

## **Report for 1912-13 / Entomological Research Committee.**

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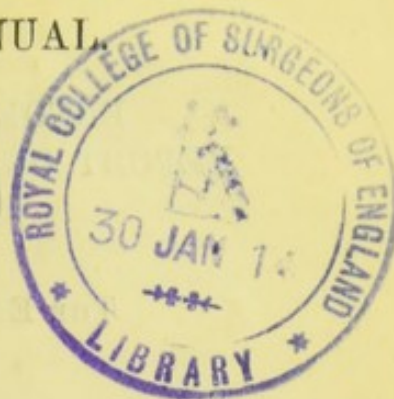
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No. 781.



# ENTOMOLOGICAL RESEARCH COMMITTEE.

REPORT FOR 1912-13.

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Presented to both Houses of Parliament by Command of His Majesty.  
*January, 1914.*

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## No. 781.

ENTOMOLOGICAL RESEARCH COMMITTEE.  
REPORT ON THE WORK OF THE COMMITTEE SINCE  
8TH OCTOBER, 1912.

## I.

THE EARL OF CROMER TO MR. HARCOURT.

London,

17th December, 1913.

SIR,

IN my Report of the 8th of October, 1912,\* account was given of the work which had been accomplished by the Entomological Research Committee, of which I have the honour to be Chairman, during the three years of its existence; but although little more than a year has elapsed since that date the work of the Committee has developed, and is developing, so rapidly that it becomes necessary to submit a further Report now and it is proposed in future to make a Report every year.

Since the establishment of the Bureau we have discontinued the use of the title "Entomological Research Committee," as confusion seemed likely to arise from the existence of what were apparently two separate organisations in London working at the same subject. The Entomological Research Committee has, therefore, now become the Managing Committee of the Bureau, and Mr. Guy Marshall, who held the appointment of Scientific Secretary to the Entomological Research Committee, has been made Director of the Bureau.

2. The chief feature of the work of the past year has been the actual establishment of the Imperial Bureau of Entomology to which reference is made in the 14th and 15th paragraphs of my previous Report. The following contributions are being made annually by the Governments concerned:—

	£
Great Britain ... ..	500
Canada ... ..	500
India ... ..	500
Australian Commonwealth ... ..	200
Six Australian States ... ..	300
South Africa ... ..	350
New Zealand ... ..	200
Newfoundland ... ..	50
Ceylon ... ..	100
Malay States ... ..	100
Straits Settlements ... ..	50
Hong Kong ... ..	50
Mauritius ... ..	50
Seychelles ... ..	25
West Indies ... ..	250
Egypt ... ..	50
Soudan ... ..	50
Fiji ... ..	50

£3,375

\* No. 1 in [Cd. 6429], November, 1912.



As the Imperial Government already contributes on behalf of the State-aided Protectorates in Tropical Africa an annual sum of £1,000 a year for the general work of the Committee, the West African Colonies a sum of £1,000 a year, and Zanzibar a sum of £50 a year, the whole organization is singularly comprehensive and, from the information which has reached me, is proving of great utility not only to countries within the Empire but also to those without.

3. The Review entitled the "Review of Applied Entomology," which is issued by the Bureau every month, is making satisfactory progress and the material available for publication is steadily increasing, more especially on the agricultural side. The total number of periodicals examined for the purposes of the Review is 895, and approximately 4,500 separate parts have been searched for useful entomological information between January and November of this year. The number of articles abstracted or reviewed during eleven months is 860, published in the following countries:—

United States	...	...	193	Holland and Belgium	...	24
France	...	...	135	West Indies	...	23
Great Britain	...	...	128	Central and South America	...	23
Germany	...	...	45	French Africa	...	12
Italy	...	...	43	Switzerland	...	11
Canada	...	...	42	Spain	...	10
British Africa	...	...	39	German East Africa	...	5
East Indies	...	...	35	Austria	...	4
Russia	...	...	31	Egypt	...	2
India and Ceylon	...	...	28	Cyprus	...	1
Australasia	...	...	25	Denmark	...	1

4. Arrangements have been made for the representation of the self-governing Dominions and India on the Committee of Management of the Bureau by the following members of the Committee:—

Australia	...	...	Mr. F. V. Theobald
Canada	...	...	Dr. A. E. Shipley
India	...	...	Professor Maxwell Lefroy
New Zealand	...	...	Mr. E. E. Austen
South Africa	...	...	Mr. G. A. K. Marshall

Special arrangements have been made to meet the wishes of the Australian State Governments to be represented by one of the Agents-General, and we are fortunate in having obtained the services of the Hon. Sir John McCall, Agent-General of Tasmania, in this capacity.

5. The Bureau has made considerable progress towards obtaining a complete set of the various laws and regulations against injurious insects which have been promulgated in the British Dominions and Colonies, and arrangements are now being made to collate and summarise them in a convenient form.

6. The Bureau has also extended the sphere of its activities in another important direction. Major S. P. James, of the Indian Medical Service, was recently deputed by the Indian Government to visit South and Central America and report on the possibility



of yellow fever being introduced into India by the increased traffic across the Pacific Ocean which will inevitably follow the opening of the Panama Canal. It appeared from his report that there is little or no knowledge, not only of a sure method of diagnosing the disease, but also of the presence or absence—and of the distribution if present—in Eastern lands of the mosquito which is known to convey the disease (*Stegomyia fasciata*).

7. It also appeared that there is a similar want of knowledge as to whether *Stegomyia scutellaris*, another very widely distributed and abundant species of mosquito of the same genus, carries the disease or not, and as to many other matters of capital importance affecting the etiology and prevention of yellow fever. Should it be necessary, therefore, to deal with an outbreak of yellow fever in a new territory, it is evident that this want of knowledge would greatly hamper and delay efficient and enlightened administrative action.

8. The co-operation of the Bureau of Entomology was invited on behalf of India and the Eastern Colonies, and the Bureau has undertaken to collect information as to the distribution of the *Stegomyia* mosquito in the countries which are likely to provide ports of call for vessels coming from infected districts.

9. As a preliminary measure the Bureau has asked to be furnished with all information available as to the distribution of mosquitoes generally, and of the genus *Stegomyia* in particular, in the French, German, Japanese, American, and Dutch possessions in the Far East and the Pacific, and to be provided with collections of mosquitoes from these localities. The question of sending out an entomologist specially to collect information in those places from which none can now be obtained may be considered at a later date in the light of the knowledge thus gained.

Dr. A. T. Stanton has kindly offered to supply the Committee with collections and data from the Federated Malay States and has written to various correspondents in the East asking them to do the same. He is shortly visiting Siam and Indo-China, and will utilise the opportunity to further our enquiry. Mr. J. C. Moulton, of the Sarawak Museum, has agreed to assist us in Borneo, and Mr. P. D. Montague, of Cambridge, who has just started on a zoological expedition to New Caledonia, has kindly consented to collect mosquitoes for us both there and in any ports visited *en route*. In Hong Kong the medical authorities have already made a preliminary mosquito survey.

With regard to the littoral of South East Africa, concerning the mosquito fauna of which we have but little knowledge, Mr. C. P. Lounsbury, Chief Entomologist of the Union, has been good enough to suggest the names of persons who might help us, and letters have been written to them. He has also asked the authorities in Delagoa Bay to communicate with the Committee, and has promised further information after the completion of his present tour of the South African ports.

10. In this connexion it may be mentioned that the West African Yellow Fever Commission recently applied to the Bureau for information with regard to the distribution of mosquitoes in British West Africa and that the Bureau was able to supply



a very useful statement setting forth the locality-records for all known species. A considerable amount of additional material has since been received and a supplementary statement has now been furnished.

11. The Committee are also taking steps to render assistance in another important direction. Arrangements have been made with Mr. W. F. Fiske, one of the most capable entomologists lately in the service of the United States Bureau of Entomology, to carry out, under the direction of the Royal Society and at the expense of the Government of Nyasaland, a thorough investigation of the bionomics of the tsetse fly *Glossina morsitans*. In the first instance, however, he is investigating the allied species *Glossina palpalis* in Uganda, as a preliminary to his work on *Glossina morsitans*, which will be carried out in Nyasaland. The Committee, with Mr. Carnegie's consent, are placing at his disposal the services of one of the Carnegie Scholars who, as you are aware from my previous Report, are being trained in American methods of entomology with the help of funds which Mr. Carnegie has generously provided for the purpose.

12. It is to be hoped that this will be the beginning of an organised campaign against the various species of tsetse fly throughout Africa, and the Committee are now considering whether they cannot render further assistance by employing the two entomologists who are working under their direction in East and West Africa respectively entirely on investigations connected with tsetse flies. It is clear that the discovery of any effective method of dealing with these flies in Africa would have the most far-reaching effects on the prosperity and progress of that continent.

13. To turn to the more routine side of the work of the Committee, some 80,000 specimens have been received since the date of my last Report, of which 14,000 are blood-sucking insects. Nearly all the latter have been identified, as well as numerous insects of agricultural importance. In the course of the year 248 lists of names have been sent out to 107 different correspondents, involving about 3,500 specific identifications. In addition to numerous sets of named insects returned to correspondents, large collections of African ticks, named at Cambridge by Professor Nuttall and Mr. Warburton, two members of the Committee, and of blood-sucking flies have been issued to the following institutions:—British Museum, the Universities of Oxford, Cambridge, Edinburgh, Aberdeen, and Manchester, the London and Liverpool Schools of Tropical Medicine, the Royal Veterinary College (Camden Town), the Imperial College of Science and Technology, the Museums at Birmingham, Leicester and Warrington, and the King Institute of Preventive Medicine, Madras; while over 74,000 insects which are not of economic importance have been handed over to the British Museum.

14. The Bureau has continued to publish its quarterly journal, the "Bulletin of Entomological Research," which contains only original articles. This excellently illustrated publication has maintained its previous high standard, and mention may be



made of some of the more important articles that have appeared in it during the past twelve months. Messrs E. E. Austen and F. W. Edwards, of the British Museum, have communicated several papers on blood-sucking horse-flies and mosquitoes from Africa; and Mr. S. A. Neave, Travelling Entomologist to the Bureau, has given an account of all the blood-sucking flies known to occur in our Protectorates in Eastern Africa. Dr. J. W. Scott Macfie has published a very valuable and comprehensive survey of the tsetse flies of the Ilorin Province, Northern Nigeria; while useful observations on the bionomics of these dangerous insects have been furnished by several other authors. The breeding habits of the malaria-carrying mosquitoes of St. Lucia have been fully dealt with by Dr. Lucius Nicholls; while Dr. Johann Dewitz, of Geisenheim, and Dr. Trägårdh, of Stockholm, have shown the importance of studying the physiology of injurious insects as an aid to their destruction.

15. The question of the identification of parasitic *Hymenoptera* is becoming a pressing one, owing to their great importance in the control of injurious insects. Unfortunately the number of reliable specialists working at these groups is extremely limited, and they already have more work than they can do. The Committee therefore propose that one or more of the assistants working under the Director of the Bureau should devote themselves to this group of insects. For the identification of the African *Tachinidæ* (a very useful family of parasitic flies) the Committee has been fortunate in securing the generous assistance of Dr. Villeneuve, of Rambouillet, who has kindly agreed to name all the material submitted to him.

16. All this extension of the work of the Committee has entailed a considerable extension of the staff. It has been found necessary to accommodate the Bureau for the time being in a suite of rooms in Elvaston Place, while the Trustees of the British Museum have continued to extend their generous assistance to the Committee by providing accommodation for the Director and his increasing staff of personal assistants at the British Museum (Natural History).

At present some 75 per cent. of the material received by the Bureau comes from tropical Africa, as it is there that the Committee has been longest at work, and there its organisation has been most fully perfected. As, however, the many other countries which have now come within the scope of the Committee's activities avail themselves of its services I anticipate that greater extension both of staff and of accommodation will be required, and I am anxious that the work of the Committee should suffer no set-back by any inadequate provision under these two heads.

17. Mr. Andrew Carnegie has, with great generosity and public spirit, renewed for a further period of three years his grant of £1,000 a year for the purpose of giving some young men selected in this country a thorough training in the methods employed in the United States in dealing with noxious insects. That the purpose of the grant is being attained is shown by the fact that the two previous Carnegie Scholars, Mr. A. Rutherford



and Mr. Strickland, received immediate employment on the termination of their entomological work in America. Mr. Rutherford was appointed Entomologist for Ceylon in succession to Mr. Green, and sailed at the beginning of last March to take up the duties. Mr. Strickland has been appointed Medical Entomologist in the Federated Malay States. In view of the growing demand for competent Entomologists both by Government administrations and private enterprises the establishment of a body of well-trained entomologists of this kind is a matter of great practical importance. I am glad to have this opportunity of referring to the valuable assistance which the Committee has always received from the State Department of Entomology at Washington, and I cannot refrain from quoting the following extract from a letter received by the Director of our Bureau from Dr. O. Howard, the distinguished Head of the Department:—

“Mr. Fiske was here recently, enthusiastic over the prospect of doing some work for your country. I think he has a great opportunity. Incidentally, in conversation, he said that he had the impression that you were loath to ask favors of me, feeling that you did not wish to intrude on my time. I beg to assure you, however, that I will do gladly anything I can for you or for the men you send over. I have a distinct feeling of pleasure in the thought that I am able to be of service to you and your people. It is really a compliment that you pay me in asking me to do this for you, and I trust that you will not hesitate for a moment to give me any chance to help you.”

The grateful thanks of the Committee are also due to the authorities of Harvard and Cornell Universities, who have been good enough to remit all fees in connexion with the classes of instruction attended by our Carnegie scholars.

18. It is difficult to give an adequate account of the manifold activities of the Committee within the compass of an official report, but reference may be made to two or three representative instances.

19. You are aware of the assistance which the Committee has rendered to the sugar planters of Trinidad in dealing with the frog-hopper pest, and I am glad to be able to record another case in which the Committee has been able to give practical help to the sugar industry. As the result of his visit to the West Indies the Director, Mr. Guy Marshall, was able to show that the beetle, *Phytalus*, which was devastating the sugar-cane in Mauritius, was indigenous in Barbados, and in a larva which he brought home a parasite was found. The Superintendent of Agriculture in Barbados was advised to investigate the life-history of this parasite and he soon showed that it was effectively controlling the beetle. Consignments of the parasite have now been sent to Mauritius and there is every hope that the species may be successfully established in that island.

20. As an instance of assistance in another direction, I am informed that it is often a matter of difficulty for entomologists in the Colonies and elsewhere to secure really good reproductions of insects for their publications. The Bureau has accordingly



made arrangements for meeting this difficulty and has supervised, on behalf of the Egyptian Department of Agriculture, the drawing and reproduction of several coloured plates; it has also prepared numerous blocks for the Government Entomologist of Trinidad. The Imperial Commissioner of Agriculture for the West Indies has asked to be permitted to avail himself of the opportunities thus offered, and Sir Charles Lukis has sought advice with regard to the entomological illustrations for the new publication of the Indian Research Fund Association.

21. It would be easy to multiply instances, but enough has already been said to show both the range and variety of the Committee's activities and the great amount of useful public work it is accomplishing. The problems which it is engaged in solving are so important and so numerous that it seems difficult to assign any limits to the possibilities of its beneficent action in the future, and I cannot too strongly urge that every effort should be made to provide, either from public funds or by appeal to private generosity, the money which will be required to place it in a position to carry out its work adequately and with efficiency.

22. Finally, I am glad to have again an opportunity of referring to the valuable services which the expert members of the Committee have rendered with so much zeal and public spirit. There is such an obvious desire to further in every way the work of the Committee that, although I am unable to lay any claim to technical knowledge upon the various scientific questions discussed, my office of chairman is none the less extremely interesting, and is also a source of real pleasure to myself.

23. The development of the Bureau has thrown upon the two Secretaries, Mr. Guy Marshall and Mr. Parkinson, a large increase of work which they have readily undertaken and carried out to the entire satisfaction of the Committee.

I have the honour to be,

Sir,

Your most obedient servant,

CROMER.

The Rt. Honble. L. Harcourt, M.P.,  
&c., &c., &c.

## II.

### COLONIAL OFFICE TO THE EARL OF CROMER.

Downing Street,  
27th December, 1913.

MY LORD,

I AM directed by Mr. Secretary Harcourt to acknowledge the receipt of the further Report on the work of the Entomological Research Committee with which you have been good enough to furnish him. The Report clearly indicates the value



of the work of the Committee and the rapidity with which it is expanding, and he gladly concurs in your proposal that such Reports should in future be annual.

2. Mr. Harcourt is of opinion that it is a matter for hearty congratulation that you should have succeeded in establishing the Imperial Bureau of Entomology on so wide a basis and that such good progress should already have been made in its development. He is confident that you have not in any way overrated the importance of the part which the Bureau must play in the economic development of the oversea possessions of this country, and he trusts that its utility will receive practical recognition in the supply of such funds as are needed to give full scope to its activities.

3. He has read with much interest the account of the entomological investigations which have been set on foot in view of the possibility of yellow fever being introduced into India and the Eastern Colonies by the increased traffic across the Pacific Ocean which must follow the opening of the Panama Canal, and he has no doubt that the Bureau will render a great service to the Administrations of those countries by supplying them with accurate information on which to base their protective measures. It appears from correspondence which the Foreign Office has communicated to this Department that the Governments of France, Japan, and Holland have already taken steps to co-operate with the Bureau in this work; and replies will no doubt be shortly received from the other Governments referred to in the 9th paragraph of your Report.

4. Mr. Harcourt has noted with pleasure that the Bureau has been able to assist the important Commission which is investigating the question of yellow fever in the British possessions in West Africa.

5. With regard to the 11th and 12th paragraphs of your Report, I am to say that he entirely concurs in your view that the discovery of any effective method of dealing with the tsetse fly in Africa would have the most far-reaching effects on the prosperity and progress of that continent. In spite of the havoc wrought by this fly, singularly little seems to be known regarding its life-history, and he trusts that, as you suggest, the present inquiry will lead to a comprehensive investigation of the whole question and to concerted action throughout Africa.

6. He understands that the control of noxious insects by other insects which are natural enemies and of a harmless type is a branch of entomological work which has been successfully developed in the United States, and he has been glad to observe from the 14th paragraph of your Report that this important matter is receiving the consideration of the Committee.

7. He has readily given his approval to the increases of staff which you have recently recommended, and he desires to take this opportunity of expressing his grateful thanks to the Trustees of the British Museum for the assistance which they have so generously afforded the Committee by continuing to provide accommodation for the Director of the Bureau and his personal assistants.



8. He recognises that Mr. Andrew Carnegie has rendered a public service by renewing his grant of £1,000 a year for a further period of three years, and he thinks that it must be a source of gratification to him that the organization which he is so generously supporting is rapidly developing and is rendering valuable assistance in the campaign against those insect pests which are responsible for a heavy mortality in human beings and animals and are the cause of serious injury to the crops on which man is dependent for his food or his industries.

9. He has noted with special pleasure your reference to the sympathetic and generous attitude of the American State Department of Entomology and the Universities of Harvard and Cornell towards the Bureau.

10. From information which has reached him he gathers that the work in connection with the frog-hopper pest in Trinidad is proceeding satisfactorily, and he considers that the sugar planters of the island are much indebted to the Committee for the valuable advice which they have given in the matter. He will await with much interest the result of the measures which are being taken in Mauritius to eradicate the beetle which is injuriously affecting the sugar plantations of the island.

11. He desires to associate himself with the well-deserved tribute which you have paid to the expert members of the Committee who, by their generous co-operation, have rendered such valuable services since the scheme was first inaugurated, and he has noted with pleasure the appreciative terms in which you refer to the two secretaries, Mr. Guy Marshall and Mr. Parkinson.

12. In conclusion, Mr. Harcourt asks me to express his grateful thanks to you for the skill with which, from comparatively small beginnings, you have developed this organization into its present satisfactory condition. He feels assured that, under your tactful and energetic direction, the work of the Committee will continue to expand on sound lines and will prove of the utmost value to the British possessions in all parts of the world.

I have, &c.,

JOHN ANDERSON.



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754	Cayman Islands (Jamaica) ...	1911-1912
755	Gibraltar ... ..	1912
756	St. Helena ... ..	"
757	Weihaiwei ... ..	"
758	Ceylon ... ..	1911-1912
759	Sierra Leone ... ..	1912
760	Seychelles ... ..	"
761	Somaliland ... ..	1912-1913
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763	Turks and Caicos Islands ...	"
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### MISCELLANEOUS.

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77	St. Vincent ... ..	Roads and Land Settlement Fund.
78	Weihaiwei ... ..	Census, 1911.
79	Northern Nigeria ... ..	Mineral Survey, 1907-8 and 1908-9.
80	Nyasaland ... ..	Mineral Survey, 1908-9.
81	Southern Nigeria ... ..	Mineral Survey, 1908-9.
82	Imperial Institute ... ..	Rubber and Gutta-percha.
83	Southern Nigeria ... ..	Mineral Survey, 1910.
84	West Indies ... ..	Preservation of Ancient Monuments.
85	Southern Nigeria ... ..	Mineral Survey, 1911.
86	Southern Nigeria ... ..	Mineral Survey, 1912.



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No. 834.

IMPERIAL BUREAU OF  
ENTOMOLOGY

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REPORT FOR 1914.

(For Report for 1912-13 see No. 781.)



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Presented to both Houses of Parliament by Command of His Majesty.  
*February, 1915.*

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1915.

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No. 334

INTERNAL AFFAIRS OF  
ETHIOPIA

REPORT FOR 1911

BY THE SECRETARY OF THE INTERIOR



REPORT ON THE PROGRESS OF THE  
INTERNAL AFFAIRS OF ETHIOPIA  
FOR THE YEAR 1911  
BY THE SECRETARY OF THE INTERIOR  
H. M. KASSABE  
ADDIS ABABA  
1912





No. 834.

IMPERIAL BUREAU OF  
ENTOMOLOGY.

REPORT FOR 1914.

Mr. AUSTEN CHAMBERLAIN to the SECRETARY OF STATE.

London, 16th February, 1915.

SIR,

In December, 1913, the Earl of Cromer submitted a report (Colonial Report Annual, No. 781), on the work accomplished by the Imperial Bureau of Entomology during the year, and stated that he proposed in future to make a report every year.

2. Unfortunately Lord Cromer has had to resign the Chairmanship of the Managing Committee of the Bureau owing to ill-health, and you have done me the honour to ask me to succeed him as Chairman, a request to which I readily agreed. Although I have only just accepted your offer, it is clear from the papers which I have had before me and from what I have been able to learn by personal enquiry, that the Bureau is doing excellent work, and I have much pleasure in being able to submit so satisfactory an account of its operations during the year 1914.

3. Before proceeding to the report itself, I must express on behalf of all the Committee the deep regret with which they have learnt of Lord Cromer's resignation and the reasons which have led him to take that step. I am assured that he was an ideal Chairman, and that his wise judgment has been invaluable in guiding the decisions of the Committee ever since it was instituted by your predecessor, the Marquess of Crewe, as the "Entomological Research Committee" in June, 1909.

4. The Bureau has now been established for two years, and I am glad to be able to record the emphatic opinion of the Committee that it has more than justified its existence. From many quarters the Director has received appreciation of its work, and there is no reason to doubt that if the necessary funds for its maintenance are obtained, it will continue to be of real assistance not only to the Dominion and Colonial Governments, but also to foreign Governments which are closely interested in entomological problems. It appears, moreover, that commercial firms who are engaged in enterprises in the Colonies are realising the value of having practical entomologists on their staffs, and it is satisfactory to note that the senior assistant



entomologist at the Bureau has been selected for a post in Fiji with the Colonial Sugar Refining Company of Sydney. If, as a result of the work of the Bureau, the importance of economic entomology is more widely understood, this would alone be ample justification for the expenditure of money which the creation and maintenance of the Bureau has involved.

5. The publications of the Bureau have been continued as in previous years. Every month the "Review of Applied Entomology" is published in two parts, one dealing with Agricultural Entomology, and the other with Medical and Veterinary Entomology. In this Review summaries are given of current literature on all aspects of economic entomology. The work in this connexion has grown considerably, and although the scope of the Review is comprehensive, even now it cannot be called complete, for untapped sources of information are still being discovered. Volume I (1913) contained 788 pages, or an average of 65 pages a month; while Volume II just completed (1914) contains 926 pages, or an average of 77 pages a month, and but for the war, which has prevented German, Austrian and Belgian publications from being received by the Bureau, this volume would probably have reached 1,000 pages. An idea of the general extent of the work can be gathered from the following table, which shows the number of abstracts published:—

RECORD OF ABSTRACTS PUBLISHED IN 1913 AND 1914.

Country of Publication.	No. of Abstracts.	
	1914.	1913.
United States .. .. .	315	231
France .. .. .	202	147
Russia .. .. .	192	72
Great Britain .. .. .	160	144
Germany .. .. .	117	65
British Africa (including Egypt) ..	97	48
India and Ceylon .. .. .	65	43
Italy .. .. .	58	43
Central and South America ..	51	25
West Indies .. .. .	43	23
Australasia .. .. .	43	39
Canada .. .. .	41	41
East Indies .. .. .	29	39
Belgium and Holland .. .. .	19	25
French Africa .. .. .	17	12
Austria-Hungary .. .. .	11	9
German East Africa .. .. .	11	6
Switzerland .. .. .	10	12
Scandinavia .. .. .	5	1
Portugal and Colonies .. .. .	4	0
Spain .. .. .	3	10
Hong Kong .. .. .	1	2
Totals ..	1,494	1,037



It should be added that the total number of periodicals examined for the purposes of the Review is now 1,001, and approximately 4,600 separate parts have been searched for entomological information. Of these periodicals 400 additional parts failed to reach this country on account of the war. A very full index has been compiled to Volume I (1913), and this in itself has involved a great amount of labour.

6. The other regular publication of the Bureau is the "Bulletin of Entomological Research." This is issued quarterly and contains original illustrated articles. Among the most important published during the year may be mentioned contributions dealing with the bionomics of tsetse-flies by Messrs. R. W. Jack, Ll. Lloyd, R. B. Woosnam and Dr. J. O. Shircore; Dr. R. Roper's paper on the malaria-carrying mosquitos of British North Borneo; an account of the blood-sucking insects observed by Dr. J. J. Simpson in the Gold Coast; papers on the agricultural insect pests of Southern Nigeria, by Dr. W. A. S. Lamborn, and of Nyasaland, by Mr. E. Ballard.

An index to the Volume of the Bulletin for 1913 was also compiled and published during the year.

7. In connexion with these publications I cannot refrain from quoting from two among many of the appreciative references made to them by experts who are in the best position, perhaps, to form a sound judgment. Professor Kulagin, the distinguished Director of the Moscow Agricultural Institute, writing to the Director of the Bureau on the subject of the "Review of Applied Entomology," said: "I am prepared to serve you as far as I possibly can. Your journal is necessary for all entomologists, and it is the duty of us all to help you." And Mr. E. Porter Felt, the State Entomologist for New York, recently wrote: "I wish to voice my personal appreciation of the Review published and to express the hope that it will be continued along substantially the same lines, since with the passage of years it is going to be an exceedingly convenient medium for keeping track of work in all branches of entomology." Unsolicited testimony of this kind is perhaps the most gratifying recognition which could be extended to the Bureau.

8. As may be well imagined, the constant examination of periodicals in all languages for entomological information of importance, has enabled the Bureau to build up a useful reference library. Roughly 320 publications, amounting to about 1,500 separate parts annually are received, and I should like to refer especially to the kindness of Dr. C. Gordon Hewitt, Dominion Entomologist to the Canadian Government, in obtaining all the available back numbers of official entomological publications in Canada. Many, too, of the experiment stations in the United States have been very generous in this respect, and deserve our thanks for supplying back numbers of their publications; while Dr. David Sharp, F.R.S., has very kindly presented some 60 volumes of various useful journals. There are now over 400 bound volumes in the library; and in addition to these, a number of separate pamphlets, bulletins, reprints, and duplicates are being accumulated.



9. In the original proposals for the work to be carried out by the Bureau the preparation of a list of the plant pests occurring in each British Colony was suggested. It was contemplated that the list would be drawn up by the Government Entomologist in the Colony, but it is clear that this plan is not feasible, and it has been decided to adopt an alternative arrangement whereby the lists will be prepared in the Bureau from the published literature. The lists will contain information as to the scientific name of the insect; its popular name (if any); an indication of its distribution in the Colony (general, local, hill species, etc.); plants attacked; and the relative importance of the pest. It is proposed to submit the lists to the local entomologists for additions and corrections. This work has already been put in hand, but it will be some time before it can be completed.

10. Reference was made in last year's report to the proposal to collate and summarise the various laws and regulations which have been promulgated in the British Dominions and Colonies for the control of plant pests and diseases. Professor Maxwell Lefroy, a member of the Committee, has kindly undertaken this work, and the summary will shortly be in the hands of the printers. The general scheme adopted is to give a brief summary in non-technical language of the various regulations in force in each country. From these all the essential points have been extracted and arranged so as to form a useful guide for future legislation on the part of those Governments which have not yet dealt comprehensively with the subject. It is believed that it will also prove valuable to those Governments which have already made laws, by indicating where additions or amendments to those laws might be desirable.

11. I will now turn to another side of the work. Two Travelling Entomologists have been employed in Africa as hitherto, although a period of some six months elapsed between the departure of Mr. S. A. Neave from Nyasaland to take up his duties as Assistant Director of the Bureau and the appointment of Dr. W. A. S. Lamborn to succeed him as Travelling Entomologist in East Africa. Mr. Neave had been stationed at Mlanje for the purpose of studying the life-histories of the blood-sucking flies of the family Tabanidæ, many of which undoubtedly play an important rôle in the dissemination of various diseases of domestic animals; and to enable him to carry out his researches, a laboratory was built for him by the Government of Nyasaland at his headquarters. He has succeeded in discovering the breeding habits of no less than twenty different species concerning which nothing was known previously. It was at first intended that Dr. Lamborn should proceed to the East Africa and Uganda Protectorates, but on reconsideration the Committee felt that his services would be more valuable for the time being in Nyasaland. Accordingly, he is now working in that Protectorate, his general objects being to test, by experiment on a fairly large scale, the practicability of eradicating *Glossina* within a given area by direct attack upon the flies themselves, and concurrently with this experiment to test the actual effects on the fly of clearing undergrowth, in order to ascertain whether the clearing really kills the flies or merely drives them elsewhere. It is anticipated that this experiment in destruction of *Glossina* must extend over at least one year, if definite



information is to be obtained as to the likelihood of catching and trapping operations proving really effective in controlling the numbers of the fly.

12. On the West Coast Dr. J. J. Simpson has been employed on special investigations connected with the *Glossina* problem in the Northern Territories of the Gold Coast. A full account of his previous work in the Gold Coast has appeared in Volume V. of the Bulletin of Entomological Research, and it was hoped that he would have been able to collect some equally useful information in the Northern Territories, but I regret to report that when he had only half completed his tour he was invalided home, and he is now recuperating in this country.

13. Arrangements have also been made for Mr. W. F. Fiske, who had spent a year in Uganda working for the Royal Society, to carry out investigations for the Bureau in that Protectorate. He will send in a final report to the Royal Society, and thereafter report to the Director of the Bureau. At present he is living on the Sesse Islands in Victoria Nyanza. He is very hopeful of obtaining successful results to the series of preliminary enquiries which he has been conducting, and the Committee trust that valuable information will be gained by him.

14. The importance of the *Glossina* investigations cannot easily be overrated, as, indeed, appears in the Report of the Sleeping Sickness Committee which you appointed to examine the question of the relation between trypanosomiasis and wild animals. In their general conclusions that Committee reported as follows:—

“It must be recognised that the evidence all points to the conclusion that if tsetse-fly could be eliminated or removed from contact with human settlement sleeping sickness would practically disappear, infection conveyed by other biting flies being a negligible factor in the spread of the disease.

“For this reason your Committee attach great importance to a proper and sufficient equipment of entomological research into the bionomics of the incriminated tsetse-flies. This form of research has, in their view, been insufficiently pursued up to the present time. The workers have been zealous, but few in numbers, and the work consequently limited to only a very small portion of the fly belts and areas from which the danger arises.

“Different views are taken as to the prospect of dealing with the fly, but it was, as your Committee think truly, said by more than one of the witnesses, that in this form of research there is a large element of chance that accident may at any time lay bare a secret which may lead to the solution of the problem, and that the multiplication of workers is the multiplication of those chances.

“Your Committee think, therefore, that, within reason, there should be devoted to this form of inquiry a considerable portion of such funds as may be available in British possessions, and that endeavours should be made to obtain the co-operation in this work of foreign Powers in their African possessions, the results of the work being from time to time tabulated and collected.”



It will be seen from what I have said above that the Bureau is doing all that it can, with the limited resources at its disposal, to pursue actively the campaign against *Glossina* in our tropical African Colonies and Protectorates. The Committee would be happy if they could see their way to increase the number of experts working in the field for the Bureau, but this is quite impossible at present, and they fear that at a time when economies have to be effected on all sides the local Governments will not be in a position to provide funds for special investigators.

15. During the year a large number of collections of insects have been sent in from Africa and many parts of the Empire. These collections are acknowledged in detail in the Bulletin; the insects are all identified, and the sender is furnished with an authoritative statement of the numbers and species in the collection, together with named specimens, if desired.

In the twelve months 229 separate consignments have been received from 72 different correspondents, distributed as follows:—Africa 53, Asia 8, West Indies 7, and Australasia 4. The total number of specimens received was no less than 86,000, of which 35,000 were blood-suckers. Among the latter special mention must be made of an exceptionally fine collection of over 22,000 mosquitos (all bred) and 1,500 Tabanidæ from Dr. H. Macfarlane, Government Bacteriologist in Hong Kong.

The number of lists of identification issued during the year was 190, and these lists comprise about 4,500 specific names of insects. In this work of identification the Bureau has received much assistance from various entomological specialists, including the following members of the Honorary Committee of Management:—Mr. E. E. Austen, Prof. R. Newstead, F.R.S., Prof. G. H. F. Nuttall, F.R.S., Hon. N. C. Rothschild, Mr. F. V. Theobald, and Mr. C. Warburton.

16. These collections, when named, are at the service of such institutions as may require them. In the report for last year mention was made of the collections of ticks and blood-sucking flies issued to the British Museum, the Universities of Oxford, Cambridge, Edinburgh, Aberdeen, and Manchester, the London and Liverpool Schools of Tropical Medicine, the Royal Veterinary College (Camden Town), the Imperial College of Science and Technology, the Museums at Birmingham, Leicester, and Warrington, and the King Institute of Preventive Medicine at Madras. In the year which has just ended further collections have been sent to several of these institutions, and also to the Birmingham Natural History and Philosophical Society and the Bedford College for Women. In addition to 2,200 blood-suckers and insects of agricultural importance, over 41,000 other insects were presented to the British Museum.

17. While dealing with this side of the work, I should refer to the fact that arrangements have been made for the identification of lice and the investigation of the minute beneficial parasites of the family Chalcididæ. Mr. James Waterston has been engaged by the Bureau for this purpose, and he has made very



satisfactory progress. It is of interest to note that he has recently described a new species parasitic on *Glossina palpalis* discovered in Uganda by Dr. G. D. H. Carpenter.

18. It is to be regretted that comparatively little progress has been made with the *Stegomyia* survey in the Far East, reference to which was made in last year's report. Dr. H. Macfarlane has sent valuable material from Hong Kong and Dr. A. T. Stanton from the Malay States and Indo-China; and collections of mosquitoes have also been received from Mr. F. P. Jepson in Fiji, Mr. J. C. Moulton at Kuching (Sarawak), and Dr. G. Davies in the Solomon Islands; but so far the offers of assistance from foreign Governments which have possessions in the Far East and the Pacific have not materialised. The outbreak of war will doubtless interfere somewhat with this survey; but the matter is now under consideration, and it is hoped that ultimately the Bureau will be in a position to furnish definite information as to the distribution of *Stegomyia* at the chief ports of call in the Far East.

19. Excellent results have been obtained with the Carnegie Studentships, which are generously provided by Mr. Andrew Carnegie for the purpose of enabling young men selected in this country to have an opportunity of studying the American methods of dealing with noxious insects; and once more the Committee wish to express their thanks to Dr. L. O. Howard, Chief of the Bureau of Entomology at Washington, for his kind assistance in advising and directing generally the work of the students. At the beginning of the year Mr. C. Mason, Mr. M. E. MacGregor, Mr. A. H. Ritchie, and Mr. E. Speyer were in America. These gentlemen have now all obtained appointments—Mr. Mason as Government Entomologist in Nyasaland, Mr. MacGregor as an Assistant to Professor Nuttall at Cambridge, and Mr. Ritchie as Government Entomologist in Jamaica, while Mr. Speyer has been selected for special investigations in Ceylon in connexion with the "shot-hole borer" of tea. There are now four Carnegie Students in the United States—namely, Mr. H. G. Champion, Mr. C. B. Williams, Mr. G. H. Corbett and Mr. E. Hargreaves—and a fifth, Mr. F. Dry, is about to leave for America.

20. It was proposed to hold in London in July, 1915, a Conference of the official entomologists of the Empire, with the object of discussing various questions which closely concern the interests of the various parts of the Empire, and you were good enough to give this proposal your warm support. The Dominion and Colonial Governments and the Governments of India, Egypt, and the Sudan were all invited to take part in the Conference and to send representatives. A number of useful purposes would have been served by such a Conference, but two may perhaps be specially mentioned. It would have been valuable in bringing together the official entomologists, who could discuss problems of Imperial importance in the prevention of the spread of insect-borne diseases; and it would have afforded an opportunity of placing the entomologists in closer personal touch with the Bureau of Entomology and of settling lines on which the Bureau might render further assistance to different parts of the Empire. A programme was submitted for the consideration of the Governments invited to send representatives, and among other important subjects suggested for



discussion were "The regulation of plant imports; the inspection of imports and Imperial co-operation in restrictive legislation; and the desirability of establishing an Empire Convention in preparation for the next International Phytopathological Conference."

It is very regrettable that, owing to the war, the Conference has had to be postponed indefinitely; but the Committee trust that when circumstances admit, you will again approach the Governments concerned, and that they will then readily agree to send their entomologists to London.

21. The expenditure of the Bureau is carefully watched, so as to ensure a reasonable balance being kept in hand; but, needless to say, if the funds at our disposal were doubled or quadrupled, we could employ them profitably in extension of the work, parts of which, indeed, are at present retarded, in some cases very seriously, by lack of staff. The annual contributions made to the Bureau are as follows:—

	£
Imperial Government .. ..	1,500
Canada .. ..	500
Australian Commonwealth .. ..	200
Six Australian States .. ..	300
South Africa .. ..	350
New Zealand .. ..	200
Newfoundland .. ..	50
India .. ..	500
Egypt .. ..	50
Sudan .. ..	50
Nigeria .. ..	500
Gold Coast .. ..	350
Sierra Leone .. ..	100
Gambia .. ..	50
Zanzibar .. ..	100
Ceylon .. ..	100
Malay States .. ..	100
Straits Settlements .. ..	50
Hong Kong .. ..	50
Mauritius .. ..	50
Seychelles .. ..	25
Fiji .. ..	50
West Indies .. ..	250
Malta .. ..	20
Cyprus .. ..	100
Total .. ..	£5,595

In addition there is Mr. Andrew Carnegie's donation of £1,000, which has been promised for six years (from 1911 to 1916 inclusive), to provide the studentships referred to above.

It should be explained that the contribution from the Imperial Government includes a grant of £1,000 which was originally approved for the Entomological Research Committee in 1909 on behalf of the Exchequer-aided Protectorates in East Africa, and a grant of £500 approved when the Bureau of Entomology was established in 1912.



22. It will be necessary to take up in the course of the current year the question of the renewal of these grants, or at any rate of most of the contributions other than those from the African possessions, as in the majority of cases the contributions were guaranteed in the first instance for three years only and this period will have expired at the end of 1915. It would have been convenient to discuss this at the Conference in July, if it could have been held; but, as this is impossible, the matter will have to be dealt with mainly by correspondence.

It is obviously desirable that the Bureau should be placed on a permanent basis as soon as possible, and there would appear to be no doubt that the value of its services has been so generally recognised that, if the contributing Governments were now asked to guarantee contributions, they would be willing to agree. But in present circumstances it seems to be preferable to ask for a renewal of the grants for a limited period only, and at the end of the war to take up the question of obtaining permanent provision for the upkeep of the Bureau.

I may further observe that if the Bureau is to develop as it should, it will be necessary to provide additional staff, and this cannot be done without extra funds. It ought to be possible, for instance, whenever some special piece of entomological research is required in any part of the world, for the Bureau to be able to send one of its own experts to conduct that research; but with its present resources this is quite out of the question. Nevertheless, the Committee feel that it would probably be unwise to seek for increased contributions at so inauspicious a moment, and this question, as well as that of permanency, must therefore stand over for future consideration.

23. I cannot conclude this report without expressing the Committee's appreciation of the work of the Director of the Bureau, Mr. G. A. K. Marshall, the Assistant Director, Mr. S. A. Neave, the Assistant Editor, Mr. W. North, and the whole staff generally. The Committee also desire to express their appreciation of the value of the services of their Secretary, Mr. A. C. C. Parkinson.

We are particularly fortunate in having obtained the services of Mr. Marshall as Director. He has worked with untiring zeal to bring the Bureau to its present state of efficiency; and he has spared himself no trouble in carrying out the multifarious duties which have fallen upon him. The combination of real enthusiasm for the work with expert knowledge and ability render him especially suitable for this appointment, and the Committee gladly recognise how greatly the success of the Bureau is due to him.

I have the honour to be,

SIR,

Your most obedient servant,

AUSTEN CHAMBERLAIN.

The Right Hon. Lewis Harcourt, P.C., M.P.

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# COLONIAL REPORTS, &c.

The following recent reports, &c., relating to His Majesty's Colonial Possessions have been issued, and may be obtained from the sources indicated on the title page:—

## ANNUAL.

No.	Colony, &c.	Year.
805	Gambia .. .. .	1913
806	Gold Coast .. .. .	"
807	Northern Territories of the Gold Coast .. .. .	"
808	Sierra Leone .. .. .	"
809	Bahamas .. .. .	1913-1914
810	Cayman Islands (Jamaica) .. .. .	1912-1913
811	Fiji .. .. .	1913
812	Ashanti .. .. .	"
813	Basutoland .. .. .	1913-1914
814	Hong Kong .. .. .	1913
815	Bechuanaland Protectorate .. .. .	1913-1914
816	Imperial Institute .. .. .	1913
817	Falkland Islands .. .. .	"
818	Malta .. .. .	1913-1914
819	Trinidad and Tobago .. .. .	"
820	Jamaica .. .. .	"
821	Northern Nigeria .. .. .	1913
822	Grenada .. .. .	"
823	Zanzibar .. .. .	"
824	Barbados .. .. .	1913-1914
825	Southern Nigeria .. .. .	1913
826	Mauritius .. .. .	"
827	British Honduras .. .. .	"
828	Colonial Survey Committee .. .. .	1913-1914
829	Tonga Protectorate .. .. .	"
830	Swaziland .. .. .	"
831	Uganda .. .. .	"
832	Nyasaland .. .. .	"
833	British Guiana .. .. .	"

## MISCELLANEOUS.

No.	Colony, &c.	Subject.
78	Wei-hai-wei .. .. .	Census, 1911.
79	Northern Nigeria .. .. .	Mineral Survey, 1907-8 and 1908-9.
80	Nyasaland .. .. .	Mineral Survey, 1908-9.
81	Southern Nigeria .. .. .	Mineral Survey, 1908-9.
82	Imperial Institute .. .. .	Rubber and Gutta-percha.
83	Southern Nigeria .. .. .	Mineral Survey, 1910.
84	West Indies .. .. .	Preservation of Ancient Monuments, &c.
85	Southern Nigeria .. .. .	Mineral Survey, 1911.
86	Southern Nigeria .. .. .	Mineral Survey, 1912.
87	Ceylon .. .. .	Mineral Survey.
88	Imperial Institute .. .. .	Oilseeds, Oils, &c.
89	Southern Nigeria .. .. .	Mineral Survey, 1913.