are 5,278 miles of roads in Italian Somaliland. Of this total 3,383 miles include unimproved earth and 1,895 miles of earth, sand-clay, or gravel, graded and drained. A highway 800 to 900 miles long, beginning at the most northern point in the colony near Cape Guardafui, follows the seacoast to Kismayu and Mogadiscio.

AUTOMOBILE REGISTRATIONS

That the construction of roads is having a favorable effect on the market for motor vehicles is evidenced by the fact that automobile registrations increased from 55 units in 1926 to 428 in 1930. The American industry is represented by 27 per cent of the passenger cars and 33 per cent of the trucks.

AUTOMOBILE REGISTRATIONS IN ITALIAN SOMALILAND, 1926-1930

Year	Passenger cars	Trucks	Total	Motor cycles
1926.....	35	20	55	6
1927.....	75	13	88	10
1928.....	45	69	114	41
1929.....	243	203	446	34
1930.....	102	326	428	48

LIBERIA

The Republic of Liberia is situated on the upper West African Coast. Its area of 43,000 square miles is comparable with that of Pennsylvania. From its Atlantic coast line of 300 miles the country extends inland 90 to 200 miles to an irregular boundary. The

total population is estimated at 2,000,000 to 2,500,000, all of the African race.

Liberia is in general a mountainous country; the coast is low and sandy, with many small draining streams. The climate is tropical, with a wet season (April to November) and a dry season. Annual rainfall varies from 150 to 180 inches on the coast and from 85 to 100 inches in the interior. The country is largely covered with secondary forest and brush.

TRANSPORTATION FACILITIES

Communication facilities in Liberia are altogether inadequate. The country has no harbors, no navigable rivers of importance, and no railways. There are several motor roads, and motors and ox-carts constitute the chief means of vehicular transport.

The highway mileage of Liberia is about 200. All roads are of gravel construction. One motor road from Monrovia to White Plains, a distance of 24 miles, is completed, and another, from Monrovia to Sanoquelleh (300 miles), is under construction. At present 130 miles of this road have been completed for light motor traffic. The road from Brewerville to Belle Yalla has been completed to a distance of 40 miles, and a road extending from Cape Palmas into the interior has been completed to a distance of 40 miles.

In the hinterland there are no roads. Native tracks or paths are used in traveling from one section to another.

In recent years the Government has manifested its determination to extend the road system of Liberia. The need for roads is strikingly apparent. The interior of the country, much of which is covered with forest and brush, is inaccessible except by narrow paths. The construction of suitable highways will mean that the large areas of oil palm which are now wasting may, through adequate transport facilities, come into profitable use. This is merely one of the economic benefits that Liberia may anticipate as a result of a progressive policy of road construction.

With a view to furthering highway construction, the legislature, on January 14, 1925, approved an act to provide a special fund to be known as the highway fund. This act provides for licenses to drive automotive vehicles, a tax of 4 cents to be levied and collected on each imperial gallon of lubricating oil imported into the Republic, and a tax of 2 cents on each gallon of gasoline, kerosene, or other explosive or inflammable oil. It is planned to disburse all funds collected under this act for the construction and maintenance of highways.

It is difficult to name a country which is in more urgent need of transportation facilities, especially roads, than Liberia. The Government is seeking to extend the road system gradually. The prosecution of an intelligent road program will undoubtedly react to the marked benefit of the country.

AUTOMOBILES IN LIBERIA

In spite of the inadequacy of roads in Liberia, there are 300 automobiles in the country. Of the total registrations, 92 per cent of the passenger cars and 99 per cent of the trucks are of American make.

AUTOMOBILE REGISTRATIONS IN LIBYIA, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926.....	32	-----	22	54	7
1927.....	39	-----	34	73	9
1928.....	130	-----	45	175	4
1929.....	1 225	(?)	(?)	225	-----
1930.....	1 300	(?)	(?)	300	-----

¹ Includes busses and trucks.

² No separate figures; included with passenger cars.

LIBYA

Italian Libya, situated on the north coast of Africa between Tunis on the west and Egypt on the east, includes the two Provinces of Tripolitania and Cyrenaica.

TRIPOLITANIA

The area of Tripolitania is estimated at about 347,491 square miles. According to the census of population of 1921 there were 550,000 natives—Arabs, Berbers, Arab-Berbers, and Jews. In addition, there is a European population of about 20,000, mostly Italians. Tripolitania has three zones from the coast inland—the Mediterranean, the subdesert, and the desert.

Sponge fishing and tobacco manufacture are the chief industries.

Inland communication depends largely upon the caravans which follow long-frequented routes. The total length of railways is about 138 miles. There are fortnightly steamship sailings from Tripoli to Naples. From Tripoli along the coast there are also weekly steamship sailings.

CYRENAICA

Cyrenaica is estimated to have an area of about 75,340 square miles (or with the hinterland zone of Cufra, 285,640 square miles). The population consists of about 225,000 natives and 9,714 Europeans (practically all Italians). Sponge fishing is the chief industry.

A railway line 67 miles long runs from Benghazi to El-Abiar and on to Barce, and one 35 miles long extends from Benghazi to Solach.

A steamer calls every week at Benghazi from Syracuse.

ROADS IN LIBYA

According to the latest census, Tripolitania has a total road mileage of 1,025, as follows: 720 miles of earth, sand-clay, or gravel, graded and drained, 232 miles of water-bound macadam, and 34 miles of other types.

Cyrenaica has 1,487 miles of roads of the following construction types: 409 miles of unimproved earth, 818 miles of earth, sand-clay, or gravel, graded and drained, and 250 miles of macadam.

Road building in Cyrenaica and Tripolitania is under the supervision of the Government of Italy.

Active efforts to extend the road system of Libya date from the beginning of 1928. In the preceding 16 years (since Italy acquired her colony in 1912) only 40,000 lire (\$2,105) had been expended for

the construction of roads. A marked step forward was taken in 1928 when about 9,500,000 lire, or \$499,985, was spent on road construction. In line with the progressive policy adopted in 1928, the budget of 1929 called for an expenditure of about 12,000,000 lire, or \$631,560.

Announcement was made recently of a decree authorizing the launching of an ambitious program for Libya involving the expenditure of a total of 70,000,000 lire, or \$3,684,100, within the fiscal years from July 1, 1929, to June 30, 1933. Of the total sum, Tripolitania is to receive 24,000,000 lire (\$1,263,120) and Cyrenaica 46,000,000 lire (\$2,420,980).

The expenditures of Tripolitania are to be divided equally over the four fiscal years, 1929 to 1933; that is, 6,000,000 lire (\$315,780) for each year. Cyrenaica will spend 16,000,000 lire (\$842,080) in 1929-30, and 10,000,000 lire (\$526,300) for each of the succeeding fiscal years.

AUTOMOBILE REGISTRATIONS

There has been an increased interest in roads and automobiles in Libya during recent years, and the progressive road program augurs well for the future of automotive transportation. The present registration of motor vehicles totals 5,342 (3,464 passenger cars, and 1,878 trucks). Five per cent of the passenger cars and 14 per cent of the trucks are of American make. A large part of the remainder are of Italian origin.

MADAGASCAR

The French colony of Madagascar, situated off the southeast coast of Africa, covers an area of 241,094 square miles and has a population of 3,621,342. The coast line of the island has a total length of more than 3,000 miles.

The climate is tropical and moist. Rains occur almost daily on the east coast, but the west coast is drier.

TRANSPORTATION FACILITIES

Tamatave is the principal seaport of the island, and the important ports are connected by coast steamers on regular schedules.

Three railways are in operation at present in Madagascar: (1) The line between Antananarivo and Tamatave (229 miles); (2) the railway between Antananarivo and Antsirabe; and (3) the branch line of the Tamatave railway, from Moramanga to the Antsihanaka Provinces, a distance of 103 miles. The total railway mileage is 430. There is also a motor-car service with a network of routes covering 612 miles.

HIGHWAYS

Road construction in Madagascar, while not attaining the high development of many countries, has been a subject of constant attention by the colonial government of Madagascar, which performs all road building and maintenance, even in the towns, and the progressive action of the government is being reflected in an increasingly improved system of roads.

With the exception of between 1 and 2 miles of bitumen-surfaced roads in the city of Tananarive, Madagascar has but two types of

highways, namely, macadamized and dirt. During 1928 there were constructed in the island and its dependencies, according to the director of public works, 25 miles of macadamized and 296 miles of nonmacadamized or dirt roads, bringing the total mileage of the Madagascar highway system as of January 1, 1929, to a total of 1,622 miles of macadamized main roads and 1,150 miles of non-macadamized regional roads. On the same date construction work was in progress on 283 miles of main roads and 380 miles of regional roads. Main and regional roads for which plans had been drawn up and approved but on which construction had not been started on the above date, totaled an additional 1,665 miles and 565 miles, respectively.

Approximately 90 per cent of the macadamized roads suitable for motoring are on the high central inland plateau and consist for the most part in main trunk highways radiating from Tananarive. The principal routes are the following: (1) Route du Sud (Southern Highway); 510 miles, from Tananarive to Besoa via Antsirabe, Ambositra, Fianarantsoa, and Ambalavao; (2) Route de l'Ouest (Western Highway), 231 miles, from Tananarive via Maevatanana to Mananika, the terminus of the Betsiboka River (hydroglider passenger service); (3) Route de l'Est (Eastern Highway), 164 miles, from Tananarive to Brickaville, via Moramanga; (4) route from Fianarantsoa to Mananjary, 106 miles; and (5) Tananarive to Mirinarivo, 40 miles.

Although somewhat rough in spots, especially after heavy rains of the summer season from September to March, all the above roads with their numerous small branches provide fairly good motoring, and are passable the year round. In the winter or dry season, from the latter part of March to the latter part of September, through trips may be made by automobile from Tananarive to the important southern towns of Tulear and Fort Dauphin, where dirt-surfaced highways connect with the Route du Sud at Ambalavao, and from Tananarive to the port of Majunga, which is connected by a dirt road with the Route de l'Ouest at Mananika.

Construction and maintenance of highways in Madagascar as well as disbursements thereon are entirely controlled by the general government of the colony. The financial operations of the colonial government of Madagascar are highly centralized under the budget system. The chiefs of the various Provinces and other subdivisions of the colonial administration, with the exception of the mayors of a few of the larger towns, have little or no influence in determining the amounts to be spent within their jurisdiction for the construction and maintenance of roads—or, in fact, for any other purposes. Except Tananarive (where a municipal vehicle tax is imposed, proceeds of which enter the municipal treasury and may be devoted by the mayor to the construction and maintenance of city streets or other municipal purposes) local cities and towns do not build and maintain their streets as in the United States, but depend entirely for this work upon the general government of the colony. Road building by private firms or individuals is extremely rare and is confined to a few private roads built to connect mines and other properties with the public highways. No statistics are available as to the mileage of such roads or the amount spent thereon.

The budget system.—Under the budget system in practice in Madagascar the department of public works of the colonial government, which is charged with the construction and maintenance of the public highways and streets in Madagascar other than those in Tananarive, is allotted annually under several sections of the budget, principally under the items "General budget," "Extraordinary expenditures," and "Major improvement," specified sums for the maintenance and construction of specifically designated streets or highways. The total budgetary allotments and expenditures by the above department in 1928 for maintenance amounted to \$263,080, of which approximately \$196,000 was devoted to the upkeep of macadamized roads, and \$78,400 to dirt roads. The sums allotted and expended for new construction in the same year totaled \$666,400, of which amount approximately \$548,800 was spent for the macadamization of existing roads and \$117,600 for construction of new dirt roads.

In the 1929 budget of the Madagascar Government the aggregate sum allotted to the department of public works for the maintenance and construction of highways in Madagascar totaled \$802,855. Allotments under "Ordinary budget" amount to \$308,850 for maintenance and \$195,804 for new construction; under "Extraordinary expenditures," to \$94,354 (not specified whether for maintenance or new construction); and under "Major improvements," to \$203,840 for the construction of the highway from Maevatanana to Majunga.

Derivation of funds.—The sums expended in Madagascar annually for the construction and maintenance of roads are derived from no particular tax or taxes but come out of the general revenues. These revenues comprise principally import and export duties, consumption taxes, poll and prestation taxes, patents or business licenses, mining taxes, and income taxes. There is no gasoline tax, nor, at present, any vehicle tax imposed in the colony other than the Tananarive municipal tax previously mentioned in this report. In 1930, however, a general and comparatively heavy road tax will in all probability be levied on all road vehicles.

Native free labor.—In addition to the sums expended by the central government through its department of public works an indeterminate amount is spent by the various provincial administrations for road construction and maintenance in the form of free labor from natives, each native being compelled under the prestation tax, so-called, to give 30 days of free labor yearly to the government or, if for any reason excused from this obligation, to pay an amount varying from \$1.18 to \$1.57 a year, depending upon the region in which he resides. Any moneys derived from this tax are paid into the treasury of the central government, but the free labor available under this system may be used (and often is) for strictly local purposes.

AUTOMOBILE REGISTRATIONS

The number of motor vehicles in use increased from a total of 785 in 1926 to 2,831 in 1930, a gain of 260 per cent. Most of these are of French origin, American makes being represented by 8 per cent of the passenger cars and 19 per cent of the trucks.

AUTOMOBILE REGISTRATIONS IN MADAGASCAR, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926.....	655	130	785	637
1927.....	859	19	182	1,060	667
1928.....	1,000	48	255	1,303	780
1929.....	1,584	88	394	2,066	1,216
1930.....	2,046	(?)	785	2,831	1,347

¹ Includes busses.

² Included with passenger cars.

MADEIRA

The island of Madeira, situated in the Atlantic Ocean off North-west Africa, is about 250 square miles in area and has a population of 200,000. The island is very mountainous and has a semitropical climate.

TRANSPORTATION

In addition to the sailings maintained with the United States, Great Britain, and other countries, local transportation is furnished by coastwise steamers, bullock sleds, and motor cars.

Because of the mountainous surface of the island, the building of roads is expensive and the lack of funds offers an obstacle to plans for highway improvement. The construction and maintenance of roads is carried on mainly by the Junta Geral, a governmental agency, although various municipalities also conduct such work.

There are at present about 500 miles of roads in Madeira, including unsurfaced and surfaced roads. There are no macadam, asphalt, concrete, brick, or granite-block roads in the island; the total mileage is divided between sand-clay roads (20 per cent of the total) and those paved with round stones or crushed stone. There are about 100 miles of paved roads suitable for motor traffic.

The Junta Geral of Funchal maintains about 373 miles of the total road mileage; the municipality of Funchal, approximately 93 miles; and the other municipalities about 31 miles.

The municipality of Funchal estimates its expenditures from July 1, 1929, to June 30, 1930, for the repair and maintenance of roads and streets of Funchal at approximately 1,000,000 paper escudos (\$45,450), and it is estimated that the Junta Geral spent more than 500,000 paper escudos (\$22,725) during the same period. The money was derived from the taxes, licenses, and customs duties.

The Junta Geral constructed about six miles of road during the above period. The municipality of Funchal constructed no roads. No figures as to the construction and maintenance of roads by types are available.

The hotel owners, shop keepers, chauffeurs, and others in Funchal who depend largely on the tourist trade are clamoring for road development in the island. Roads which would permit tourists to visit parts of the island where the scenery is magnificent, but which are now almost inaccessible, would stimulate tourist trade. The local press has continued to point to this deficiency in the matter

of roads, which if remedied would open up a demand for motor-bus service, and would also make for more active business in passenger automobiles in the island.

AUTOMOBILE REGISTRATIONS

Although Madeira is handicapped by lack of good roads, registrations of motor vehicles have increased almost 100 per cent since 1926. Of the total number registered 75 per cent of the passenger cars, 90 per cent of the busses, and 70 per cent of the trucks are of American manufacture. Madeira is a popular tourist center, and the improvement and extension of the road system would doubtless result in an expansion of the market for automobiles.

AUTOMOBILE REGISTRATIONS IN MADEIRA, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926.....	348	40	51	439	119
1927.....	210	120	85	415	100
1928.....	300	130	90	520	105
1929.....	370	130	75	575	58
1930.....	650	110	70	830	20

MAURITIUS

Mauritius, a British Crown Colony situated 500 miles east of Madagascar, has an area of about 720 square miles. The greatest length of the island is only 37 miles, and its width is about 29 miles. The population numbers approximately 405,000.

TRANSPORTATION FACILITIES

In contrast with some other African possessions, Mauritius is well provided with transportation facilities. The railway lines approximate 144 miles. Coastwise sailing vessels are also employed to advantage in carrying goods.

ROADS

The island has 700 miles of road which are open for traffic. The highway system of Mauritius has undergone marked improvements during the last eight years. The favorable condition of the sugar industry immediately following the Great War increased the prosperity of the island to a remarkable degree, and in 1920-21 the Government found itself with a surplus of over 15,000,000 rupees (\$3,933,000 at the rate of exchange then prevailing). The Government allotted a fair share of this amount to road-construction work and adopted a definite road program.

The total mileage of hard and semihard surfaced roads was increased to about 700 miles. The main roads were surfaced to a width of 20 to 25 feet, and many roads connecting various parts of the island were put into shape.

The hard-surfaced highways are built chiefly of bluestone, sand, and some sort of binding material such as asphalt or bitumin and

are laid according to modern construction methods to the extent of using steam rollers, but other labor-saving machinery is used sparingly. Hand labor is employed extensively, and it is a common sight to see Indian workmen transporting the bluestone considerable distances in little wicker or cane baskets. Construction work is, therefore, very slow, and road programs are often delayed in completion.

The construction and the maintenance of public roads are carried out by the public works department, and funds for road construction and maintenance are supplied by the Government, except in the towns, where the respective boards of corporations attend to road maintenance. An extra tax on gasoline has just been levied by the Government, with the alleged object of providing a fund for road maintenance. Generally speaking, all funds for road construction and maintenance have formerly been provided out of the general expenditure funds of the Government.

No development projects involving the extension of roads are under consideration at the moment. Since Mauritius is so small, 100 miles of hard-surfaced roads adequately provide the colony with highways. There does not appear to be much prospect for extensive development of the road system. Furthermore, economic conditions are adversely affecting Government revenue and expenditures, so that extension projects, even if any have been conceived, will have to be reduced to a minimum this season.

AUTOMOBILE REGISTRATIONS

Of the total number of motor vehicles in use in Mauritius 50 per cent of the passenger cars, 90 per cent of the busses, and 95 per cent of the trucks are of American origin.

AUTOMOBILE REGISTRATIONS IN MAURITIUS, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
26.....	1,881		274	2,156	119
27.....	2,283	35	298	2,626	135
28.....	2,422	40	303	2,855	144
29.....	2,850	50	435	3,385	159
30.....	1,975	120	268	2,363	136

MOROCCO

Morocco, situated in the northwestern part of Africa, covers an area of 218,000 square miles. Morocco is generally divided into three zones—French, Spanish, and international (Tangiers).

The French zone, which is by far the largest section of Morocco, covers an area of 200,000 square miles; the remainder is made up of the Spanish protectorate, 18,000 square miles, and the Tangier zone, 200 square miles.

Morocco has a population estimated at 5,309,000, according to the census of 1926, of which about 4,229,000 occupy the French zone. The population of the French zone is composed of some 4,017,000 native Moslems, 108,000 native Jews, and 105,000 foreigners. The

population of the Spanish zone is a little under 1,000,000 and that of the Tangier zone about 80,000.

Morocco has a long coast line backed by mountains, with a desert to the east. Hot summers and short rainy, winters characterize the climate. Temperatures on the coast range from 50° to 60° F. in winter and from 68° to 80° F. in summer. The interior has a wider range of temperature.

Arabic is the vernacular of the majority of the native population. French is used quite widely as the commercial language of French Morocco. In Spanish Morocco and in Tangier Spanish is the commercial language, although French and English are also used in the international zone.

FRENCH MOROCCO

Transportation.—There are about 1,200 miles of railways in Morocco. The lack of adequate railway facilities is thought to have been largely responsible for the greater use of motor transportation. Roads have been built to connect the important centers of population.

The highway system consists of 3,216 kilometers (1,998 miles) of main roads which serve as connecting links between the various ports, as well as between ports and the larger cities in the interior. The total length of the secondary roads is 1,887 kilometers (862 miles.) The second-class roads serve as feeder lines to the main roads. Goods pass over these roads from the productive areas to outlets in the cities.

The main and secondary roads are macadamized. The extent of those surfaced with asphalt or bituminous substances was, on January 1, 1929, 365 miles for the principal roads and 34 miles for secondary roads. In addition, it is estimated that there are about 311 miles of surfaced rural roads connecting the outlying settlements.

There are now main roads from Oudja on the Algerian frontier via Taza to Fez, and from Fez to Rabat, either via Petitjean and Kenitra or via Meknes, with a branch at this point to Azrou in the Middle Atlas, from Rabat to Casablanca; from Rabat and Kenitra to Souk-el-Arba and Arbaoua into the Spanish Zone, via El-Jsar, Larache and Arzila, and to Tangier; from Casablanca eastward to Oued Zem and Kasbah Tadla; from Casablanca south to Marrakech; and from Casablanca southwest to Mazagan, Safi, and Mogador. From each of the three latter places there are principal roads going to Marrakech and to Agadir. Principal roads are either projected or already under way between Marrakech and Agadir, via Taroudant; also between Marrakech and Taourirt via Zerectene and Telouet. The increase in road mileage and the good condition in which the roads are kept have had the inevitable result of greatly stimulating the use of motor vehicles.

Administration and finance.—The administration of roads outside the corporate limits of the municipalities comes under the jurisdiction of the protectorate Government. Expenditures for roads is provided by the Shereefian Government out of the national budget. The amounts spent by the French Government on Moroccan roads during 1928 was 82,250,000 francs (\$3,224,200). Of this sum 46,-

450,000 francs (\$1,820,840) was spent on construction and 35,800,000 francs (\$1,403,360) on maintenance.

It is estimated that there are about 12,000 automobiles in French Morocco, about one-third of which are in the Casablanca district. There has been a rapid expansion in the use of automobiles, and improved roads should result in a much wider use of this type of transportation.

TANGIER

In the international zone there are only two State highways—the arteries connecting Tangier with the Spanish zone to the southeast and southwest and leading to Tetuan and Larache, respectively. The road mileage in the international zone is given as 23 miles, plus 3 miles of adjacent road constructed especially for the use of pedestrians. These roads are all macadamized.

The problem for the road authorities is one of upkeep rather than of opening up new arteries of communication.

According to the State budget 3,450,000 francs (\$135,240) were expended for repair and maintenance of roads in 1928.

There are 50 kilometers (31 miles) of municipal roads in Tangier. The municipal budget showed an expenditure of 2,837,000 francs (\$111,210) for repair and maintenance during 1928.

Taxes are not specifically earmarked for road construction and maintenance, but are paid into the treasury of either the zone or municipality; as a result, vehicle and land taxes collected have no special relation to highway expenditures.

There are about 500 automobiles in use in Tangier.

SPANISH ZONE

The Spanish zone of Morocco has highways totaling 1,028 miles. These roads are open to traffic during the entire year, except a portion in the central region which is impassable during the rainy season.

The annual expenditure for road maintenance is 3,500,000 pesetas (\$513,800). To this should be added approximately 1,000,000 pesetas (\$146,800) derived from the extraordinary credit of 10,000,000 pesetas (\$1,468,000) for military barracks and permanent highways, granted by the Government on May 21, 1928.

Among the more important new roads are those connecting Tetuan and Melilla (about 267 miles) and Puente Busfija, Ceuta zone, to Alkassar Kebir. A sum of 31,000,000 pesetas (\$4,550,800) has been allocated for the former project from an 80-year, 5 per cent loan of 82,000,000 pesetas (\$12,037,600) made last year by Spain to the Sbercefan authorities for public works. An expenditure of 12,904,000 pesetas (\$1,894,307) has already been approved and contracts have been entered upon for the construction of the central section of 160 kilometers (99 miles) in four years, and for its upkeep for two years. A sum of 2,000,000 pesetas (\$293,600) has been voted for the highway between Busfija and Alkassar Kebir.

The funds for road construction are derived from loans and special appropriations provided for in the zonal budget. As stated, the budget for 1929 provided 3,500,000 pesetas (\$513,800) for road maintenance chargeable against the general revenues amounting to

59,185,000 pesetas (\$8,688,358), of which sum the zone is required to furnish 19,267,000 pesetas (\$2,828,396) and the Spanish Treasury 39,918,000 pesetas (\$5,859,962). No special imposts, such as land taxes or gasoline taxes, are appropriated for highway construction and repair.

The estimated revenues for the zone for 1929 are given as 59,185,000 pesetas (\$8,688,358), derived principally from customs taxes (10,597,000 pesetas), commercial and industrial licenses and mining royalties (2,300,000 pesetas), and indirect taxes on alcohol, beer, sugar, tea, etc. (2,170,000 pesetas).

There are approximately 1,000 cars registered in Spanish Morocco.

AUTOMOBILES IN MOROCCO

Automobiles have played a prominent part in the development of Morocco. The French section has made the greatest advance in automotive transportation, and registrations in French Morocco have shown a steady increase from year to year. American cars represent 35 per cent of the total number of passenger cars and 50 per cent of the trucks.

In the Spanish and international zones the outlook is favorable for an increase in the use of automobiles, in view of the expenditures for road improvements. About 45 per cent of the passenger cars and busses in use and over 50 per cent of the trucks are of American manufacture.

AUTOMOBILE REGISTRATIONS IN MOROCCO

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
French Morocco:					
1928.....	6,000	2,100	1,100	9,200	1,200
1927.....	7,883		2,758	10,641	1,010
1928.....	9,828	13,562	(?)	12,390	1,186
1929.....	12,968	14,841	(?)	17,806	1,309
1930.....	11,316		4,630	15,955	1,200
Spanish and international zones:					
1928.....	825	23	598	1,446	35
1929.....	1,439	(?)	967	2,396	105
1930.....	1,625	48	1,061	2,732	130

† Includes trucks.

‡ Included with busses.

§ Includes busses.

¶ Included with passenger cars.

NYASALAND

The British protectorate of Nyasaland lies along the southern and western shores of Lake Nyasa, and extends toward the Zambezi. It covers a land area of 37,890 square miles, divided into four Provinces. The population is about 1,325,000.

TRANSPORTATION

Rail transportation is provided by a railway from Murraca, on the southern bank of the Zambezi, to the port of Beira in Mozambique (Portuguese East Africa), a distance of 175 miles. This establishes rail connections between Blantyre and Beira.

There are 4,159 miles of roads, of which 20 miles are of macadam type and the remainder of earth, sand-clay, and gravel.

Following the World War the use of heavy trucks was impossible except on the road between Blantyre and Zomba. In other sections traffic was restricted to light cars. Transportation was supplied to some extent by bullock carts. However, human portage was still the usual means of transport.

It is only during the past eight years that any progress has been made in building up a road system. This has been prompted by the increased use of motor transportation and the consequent expansion of trade.

The lack of proper surfacing has been a cause of trouble. Considerable damage is done to the roads by the larger vehicles, and unless the country is prepared to meet the cost of adequate surfacing, the roads will continue to suffer disintegration from high-speed traffic. Much remains to be accomplished, but there is a growing appreciation of the value of roads, and it is hoped that in time an improved system of highways will be developed.

AUTOMOBILES IN NYASALAND

The growth of automobile transportation in this section of Africa while not spectacular has been steady. American products in this field outrank those of all other countries, representing 80 per cent of all passenger cars, 90 per cent of the busses, and 90 per cent of the trucks in use.

AUTOMOBILE REGISTRATIONS IN NYASALAND, 1926-1930

Year	Passenger cars	Busses	Trucks	Total	Motor cycles
1926	358	-----	88	446	810
1927	390	15	115	520	938
1928	430	(¹)	135	665	1,000
1929	598	28	1,499	1,047	1,136
1930	670	-----	480	1,175	600

¹ Included with trucks.

² Includes busses.

RHODESIA

NORTHERN RHODESIA

Northern Rhodesia, with an area of 287,950 square miles, is situated between Tanganyika and the Belgian Congo on the north, and Southern Rhodesia and Bechuanaland on the south. It is sparsely settled, having a population estimated at only 1,269,700 in 1928.

The country consists of high plateau covered with thin forest. The land is suitable for farming and grazing.

TRANSPORTATION

Northern Rhodesia, from Livingstone to the Congo border, is traversed by the Rhodesian railway system, which furnishes the chief means of transportation. The rivers are not navigable throughout their entire courses.

Many difficulties are encountered in the construction and maintenance of roads in Rhodesia, as in other parts of South Africa. Transport costs are high and much damage is done to the roads

Almost all the cars in use in Rhodesia are of American origin, the percentages being as follows:

Northern Rhodesia:	Per cent	Southern Rhodesia:	Per cent
Passenger cars.....	90	Passenger cars.....	92
Busses.....	100	Busses.....	80
Trucks.....	98	Trucks.....	90

TUNISIA

Tunisia, a French protectorate with an area of 48,300 miles, is bounded on the north and east by the Mediterranean Sea, on the west by the Algerian Province of Constantine, and on the south by the Sahara Desert and Libya. The country lies in the same latitude as North Carolina and has a temperate climate in the north and a subtropical climate in the south near the Sahara.

Of Tunisia's 32,000,000-acre area, 32 per cent consists of mountains and 23 per cent of desert, salt lakes, and waterways. Of a tillable area of 7,025,000 acres, one-third is under cultivation.

According to the population census of 1926, the country has 2,159,708 inhabitants, divided as follows: Native population 1,986,427, composed of 1,932,184 Arabs and Bedouins, and 54,243 Jews; European inhabitants, numbering 173,281 and consisting of 71,020 French, 89,216 Italians, 8,396 Maltese, 517 Spaniards, 646 Greeks, and 3,486 other nationalities. Arabic is the national and French the commercial language.

The principal cities and ports are Tunis (the chief city, also the chief port), Bizerta, Sfax, and Sousse.

The leading occupations are agriculture, mining, and stock raising.

TRANSPORTATION

Tunisia has 1,265 miles of railway. The total road mileage (7,081 miles) is divided by construction types as follows: 3,728, unimproved earth; 3,163, waterbound macadam; and 190, other types. The main highways are those leading directly into Tunis; the secondary highways are those which serve as connecting links between the main highways and vicinal and colonization or local roads. The average width of the ordinary macadam roads is 4 meters.

Road building is carried on under the supervision of the Tunisian Public Works Department. The road budget for 1929 called for the expenditure of 64,417,500 francs, or \$2,525,166, compared with an expenditure of 48,245,700 francs, or \$1,891,231, for 1928, a 33 per cent increase. A comparison between the 1929 and 1928 road budget follows. Details of expenditures on the construction and maintenance of each type of road can not be given.

TUNISIAN ROAD BUDGET, 1929 AND 1928

Item	1929	1928
	Francs	Francs
Personnel.....	2,750,000	1,858,200
Subsidy from general budget.....	27,767,500	26,767,500
Interest charges and loans.....	500,000	400,000
Special credits.....	3,600,000	1,500,000
Circulation, tire, and gasoline taxes.....	1,600,000	3,700,000
Bond issue for road building.....	7,250,000	4,010,000
	21,000,000	10,000,000
Total.....	64,417,500	48,245,700

While there are a number of very good roads leading to the capital, Tunisia as a whole is in need of an improved and more extensive highway system.

During the postwar period appropriations were not sufficient to provide funds for the needed construction and repair of roads. This lack may be attributed to difficulties which have faced Tunisia since the war. The Government has, however, appointed an economic commission to study ways and means of financing a development project calling for an expenditure of 160,000,000 francs, an undertaking which augurs well for the future of Tunisia.

AUTOMOBILE REGISTRATIONS

Although up until 1929 the number of automobiles shows but a moderate increase from year to year, in 1930 registrations jumped to 13,741 from 7,985 in 1929. The ambitious road program which the Government hopes to carry out should be reflected in an even larger use of motor vehicles.

AUTOMOBILE REGISTRATIONS IN TUNISIA, 1926-1930

Year	Passenger cars	Buses	Trucks	Total	Motor cycles
26.....	3,300	122	380	3,802	430
27.....	4,200	85	360	4,645	585
28.....	4,800	100	450	5,350	700
29.....	7,175	105	705	7,985	880
30.....	12,141	100	1,500	13,741	1,200

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