

# MEMOIRS

BY THE SAME AUTHOR.

THE PREVENTION OF MALARIA  
With Contributions by 20 of the  
Leading Experts

A SUMMARY OF FACTS REGARD-  
ING MALARIA. Suitable for  
Public Instruction.

PHILOSOPHIES.

THE SETTING SUN. A Satire in  
Verse

PSYCHOLOGIES.

FABLES.

THE REVELS OF ORSERA. A  
Medieval Romance

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PLATE I.



GENERAL SIR CAMPBELL CLAYE GRANT ROSS, K.C.B.,  
BENGAL STAFF CORPS.

[*Frontispiece*

# MEMOIRS

WITH A FULL ACCOUNT OF  
THE GREAT MALARIA PROBLEM  
AND ITS SOLUTION

BY RONALD ROSS

LONDON  
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1923

**Inscribed**  
**To the People of Sweden**  
**and to the memory of**  
**Alfred Nobel**

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## PREFACE

THE solution of the malaria problem has been called the most dramatic episode in the history of medicine, and the facts when disclosed were certainly among the most wonderful in natural history; but the story has often been very inaccurately reported. Twenty years have elapsed since I first proposed to publish it in detail for medical readers—that is, with the correspondence and other matter now contained in Part II and in portions of Part III of this volume; but my numerous malaria-expeditions, and then the compilation of my textbook on the Prevention of Malaria, and lastly the war, interfered with the project.

The book is now complete; but I have decided to address it not only to medical men but to the general reader, in the form of my memoirs. There are several good reasons for this. In the first place it is hoped that the work will be of some practical use as regards the reduction of one of the most widespread of diseases. Now this is a matter which is always ultimately in the hands of laymen—it is they, not the doctors, who rule the world. Hitherto the matter has been left almost entirely to the medical profession, which, however, has failed to carry my scheme of 1899 to its logical conclusion, largely because it is allowed little influence in the world's counsels. Nothing, I am convinced, will really be done in this direction until those who govern us take the trouble to understand the subject. The only way to persuade them is to put the whole matter completely before them from my own point of view. In other words, the book is an appeal to Cæsar; and I hope that he will deign to consider it.

But it has another object. A witty friend of mine once remarked that the world thinks of the man of science as one who pulls out his watch and exclaims, "Ha! half an hour to spare before dinner: I will just step down to my laboratory

▼

and make a discovery." Who but men of science themselves are to blame for such a misconception? Out of the many memoirs which fill our libraries few recount the labours of investigators, even of those who seek to solve the secrets of the great maladies which annually destroy millions of us—surely a matter of interest to everyone. Our books of science are records of results rather than of that sacred passion for discovery which leads to them. Yet many discoveries have really been the climax of an intense drama, full of hopes and despairs, visions seen in darkness, many failures, and a final triumph: in which the protagonists are man and nature, and the issue a decision for all the ages. I trust, then, that this book at least will give a frank and accurate picture of one investigation, of the difficulties which attended it, and of the manner in which the world received and used, or did not use, the result.

In writing it I have seldom trusted to memory alone, but have verified most of the details from the mass of documents—generally scribbled in the heat of action—which I possess. The book contains some criticisms which are required in the interests of human life or of science—it might usefully have contained more; but I have usually left the facts themselves to do the talking. Even for most of the misdoings mentioned here I must beg for the charity of humour because they were really due less to individuals than to that large and cheerful national indifference to all intellectual effort which our fathers called Philistinism. When this spirit applies merely to learning, art, and the more sidereal sciences it may perhaps be only lightly satirised; but what is to be said for it when it applies to matters of the life and health of whole nations? Allied to it is that administrative barbarism which allows, for instance, a regiment to become infected with malaria because the officials cannot agree as to who shall hang the bed-nets (page 501); or which permits death-dealing street-puddles to remain in the midst of crowded and suffering cities for years after the danger of them has been fully demonstrated to all (page 489).

There is nothing, I hope, in these pages which the lay reader cannot easily understand; if there be, let him pass it over and proceed! We have, I fear, too much of the "first person singular" (besides many other faults), but I cannot trouble to correct this now; and, lastly, some events which might have found place in the final chapter have been resigned to the eloquence of silence. In fact, the detailed history ends at 1902.

## PREFACE

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I pray that the book will prove to be something more than a medical tale. Perhaps the kindly reader will perceive that when my malaria-work was commenced thirty years ago as a self-imposed duty I had many ambitions closer to myself than it was. Indeed it was these ambitions which led to the malaria-work as an episode, not always agreeable, in my life. They had given me, together with other pleasures, the philosophy of Epicurus, Lucretius, Comte, and Spencer; and I make my boast—among many other bravadoes—that I am one of the few among these masters' disciples who have attempted to bring their teaching to fruition! To render this clear, I add the first Part of the volume—abstracted from a family record written during the war.

For the rest, the world is worth living in: my complaints are mostly for others, not myself; for science; and for human life: and I have few misfortunes to boast about. If happiness had no history this book would not have been indited; and I now have the pleasure of ending it exactly a quarter of a century after that memorable day which occasioned it.

RONALD ROSS.

41 BUCKINGHAM PALACE MANSIONS,  
LONDON, S.W. 1.  
20 August, 1922.



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## APPENDIX

### I. HONOURS AND AWARDS

Parkes' Memorial Gold Medal, Netley, 20 March 1895. Fellow, R. Coll. of Surgeons, England, 11 April 1901. Fellow, R. Society, London, 7 June 1901. Silver Medal, Society of Arts, London, 15 June 1901. Companion of the Bath, 26 June 1902. Cameron Prize, Edinburgh University, 26 July 1902. Nobel Prize in Medicine, 10 Dec. 1902. Barclay Bronze Medal, Asiatic Soc. Bengal, 20 May 1903. Sc.D. Trinity Coll. Dublin, 20 Dec. 1904. Officier de l'Ordre de Leopold II, Belgium, 31 Aug. 1906. LL.D. Aberdeen, 26 Sep. 1906. D.Sc. Leeds, 19 July 1909. Roy. Gold Medal, R. Society, 13 Nov. 1909. M.D. Karolinska Instit. Stockholm, 13 Dec. 1910. Knight Commander of the Bath, 19 June 1911. Vice-President Royal Soc. 1911-13. M.D. Athens, 12 April 1912. Officier de l'Instruction Publique, France, 1 Nov. 1913. Bisset Hawkins Gold Medal, R. Coll. of Physicians, London, 19 Oct. 1914. Freeman, Soc. of Apothecaries, London, 9 March 1915. Knight Commander, St. Michael and St. George, 8 June 1918. Athenæum Club (Rule II), 11 April 1922.

### II. HONORARY MEMBERSHIP OF SOCIETIES

Med. Soc. Nederland Ind., Batavia, 20 March 1901. Soc. de Méd. de Gand, 14 Jan. 1902. Soc. Medicorum Svecana, Jan. 1903. R. Physiographie Soc. Lund, 11 Feb. 1903. Manila Med. Soc. 1 March 1903. American Soc. Tropical Medicine, 19 June 1903. Soc. Méd. et Hyg. tropicales, Paris, 11 Dec. 1903. Lancashire and Cheshire Entomolog. Soc. 18 Jan. 1904. Acad. de Méd. Paris (Corr. étranger), 19 July 1904. Malaria Soc. of Greece, 12 July 1906. R. Accad. di Méd., Torino (Corr. estero), 9 Nov. 1907. Soc. de Pathologie exotique, Paris, 22 Jan. 1908. Coll. of Physicians, Philadelphia, 5 Feb. 1908. Soc. de Med. Trop. Cuba, 25 April 1908. Hon. President, Med. Soc. Mauritius, 4 Dec. 1908. President, Soc. Trop. Med. London, 18 June 1909 to 1911. Russian Malaria Commission, 2 Feb. 1912. Imp. Military Acad., St. Petersburg, 2 Feb. 1912. Harveian Soc. of London, Oct. 1913. Inst. of Hygiene, London, 1 Dec. 1913. Soc. of Sciences, Upsala, 5 April 1919. Soc. Belge de Biologie, 6 Dec. 1919. École de Méd. trop. Bruxelles, 30 Dec. 1920. R. Soc. of Edinburgh, 4 July 1921. Acad. de Méd. Paris (Associé), 27 Dec. 1921. R. Accad. Med., Torino (Socio), 17 Feb. 1922. R. Soc. of Literature, London, 15 May 1922.

## REFERENCES

### I. MALARIA AND MOSQUITOES

1. M. T. Varro (116-28 B.C.). *Reŕum Rusticarum*, Lib. I. Says that in marshes there are animals which are too small to be seen but which enter the mouth and nostrils and cause troublesome diseases.
2. R. T. A. Palladius (4th century A.D.). *De Re Rustica*, Lib. I. Connects marshes with pestilence and inimical animals.
3. J. M. Lancisi. *De Noxiis Paludum Effluviis, Eorumque Remediis*, Roma 1717. Repeats the same conjectures, studies mosquitoes, and advocates drainage against malaria.
4. H. Meckel. *Alg. Zeitsch. f. Psychiatrie*, 1847. Discovers the malarial pigment.
5. D. L. Beauperthuy. *Gaceta Oficial de Cumaná, Venezuela*, 23 May 1854. Conjectured that malaria might be produced by the poison of mosquitoes injected under the skin when they bite us.
6. A. Laveran. *Bull. Acad. de Médecine, Paris*, 23 Nov. 1880. Discovers the parasites of malaria.
7. P. Manson. *Linnean Society* 1878 and *Pathological Society* 1881. Describes partially the development of *Filaria bancrofti* in certain mosquitoes.
8. C. Finlay. *Anales de la Real Academia de Ciencias*, 14 Aug. 1881. Conjectures that mosquitoes carry yellow fever by their bites from the sick to the healthy.
9. A. F. A. King. *Insects and Disease—Mosquitoes and Malaria*. *Popular Science Monthly*, New York, Sept. 1883. Conjectures that mosquitoes carry malaria from marshes to men and gives nineteen reasons for this supposition.
10. A. Laveran. *Traité des Fièvres Palustres*. Doin, Paris, 1884. Conjectures (page 457) that mosquitoes may play the same rôle in malaria as in filariasis.
11. R. Ross. *Fever with Intestinal Lesions: South Indian Branch*, *Br. Med. Assoc.*, 1892. Cases of Febricula with Abdominal Tenderness; Enteroseptic Fevers; a Study of Indian Fevers; all in *Indian Medical Gazette*, 1892. Conjectures that malarial fevers, or at least many fevers, may be due to intestinal sepsis.
12. T. Smith and F. L. Kilborne. *The Nature, Causation and Prevention, of Texas or Southern Cattle Fever*. *Bur. of Animal Industry, Dep. of Agric. Bull. I.*, Washington, 1893.

- Prove that the disease is caused by *Piroplasma bigeminum*, which is carried by ticks; but the parasites were not found in the ticks.
13. R. Ross. Some Observations on Hæmatozoic Theories of Malaria: The Medical Reporter (afterwards Indian Lancet), 1893. Nodulated and Vacuolated Corpuscles, and The Solution of Corpuscles mistaken for Parasites: Indian Medical Record, 1893. The Third Element of the Blood and the Malaria Parasite, and A List of Natural Appearances in the Blood which have been mistaken for Forms of the Malaria Parasite: Ind. Med. Gaz., 1894. Shows that various objects described by writers in India as *Plasmodia* are only artifacts, and criticises the accepted epidemiology of malaria.
  14. P. Manson. On the Nature and Significance of the Crescentic and Flagellated Bodies in Malarial Blood: Br. Med. Journ., 8 Dec. 1894. Conjectures that these forms of the *Plasmodium* are intended to infect mosquitoes or "a similar suctorial insect," and that the "free flagella" are flagellated spores.
  15. N. Sakharoff. Centr. f. Bakter., 1894-5. Describes the chromatin in the *Plasmodia*, including the alleged "flagella."
  16. R. Ross. Parkes' Memorial Prize Essay on Malaria: Army Medical School, Netley, March 1895 (unpublished). Analyses the accepted epidemiology of malaria.
  17. R. Ross. Observations on the Crescent-Sphere-Flagella Metamorphosis of the Malaria Parasite within the Mosquito: S. Ind. Branch, Br. Med. Assoc., 17 Dec. 1895, and Indian Lancet, 1896.
  18. D. Bruce. Reports on Tsetse Fly Disease or Nagana in Zululand: Ubombo, Dec. 1895 and May 1896. Proves that the disease is caused by a Trypanosome which is carried mechanically by the tsetse fly *Glossina palpalis*.
  19. R. Ross. Malaria Parasites in Secunderabad: Br. Med. Journ., 1 Feb. 1896. Dr. Manson's Mosquito-Malaria Theory: Ind. Med. Gaz., July 1896. Miscellaneous notes and discussions.
  20. P. Manson. The Life-history of the Malaria Germ outside the Human Body: Goulstonian Lectures, Br. Med. Journ., 15, 21, 28 March 1898. Elaborates his mosquito theory, conjectures that *Plasmodia* are parasites of mosquitoes independent of men, infecting men through water or dust, and quotes Ross's recent work at length in support of his views.
  21. A. Bignami. Policlinico, Rome, 15 July 1896 and translation, Lancet, II., pp. 1363, 1441; 1896. Rejects Manson's theory because (he says) the flagellate bodies are dying forms, but conjectures that mosquitoes bring malaria from marshes to men (as King suggested in 9).
  22. R. Ross. Surg. Lt. Col. Lawrie and the Parasite of Malaria: Ind. Lancet, 1 Oct. 1896. Polemic against a sceptic.

23. R. Ross. Some Experiments in the Production of Malarial Fever by Means of the Mosquito: S. Ind. Branch, Br. Med. Assoc., Dec. 1896 (read 30 Oct.); and Ind. Med. Gaz., 1897. Failure to infect men by drinking water and by mosquito bites.
24. E. Ficalbi. *Revisione Systematica d. Fam. delle Culicidæ Europea*, Florence, 1896.
25. R. Ross. On a Condition necessary to the Transformation of the Malaria Crescent: Br. Med. Journ., 30 Jan. 1897. Further Observations on the Transformation of Crescents: S. Ind. Branch, Br. Med. Assoc., July 1897; and Ind. Med. Gaz. Jan. 1898. Disproves Bignami's contention in 21.
26. R. Ross. Notes on some Cases of Malaria, Amœba coli and Cercomonas: Ind. Med. Gaz., May 1897.
27. P. D. Simond. Ann. Institut Pasteur, July 1897. Shows that the "flagellate forms" of *Coccidium oviforme* are really sperms.
28. W. G. MacCallum. Lancet, 13 Nov. 1897; and Journ. of Experimental Medicine, 1898, III, No. I. Proves the same thing in the *Plasmodia*.
29. R. Ross. On some Peculiar Pigmented Cells found in Two Mosquitoes Fed on Malarial Blood, with Notes by J. Smyth, P. Manson, Bland Sutton, and Dr. Thin, and a drawing by P. Manson: Br. Med. Journ., 18 Dec. 1897. Discovers *Plasmodium falciparum* in two *Anopheles* (unmistakably described—probably *A. Stephensi*), after many failures with species of *Stegomyia* and *Culex*.
30. R. Ross. Pigmented Cells in Mosquitoes: Br. Med. Journ., 26 Feb. 1898. The same cells found in two more mosquitoes, and answers to objections.
31. R. Ross. Report on a Preliminary Investigation into Malaria in the Sigur Ghat, Ootacamund: S. Ind. Branch, Br. Med. Assoc., Feb. 1898; and Ind. Med. Gaz., April 1898. Researches done in 1897, before those of 29 and 30.
32. R. Ross. Report on the Cultivation of Proteosoma, Labbé, in Grey Mosquitoes: Government Printing, Calcutta, dated 21 May 1898, circulated privately, but not allowed to be issued till Oct. 1898; second edition (many printers' errors), 1901. Describes cultivation of a *Plasmodium* of birds in *Culex fatigans* up to the maturity of the zygotes, with complete differential proofs, technique, and nine plates. Reprinted in Ind. Med. Gaz., Nov. and Dec. 1898.
33. P. Manson. Surgeon-Major Ronald Ross's Recent Investigation on the Mosquito Malaria Theory: Br. Med. Journ., 18 June 1898. Gives the same information derived from 32 and from Ross's letters (one serious error regarding Halteridium), with three figures and notes accepting the discovery by Laveran, Metchnikoff, and Nuttall.
34. P. Manson. The Mosquito and the Malaria Parasite: read at

- the annual meeting of the Br. Med. Assoc. at Edinburgh on the 28th July 1898; *Lancet* (with one figure), 20th Aug.; *Journ. Trop. Med.* (one figure), Aug.; *Br. Med. Journ.* (one full-page and two other figures) complete, 24 Sept. 1898. Describes the full life-cycle of *Proteosoma* (and therefore presumably of all the *Plasmodia*) in mosquitoes, with the collection of the protozoans in the salivary glands and the experimental infection of healthy birds, communicated by R. Ross in letters and telegram.
35. B. Grassi. Rapporto tra la Malaria e Peculiare Insetti (Zanzaroni e Zanzare Palustri)—Nota preliminare: Policlinico, 1 Oct. 1898, dated 29 Sept.; also, with the omission of certain passages and undated, in *Atti della R. Accad. dei Lincei*, "pervenute prima del 2 Ott. 1898." Gives vague epidemiological reasons for suspecting three kinds of Italian mosquitoes.
  36. B. Grassi. La Malaria propagata per mezzo de Peculiare Insetti: *Atti d. R. Accad. d. Lincei*, seduta del 6 Nov. 1898. The same as above with further vague epidemiological reasons.
  37. R. Ross. Preliminary Report on the Infection of Birds with *Proteosoma* by the Bites of Mosquitoes: Government Press, Calcutta, dated 11 Oct. 1898; also *Ind. Med. Gaz.*, Jan. 1899; and *Br. Med. Journ.*, with additions, 18 Feb. 1899. Delayed information already partly given by Manson in 34 from Ross's work done in July and August 1898.
  38. A. Bignami. Come si prendone le Febre Malariche; *Ricerche Sperimentali*: *Bull. R. Accad. Med. d. Roma*, dated 15 Nov.; *trans. Lancet*, 3 and 10 Dec. 1898. Records the alleged infection of the man Sola by the bites of mosquitoes on 1 Nov., and further experiments.
  39. B. Grassi, and B. Grassi and G. Bastianelli. Two papers in *Atti d. R. Accad. d. Lincei*, seduta del 4 Dec. 1898. Hypothetical matter of little value, as in 35 and 36.
  40. G. Bastianelli, A. Bignami, and B. Grassi. Coltivazione d. Semilune Malariche dell' Uomo nell' *Anopheles claviger* Fabr.: *Atti d. R. Accad. d. Lincei*, seduta del 4 Dec. 1898. Find zygotes in two *A. claviger* apparently fed on cases of malaria, but give no details and no proofs. The authors think that Ross's mosquitoes of 29 were of this species, but render false accounts of his experiments.
  41. G. Bastianelli, A. Bignami, and B. Grassi. Ulteriori Ricerche sul Ciclo Parassiti Malarici Umani nel Corpo del Zanzarone: *Atti d. R. Accad. d. Lincei*, seduta del 8 Jan. 1899. Find Ross's cycle in other *A. claviger*, but give no details and no proofs and small acknowledgments. Subsequent papers by the same authors at sitting of 5 Feb. and 7 May 1899 or elsewhere, jointly or severally, incriminate two other species



- of Italian *Anopheles*, both for *P. falciparum* and *P. vivax*, and describe and figure the cytology of the cycle.
42. R. Ross. Du Rôle des Moustiques dans le Paludisme : Acad. de Médecine, Paris, 24 Jan., and Ann. de l'Inst. Pasteur, 1899, p. 136. Summarises his work.
  43. A. Laveran. Sur un Travail de M. le Dr. Ronald Ross, etc. : bull. de l'Acad. de Méd., séance du 31 Jan. 1899. Adjudicates on the history of the subject.
  44. R. Ross. Report on Kala-Azar : dated 30 Jan. 1899, Govt. Press, Calcutta. Many notes on malaria.
  45. R. Ross. Letter to Govt. of India on malaria prevention by means of mosquito reduction, dated 16 Feb. 1899 : Ind. Med. Gaz. (with Editor's title), July 1899. Outlines mosquito-reduction as a public-health measure for appropriate localities.
  46. R. Ross. The Possibility of Extirpating Malaria from Certain Localities by a New Method : Inaugural Lecture at University College, Liverpool, Br. Med. Journ., 1 July 1899. No. 45 in greater detail.
  47. R. Ross. Life-History of the Parasites of Malaria : Nature, 3 Aug. 1899. Notes and terminology.
  48. Correspondent (R. Ross). The Malaria Expedition to Sierra Leone : Br. Med. Journ., 9, 16, 30 Sept. and 14 Oct. 1899. Describes finding of all three species of human *Plasmodium* in *Anopheles costalis* and *A. funestus*, habits of the insects and public-health methods of reduction.
  49. Anonymous (R. Ross). Instructions for the Prevention of Malarial Fever : Univ. Press, Liverpool, 1899. Popular exposition of 14 pages for residents in malarious places. Sixth edition in 1901.
  50. R. Koch. Ueber die Entwicklung der Malaria Parasiten : Zeitschr. f. Hygiene und Infect., Bd. XXXII, 1899. Confirms Ross's work and adjudicates on the history.
  51. G. H. F. Nuttall. On the Rôle of Insects . . . as Carriers . . . of Diseases of Men and Animals : Johns Hopkins Hosp. Reports, VIII, and Hyg. Rundschau, 1899. Also eight papers on the Mosquito-Malaria Theory : Centr. f. Bakt., 1899. History of the subject.
  52. R. Ross, H. E. Annett, and E. E. Austen. Report of the Malaria Expedition of the Liverpool School of Tropical Medicine (to Sierra Leone) : Univ. Press of Liverpool, Feb. 1900. The same subject as in 48, in greater detail and with previously unpublished observations of Ross ; 60 pages, 5 plates, 4 maps, 2 supplementary reports, and photographs.
  53. R. Ross. Malaria and Mosquitoes lecture to Royal Institution, 2 March ; Nature, 29 March ; and translation Revue Scientifique, 23 juin 1900. History of the subject.
  54. G. M. Giles. Handbook of Gnats or Mosquitoes : J. Bale, Sons and Danielsson, London, Feb. 1900 ; 2nd ed. Feb. 1902.

55. R. Ross. *Malarial Fever: The Medical Annual*, J. Wright & Co., Bristol, 1900. Chiefly on malaria and mosquitoes.
56. R. Ross and R. Fielding-Ould. *Diagrams Illustrating the Life-history of the Parasites of Malaria: Quart. Journ. of Microscop. Science*, No. 171, July 1900, with three full-page plates, and a Note by E. Ray Lankester. Coloured drawings without cytological staining.
57. B. Grassi. *Studi di Uno Zoologo sulla Malaria: R. Accad. d. Lincei*, 4 June 1900. Quarto volume of 192 pages, large type, and four double-page plates. Summarises previous mosquito-malaria work and attributes the discovery to himself "indipendentemente da Ross" and of his own colleagues.
58. Lord Lister. *Recent Researches with regard to the Parasitology of Malaria: Presidential Address to the Royal Society*, 30 Nov.; and *Br. Med. Journ.*, 8 Dec. 1900. Adjudicates on the history.
59. R. Ross. *Le Scoperte del Prof. Grassi sulla Malaria; two papers Policlinico*, 1 Nov. 1900, and 1 1901, with reply by B. Grassi.
60. S. Calandruccio. *Le Scoperte del Prof. G. B. Grassi sulla Malaria, con note ed aggiunte: Tip. Barbagallo, Catania*, 1900. Copies and confirms Ross's first letter in 59.
61. R. Ross. *Letters from Rome on the New Discoveries in Malaria: privately printed in Liverpool and circulated 30 April 1901. A Second Postscript issued in Feb. 1901. Gives letters of Dr. T. Edmonston Charles to R. Ross written at end of 1897 on the progress of the Italian investigations on malaria, with commentary and notes.*
62. G. H. F. Nuttall. *On the Question of Priority with regard to Certain Discoveries upon the Ætiology of Malarial Diseases: Quart. Journ. of Microscop. Science*, No. 175, May 1901. Critical analysis of the question.
63. F. V. Theobald. *A Monograph of the Culicidæ or Mosquitoes, six vols.: British Museum, 1901 et seq.*
64. R. Ross. *First Progress Report of the Campaign against Mosquitoes in Sierra Leone: Univ. Press, Liverpool, 15 Oct. 1901.*
65. R. Ross. *The Work of the Liverpool School of Tropical Medicine in West Africa: African Section, Chamber of Commerce, Liverpool, 21 Oct. 1901—a pamphlet.*
66. R. Ross. *Malarial Fever, its Cause, Prevention, and Treatment: Univ. Press, Liverpool, February 1902, 68 pages. Enlarged edition of 49. Translated into German (Wilhelm Süsserott, Berlin, 1904) and into modern Greek (Ethnikoy Typographeioy, Athens, 1906).*
67. R. Ross. *Article on Malarial Disease, Quain's Dictionary of Medicine: London, 1902, 21 columns with two plates from 56.*

68. R. Ross. Mosquito Brigades and how to Organise Them: G. Philip and Son, London, 1902, 96 pages. Practical advice for malaria prevention. Preface dated 13 Oct. 1902.
69. R. Ross. Evidence regarding the Discovery of Serum Diagnosis: *Lancet*, 1 Feb. 1902. Defence of Dr. A. S. Grunbaum's priority.
70. R. Ross. *Deutsch. Med. Woch.*, 27 March 1902, S. 231. Grassi controversy.
71. R. Ross. Report on Malaria at Ismailia and Suez: *Memoir, Liverpool Sch. of Trop. Med.*, Jan. 1903.
72. R. Ross. Papers on the thick-film process for malaria diagnosis: *Lancet*, 10 Jan.; *Journ. Trop. Med.*, 2 Feb.; and Thompson Yates Labor. Reports, Vol. V, Part I, 1903.
73. R. W. Boyce, C. S. Sherrington, and R. Ross. The History of the Discovery of Trypanosomes in Man: *Lancet*, 21 Feb. 1903.
74. R. Ross. On the newly-discovered Leishman-Donovan parasites: *Br. Med. Journ.*, 14, 21, and 28 Nov., and Thompson Yates Labor. Reports, Vol. V, Part II, 1903.
75. R. Ross. Malaria in India and the Colonies: *Journ. R. Colonial Institute*, Dec. 1903.
76. R. Ross. An instrument for obtaining continuous clinical temperature charts: *Lancet*, 27 Feb. 1904.
77. R. Ross. The Antimalaria Experiment at Mian Mir: *Br. Med. Journ.*, 17 Sept. 1904.
78. R. Ross. Researches on Malaria; being the Nobel Medical Prize Lecture delivered at Stockholm, 12 Dec. 1902: P. A. Norstedt, Stockholm, and *Journ. R. Army Med. Corps*, April, May, June, 1905. History of researches up to 1902, with bibliography and plates of 32. Translation into German by Dr. C. Schilling (G. Fischer in Jena, 1905), and Italian by F. Maiocco (Lib. Editrice Universitaria, Torino, 1905).
79. R. Ross. The Progress of Tropical Medicine; a lecture delivered before Princess Christian at St. George's Hall, Liverpool, on 12 Jan. 1905: *Journ. African Society*, 1905.
80. R. Ross. The Logical Basis of the Sanitary Policy of Mosquito Reduction: an address at the St. Louis Congress, Sept. 1904, and in *Br. Med. Journ.*, 13 May 1905. A mathematical study of the diffusion of mosquitoes and other living things; continued by C. Pearson and Blakeman, *Drapers' Company Research Memoirs, Dulau and Co.*, London, 1906.
81. Suez Canal Company. Suppression du Paludisme à Ismailia: *Société Anonyme*, 13 Quai Voltaire, Paris, 1906.
82. R. Ross. Parasites of Mosquitoes found in India between 1895 and 1899: *Journ. of Hygiene, Cambridge*, April 1906.
83. R. Ross. Malaria in Greece: *Journ. of Trop. Med.*, 15 Nov. 1906; and *University Review*, May 1907. Various studies; and suggests that the decadence of Greece might have been

- partly due to the entry of malaria from Asia and Africa. Also *Times*, 11 Oct. 1906, and Smithsonian Report, Wash., 1908.
84. R. Ross. The Prevention of Malaria in British Possessions, Egypt, and Parts of America. Congress of Hygiene, Berlin, Sept. ; and *Lancet*, 23 Sept. 1907.
  85. R. Ross, J. E. Salvin-Moore, and C. E. Walker. A New Microscopical Diagnostic Method, etc.: *Lancet*, 27 July 1907. And on the Existence of Centrosomes . . . in Red Blood Corpuscles of Vertebrates: Pathological Soc. of London, Vol. 58, Part I, 1907.
  86. R. Ross. The Public Prophylaxis of Malaria: Allbutt and Rolleston's System of Medicine, Vol. II, Part II, 1907.
  87. R. Ross. Report on the Prevention of Malaria in Mauritius: Waterlow, London, 1908.
  88. R. Ross. The Campaign against Malaria: Royal Institution, London, 7 May 1909.
  89. W. H. S. Jones. Malaria and Greek History: Univ. Press, Manchester, 1909, 175 pages. A scholarly analysis of the subject.
  90. R. Ross. The Measures taken against Malaria in the Lahore (Mian Mir) Cantonment: letter to *Lancet*, 5 Nov. 1910. Indictment of the alleged experiment by the Indian Government.
  91. R. Ross, with twenty collaborators for special sections. The Prevention of Malaria: J. Murray, London, Sept. 1910. 2nd edit., June 1911, with mathematical addendum on the Theory of Happenings, 711 pages.
  92. R. Ross. Some Quantitative Studies in Epidemiology: *Nature*, 5 Oct. 1911.
  93. R. Ross, D. Thomson, J. G. Thomson, and G. C. E. Simpson. A series of papers on Enumerative Methods and effects of cold-chamber and other treatment in Malaria and Trypanosomiasis: Proc. of R. Society, Soc. of Trop. Med., and Ann. of Trop. Medicine, Liverpool, from June 1910 to Feb. 1912.
  94. R. Ross and W. Stott. Tables of Statistical Error: Ann. of Trop. Med., Liverpool, Dec, 1911. For medical and pathological use.
  95. R. Ross. Medical Science and the Tropics: R. Colonial Institute, 14 Jan. 1913.
  96. R. Ross. An Application of the Theory of Probabilities to the Study of *a priori* Pathometry: Part I Proc. of R. Society, A. Vol. 92, 1916; Part II, with Hilda P. Hudson, *ibid.* A. Vol. 93, 1917. A mathematical explanation of epidemics by the Theory of Happenings, continued from 87 and 91. Also *Br. Med. Journ.*, 27 March 1915.
  97. R. Ross (edited by). Observations on Malaria by Medical Officers of the Army and Others; War Office Publication:

- H.M. Stationery Office, London, Dec. 1919. Ten reports on the treatment of malaria, on malaria in England, and on malaria-prevention at Taranto.
98. R. Ross. The Principle of Repeated Medication for Curing Infections: *Br. Med. Journ.*, 2 July 1921. Argues that as one dose of a remedy can destroy only a percentage of the invading organisms, the doses must be repeated to effect extirpation, and gives a formula for the number of times.
99. M. Watson. The Prevention of Malaria in the Federated Malay States, a Record of Twenty Years' Progress: J. Murray, London, 1921, 2nd ed. Revised and Enlarged, 381 pages. With full details and illustrations of large-scale anti-malaria work.
100. R. Ross: Miscellaneous. Alan Milne: *Science Progress*, Vol. XIII, p. 636. The Great Default: *ibid.* Vol. XIV, p. 664, and Vol. XV, p. 105. William Crawford Gorgas: *ibid.* Vol. XV, p. 452. Article on malaria: *Encyclopædia Britannica*, 1902. Sir Patrick Manson, *Science Progress*, Vol. XVI, p. 135. Dr. Laveran, *ibid.* Vol. XVI, p. 293.

## II. MATHEMATICAL PAPERS BY R. ROSS

101. *The Algebra of Space*, being a brief Description of a System of Geometrical Algebra placed on an Arithmetical Basis: G. Philip & Son, 32 Fleet Street, London, 1901, 31 pages, quarto. Combines the systems of Hamilton and Grassmann.
102. *Verb-functions*: *Proc. R. Irish Acad.*, Vol. XXV, A.3, April 1905. Suggests a notation for rendering operations explicitly apart from their subjects; studies the elementary algebra of the subject, namely operative multiplication and division; employs the latter to solve algebraic equations of any degree and some differential equations; and shows how the notation increases the power of our mathematical algorithm.
103. *A Method of Solving Algebraic Equations*: two papers, *Nature*, 29 Oct. 1908 and 4 Feb. 1909. Rediscovered the method of "iteration," originally found in an elementary way by Michael Dary, a friend of Newton's, and forgotten in Britain except in the form used by Newton.
104. *The Solution of Equations by Operative Division*: *Science Progress*, Vol. X, Oct. 1915 and Jan. and April 1916. Elaborates and combines the results of the three previous papers. General formulæ and eight figures.
105. *Operative Algebra; Operative Involution*: *Sc. Prog.*, Vol. XIII, Oct. 1918. Continues the theme of Verb-Functions.
106. *Isosceles Trigonometry*: *Sc. Prog.*, Vol. XIII, Jan. 1919. Trigonometrical ratios based on the isosceles triangle.
107. *The Operative Roots of the Circle-function*: *Sc. Prog.*, Vol. XVI, July 1921. Shows that De Moivre's Theorem concern-

ing imaginary numbers is a particular case of a more general theorem in operative involution concerning the operative ratios of chords of a circle—which degenerates to De Moivres' Theorem when the diameter of the circle is zero.

(For work on Pathometry, see Nos, 87, 91 (2nd edit.), 92, 96, and 98.)

### III. PRINTED LITERARY WORKS BY R. ROSS

108. Edgar, or the New Pygmalion; and The Judgement of Tithonus: Higginbotham, Madras, 1883; 151 pages. Two dramas in verse.
109. The Child of Ocean; a Romance: Remington, London, 1889; 344 pages.
110. The Deformed Transformed: privately printed, Spectator Press, Bangalore, 1890, 128 pages: published Chapman & Hall, London, 1892; 157 pages.
111. The Spirit of Storm; a Romance: Methuen, London, 1896; 352 pages.
112. In Exile: privately printed, Philip, Son and Nephew, Liverpool, 1906; 84 pages. A suite of verses written 1890-7. Published with the omission of some stanzas in No. 114.
113. Fables: University Press, Liverpool, 1907, quarto; 51 pages. Twenty fables in verse, written 1881-96.
114. Philosophies: Murray, 1910; subsequent editions in 1910, 1911; 56 pages. Verses written 1881-99.
115. Lyra Modulata: privately printed, C. Tinling, Liverpool, 1911, quarto; 7 pages. Ten poems in phonetic spelling.
116. The Setting Sun: Murray, 1912 (anonymous); 64 pages. A satire in verse.
117. The Indian Shepherds; a Fragment: English Review, Sept. 1913; 7 pages. Verses commenced in 1898.
118. Otho: The Nation, 27 Sep. 1913. The Triumph: The Nation, 13 Dec. 1913. Short dramas in verse; reprinted in 1921.
119. Shakespeare: Book of Homage, Univ. Press, Oxford, 1916. Prayer: Science Progress, London, July 1916. The Fall of the Zeppelin: the Nation, 14 Oct. 1917. Single sonnets. Another League of Nations; a Fable: Morning Post, 14 Feb. 1919.
120. Verses on the War: Poetry Review, London, Jan. and March 1917. And a treasury of War Poetry: Cambridge, U.S., 1917.
121. Psychologies: Murray, 1919; 69 pages. Five short dramas in verse.
122. The Revels of Orsera; a Mediæval Romance: Murray, 1920; 393 pages. No. 110 as a novel; written in 1895.

### IV. MISCELLANEOUS

123. R. Ross. Malaria and a Moral: University Review, Vol. I, No. 1, May 1905. Science and the Public: *ibid.* Vol. III,

## REFERENCES

- No. 12, April 1906. Patriotism in the Universities: *ibid.* Vol. III, No. 17, Sep., 1906 (on the impossibility of universal disarmament). The Ego-cell: *Science Progress*, Vol. XI, p. 157, 1916-17 (a molecular theory of mind). *Modern Literary Criticism*, *ib.* Vol. XII, p. 137, 1917-18.
124. About R. Ross's work: by E. D. Morel, in *The World's Work*, January 1903; by Sir E. Ray Lankester, in *From an Easy Chair*, 1909; and by Major-General W. C. Gorgas and Dr. F. H. Garrison, in *The Scientific Monthly*, New York, August 1916.

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