

Report on the collections of mosquitoes (Culicidae) received at the British Museum, natural history, from various parts of the world in connection with the investigation into the causes of malaria, conducted by the Colonial Office and the Royal Society / by Fred. V. Theobald.

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BRITISH MUSEUM.

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REPORT

ON THE

COLLECTIONS OF MOSQUITOES (CULICIDÆ)

RECEIVED AT

THE BRITISH MUSEUM (NATURAL HISTORY) FROM
VARIOUS PARTS OF THE WORLD

IN CONNECTION WITH THE

INVESTIGATION INTO THE CAUSES OF MALARIA,

CONDUCTED BY

THE COLONIAL OFFICE AND THE ROYAL SOCIETY.

BY

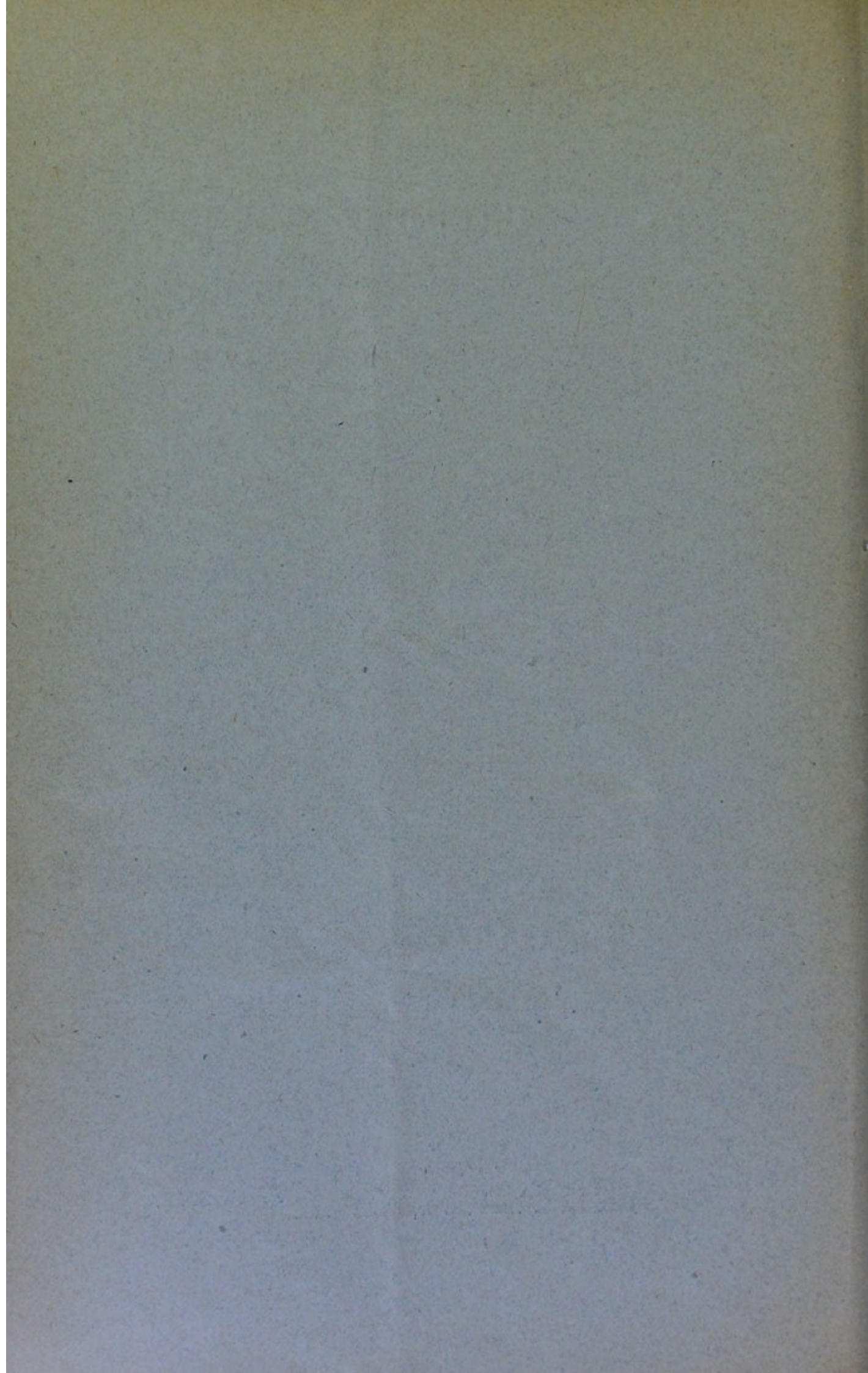
FRED. V. THEOBALD, M.A.

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By DARLING & SON, LTD., 34-40, BACON STREET, E.

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REPORT ON THE COLLECTIONS OF MOSQUITOES.

A LARGE number of mosquitoes belonging to the Dipterous Family *Culicidae* have been received at the Museum during the past year from various parts of the world.

At the request of the Director I have undertaken the work of identifying and describing the specimens which have been and are still being received from various quarters, and to prepare a monograph of the *Culicidae*.

The combined collections contain a large number of species and considerably over 3,000 specimens.

The majority belong to the genus *Culex*, but a fair number, some 400 odd specimens, to the genus *Anopheles* and a few to other genera such as *Psorophora*, R. Desv., *Aedes*, Meig., *Haemagogus*, Will., etc.

At present I have completed the genus *Anopheles*, which is represented by twenty-two species, ten of which are new, whilst four of the remainder (*A. funestus*, *A. fuliginosus*, *A. Lindsayii*, and *A. Rossi*) have only recently been described by Major Giles, I.M.S. There still remain eight or nine well defined species which are not represented in the collections. Those from India and the Straits Settlements sent by Captain S. P. James, I.M.S., Dr. Goodrich, Mr. Daniells, and Mr. Wray have proved the most interesting, all the species, except one, *A. Sinensis*, Wied., from the Straits Settlements, being new.

The *Anopheles*, unlike *Culex*, does not appear to have a wide distribution in regard to species, although the genus is world-wide. One of the greatest distances between any two localities for the same species is Formosa and the Straits Settlements, from

both of which localities *A. Sinensis*, Wied., has been received, but I believe it occurs in all the intervening East Indian Islands. This species is synonymous with Van der Wulp's *A. barbirostris* from East Java and Walker's *A. vanus* from the Celebes. A long series sent by Mr. Wray from the Straits Settlements show great variation both in colour and size; whereas all the other *Anopheles* appear very constant in colour and markings.

At present I am engaged with the genus *Culex*, some ninety odd species of which have already been identified or described as new species. The work of identification is extremely difficult owing to the very meagre descriptions of most of the older species. In many cases one description will apply to two or three distinct species, so that the probability is that several described as new species have been previously named, but cannot be identified unless from the original types, many of which have decayed away. Again a large number of descriptions have been compiled from worn specimens and are thus valueless; in this way, I believe, Walker described *Culex taeniatus* under at least three different names (*C. zonatipes*, *C. formosus*, and *C. exagitans*). In three authors alone are the descriptions sufficiently full and clear to be of any value, namely Skuse's of the Australasian species, Arribalzaga's of the Argentine, and Ficalbi's of the Italian and European, and a few isolated species such as those described by Coquillett, Williston, and others in various journals.

So far no purely European species except those that occur in Malta and Gibraltar, etc., have been examined by me, as the majority of the collections have come from tropical and sub-tropical countries.

Two species of *Culex* seem to have a very wide distribution, namely, *C. taeniatus* (Meig) and *C. fatigans* Wied. The former I make synonymous with the following, *C. formosus*, *C. exagitans*, and *C. zonatipes* of Walker, *C. Rossii* of Giles, and *C. elegans*, Ficalbi, whilst *C. mosquito* of Robineau Desvoidy is undoubtedly a distinct variety of *C. taeniatus*, specimens of typical *C. mosquito* merging into those of *C. taeniatus*. This species has been sent

from the following widely separate localities :—Japan, Formosa, Hong Kong, Malay Peninsula, India, South and West Africa, North and South America, West Indies, Gibraltar, and I believe it to be the same as Ficalbi's Italian species *C. elegans*; older records are from the Celebes, Java, etc.

A very closely related form, which may only be a variety of it, is described by Skuse as *C. Bancrofti* from New South Wales; specimens exactly answering to this species have been sent to the Museum from the West Indies and South America, which differ only from *C. taeniatus* in that the last tarsal joint has a black basal band instead of being pure white.

Another widely distributed species is *Culex mucidus* Karsch, which is the same as *Culex hispidosus* of Skuse, and *C. commovens* Walker. *C. mucidus* was described from a male specimen from Delagoa Bay; *C. hispidosus* from a female from New South Wales, *C. commovens* from Australia. Specimens received from Dr. Bancroft clearly show that these are the same although occurring in such widely separate localities. Other instances of a similar wide distribution occur.

A new genus which I propose to call *Panoplites* has been made for the reception of several species of *Culex*, three of which have previously been described, namely, *Culex annulipes*, Wlk., *C. dives* Schiner, and *Taeniorhynchus taeniorhynchus* Arri. Seven species of this genus have been sent in the collections from India, Malay Peninsula, South America, and Australia. The scales on the wing-field differ very materially from those of typical *Culicidæ*, being in the form of broad flat plates.

As many of the species of the genus *Culex* are very obscure, photographs of the wings and drawings of various parts are being prepared, and complete figures of the majority of species will also be given.

Most of the collections have arrived in fair condition, some few have been attacked by mites, and one or two by mould. Specimens seem to travel best pinned to the cork of a small glass tube, firmly packed in cotton wool.

No one collection is being worked out as a whole, so it is not possible as yet to give any collector a full list of the names of the specimens sent.

The following is a list of collections of Mosquitoes received at the Museum up to the present time either through official or private sources.

LIST OF THE COLLECTIONS OF MOSQUITOES RECEIVED UP
TO THE PRESENT TIME EITHER THROUGH OFFICIAL OR
PRIVATE SOURCES.

Place and Name.	Specimens, &c.	Registered No.	Received.
Delagoa Bay ... S. R. Christophers.	39 Culex, 5 other Diptera.	303/99	Feb. 13, 1899.
Bombay ... C. W. Daniels.	32 Culex, 36 Ano- pheles.	443/99	Mar. 6, 1899.
British Guiana — New Amsterdam. Dr. E. D. Rowland.	8 Culex ...	—	April 4, 1899.
Pará ... H.M. Consul, W. S. Churchill.	47 Culex ...	670/99	April 12, 1899.
Queensland Burpengary, viâ Brisbane. Dr. T. L. Bancroft. Do. (2nd consignment)	} Large number of Culicidæ, too damaged to iden- tify.	{ —	May 8, 1899.
		{ —	May 15, 1899.
St. Vincent, B.W.I. — Botanic station. H. Powell.	40 Culex ...	935/99	May 25, 1899.
St. Lucia, B.W.I.—Castries St. George Gray, M.B.	24 Culex ...	—	May 25, 1899.
Queensland, Burpengary Dr. T. L. Bancroft. (3rd consignment.)	4 glass tubes contain- ing Culicidæ, much damaged.	—	May 29, 1899

Place and Name.	Specimens, &c.	Registered No.	Received.
Pará ... H.M. Consul, W. S. Churchill. (2nd consignment.)	50 Culex ...	—	June 8, 1899.
Queensland, Burpengary Dr. T. L. Bancroft. (4th consignment.)	7 bottles and 1 small tin box containing quite 100 Culex and Anopheles.	—	June 10, 1899.
St Vincent ... H. Powell. (2nd consignment.)	48 Culex ...	1017/99	June 10, 1899.
Demerara ... (Through Governor and Colonial Office.) J. J. Quelch.	64 Culex ...	1054 and 1057/99.	June 16, 1899.
St. Lucia—Castries ... St. George Gray, M.B. (2nd consignment).	39 Culex ...	—	June 23, 1899.
Brazil ... Dr. A. Lutz, of the Bacteriological Institute of the State São Paulo. (Through the British Consulate, Rio de Janeiro—W. G. Wagstaff, Consul-General.)	3 Anopheles, 3 Culex and 13 other Diptera mounted. 1 Anopheles, 28 Culex and 4 Diptera in bottles.	1204/99	July 4, 1899.
Montserrat, Leeward Islands. F. L. Norris.	22 Culex ...	1195/99	July 7, 1899.
Japan—Tokyo ... C. H. B. Woodd.	25 Culex, 1 other Dipteron.	—	July 4, 1899.
Malta ... Dr. T. Zammit, Medical Officer of Health.	7 Culex, 49 other Diptera.	1129/99	July 11, 1899.
St. Lucia—Castries ... St. George Gray, M.B. (3rd consignment.)	4 boxes containing 91 Culex, 15 other Diptera, 3 Beetles, 2 Moths.	—	July 19, 1899.

Place and Name.	Specimens, &c.	Registered No.	Received.
New Zealand ... Prof. R. J. Scott.	15 Culex and 1 other Dipteron.	—	July 21, 1899.
Mexico ... British Consulate, C. J. Bjorklund, Acting Consul.	Collection of mixed insects, no Mos- quitoes.	1347/99	July 31, 1899.
Bermuda ... G. Digby Barker, C.B., Governor and Com- missioner-in-Chief. Dr. Eldon Harvey, Medical Officer of Health, Collector. (Through Colonial Office.)	3 boxes—59 Culex, 16 other Diptera.	1453/99	Aug. 16, 1899.
Kashmir ... Dr. Ernest F. Neve, Mission Hospital.	4 Culex unmounted in paper.	1470/99	Aug. 21, 1899.
Singapore... Raffles Library and Museum. (Per R. Hanitsch.)	53 Culex, 8 other Diptera.	1541/99	Sept. 4, 1899.
Formosa ... British Consulate, Tamsui. (R. de B. Layard, Con- sul; Dr. G. Mackay, Collector.)	33 Culex, 6 Ano- pheles, 2 other Diptera.	1360/99	Sept. 6, 1899. (See Reg. No. 1766/99.)
Jamaica ... F. Cundall, Secretary, Jamaica Institute.	32 Culex ...	1590/99	Sept. 15, 1899.
Fiji ... B. Glanville Corney, Chief Medical Officer, Medical Department.	—	1730/99	Oct. 11, 1899.
Panama ... British Consulate (C. Mallet, Consul.)	29 Culex ...	1598/99	Sept. 22, 1899.
Gibraltar ... Colonial Secretary, Sir H. Jackson. Collector, Major Birt.	60 Culex ...	1607/99	Sept. 22, 1899.
Fiji—Suva ... Barclay Black, M.D. Forwarded by B. Glan- ville Corney, Chief Medical Officer.	Remains of 1 Ano- pheles, 3 empty cards.	1624/99	Sept. 22, 1899

Place and Name.	Specimens, &c.	Registered No.	Received.
Hong Kong ... Charles Ford (Botanical and Afforestation Department).	43 Culex mounted 50 Culex (about in spirit (probably all Culex).	1606/99	Sept. 27, 1899.
East Africa—Pemba ... D. R. O'Sullivan-Beare, British Vice-Consul.	18 Culex, and 18 other Diptera.	No letter, ^{see} Reg. No. 1742/99.	Oct. 11, 1899.
Fiji—Suva ... Barclay Black, M.D. Forwarded by B. Glanvill Corney, Chief Medical Officer.	Mouldy, apparently all Culex (29).	1913/99	Nov. 9, 1899.
Ceylon ... A. Perry, Principal Civil Medical Officer.	9 Culex, 12 other Diptera, 1 Ichneumon.	No letter	Nov. 9, 1899.
Cayman Islands ... Per G. J. Stuart Tait, Government Medical Officer. (Through the Colonial Secretary, Jamaica.)	About a dozen Mosquitoes, much damaged by mites.	1939/99	Nov. 10, 1899.
West Africa—Bonny ... Per J. P. Fagan, District Medical Officer, H.B.M. Vice-Consul's e.	270 specimens unmounted, apparently nearly all Anopheles.	2001/99	Nov. 21, 1899.
Mauritius, Government of Per Sir Charles Bruce, K.C.M.G.	24 Culex, 2 other Diptera.	1989 and 1997/99	Nov. 22, 1899.
Jamaica—Kingston ... M. Grabham, M.D. Do. (2nd consignment)	} 6 Culex, 4 Anopheles, much damaged.	(2034/99	Nov. 24, 1899.
		(2078/99	Nov. 30, 1899.
Cyprus ... Chief Secretary to the Government (W. Hart Bennett Acting). Collected by P. Gennadius, Director of Agriculture.	5 Culex, 6 other Diptera, 2 Hymenoptera.	2125/99	Dec. 7, 1899.
Jamaica Institute ... Per F. Cundall, Secretary. (2nd consignment.)	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">{</div> <div>Box 1, about 14 pieces Culex and Anopheles; Box 2, 26 Culex, 6 Anopheles; Box 3, 25 Culex, 4 Anopheles.</div> <div style="margin-left: 10px;">}</div> </div>		2126/99 Dec. 7, 1899.

Place and Name.	Specimens, &c.	Registered No.	Received.
Rio de Janeiro ... Per W. G. Wagstaff, Consul-General. Collector, Senhor Carlos Moreira, Entomologist of the National Museum, Rio.	68 Culex, 12 other Diptera.	2127/99	Dec. 7, 1899.
South India—Travancore S. P. James, M.B., Capt. I.M.S.	1 Anopheles and 5 empty cards.	—	Dec. 5, 1899.
Queensland—Burpengary Dr. T. L. Bancroft.	2 boxes, 6 Anopheles, 35 Culex, also 14 tubes containing 150 to 200 Mos- quitoes and other Diptera.	—	Dec. 5, 1899.
Madras ... Dr. E. S. Goodrich, Ox- ford Museum.	40 Culex, 3 Anophe- les, 16 other Dip- tera.	—	Dec. 12, 1899.
St. Lucia, W.I.—Castries Otho Galgey, M.R.C. P.I.	3 boxes, 93 Culex, 9 Anopheles, 1 Moth.	2215/99	Dec. 21, 1899.
Ceylon ... A. Perry, Principal Civil Medical Officer. (2nd consignment)	32 Culex, 23 other Diptera. (No letter.)	—	Dec. 27, 1899.
Fiji—Suva ... Barclay Black, M.D. (3rd consignment.)	5 Culex and 12 frag- ments.	2261/99	Dec. 30, 1899.
St. Lucia—Castries ... St. George Gray.	16 Anopheles, 2 Cu- lex, 4 other Dip- tera, 2 Hymenop- tera, also small bottle with 4 larvæ.	—	Jan. 6, 1900.
Hong Kong ... Charles Ford, Super- intendent, Botanical and Afforestation De- partment.	42 Culex, 10 other Diptera mounted, about 40 Culex in spirit.	2236/99	Jan. 8, 1900.
Manitoba ... Dr. Gordon Bell, Pro- vincial Bacterio- logist.	11 Culex, 1 Anophe- les.	93/1900	Jan. 19, 1900
Cairo ... Dr. H. P. Keatinge (School of Medicine).	2 Anopheles ...	—	Jan. 19, 1900.

Place and Name.	Specimens, &c.	Registered No.	Received.
Straits Settlements—Tai-peng. L. Wray, junr.	66 Anopheles, 72 Culex, 53 other Diptera.	—	Nov. 22, 1899. and Dec. 21, 1899.
Sierra Leone—Freetown E. E. Austen.	104 Anopheles, 84 Culex.	—	Nov. 1899.
St. Lucia—Castries ... St. George Gray.	3 Culex, 2 other Diptera, 2 Moths.	—	Feb. 1, 1900.
Jamaica ... Dr. Grabham.	32 Culicidæ (good condition), no letter, notes in box.	—	Feb. 8, 1900.
Selangor ... A. L. Butler.	51 Culex, 1 Anopheles, 3 other Diptera, good condition.	—	Oct. 28, 1899.
St. Lucia—Castries ... St. George Gray.	31 Culicidæ, 14 other Diptera, 2 moths.	—	Aug. 3, 1899.
British Guiana, New Amsterdam. Dr. E. D. Rowland.	38 Culex, 1 Anopheles, some damaged by mites and mould.	—	Sep. 1899.
Grenada ... W. E. Broadway.	100 Culicidæ, fair condition.	—	Feb. 14, 1900.
Quilon Travancore, South India. Captain S. P. James, I.M.S., 19th M.I., Quilon. (2nd consignment.)	35 Culex, 34 Anopheles, much damaged by mites.	—	Mar. 7, 1900.
Mauritius ... Dr. Rees.	10 Culicidæ, almost entirely destroyed.	—	Mar. 7, 1900.
Lagos ... Dr. Henry Strachan, District Medical Officer.	5 or 6 fragments of Culex.	—	Mar. 17, 1900.
British Guiana—New Amsterdam. Dr. E. D. Rowland.	About 70 Culicidæ	—	Mar. 30, 1900
Granada ... Walter J. Chambers, H.B.M. Consul. Deoclesiano Chaves, Managua, Collector.	Mixed Diptera; very much damaged.	—	Mar. 30, 1900.
Grenada ... W. E. Broadway.	42 Culicidæ; fair condition.	624/1900	Mar. 30, 1900.

Place and Name.	Specimens, &c.	Registered No.	Received.
Trinidad ... H. Caracciolo, per Hon. C. C. Knollys.	Mosquitoes in spirit	625/1900	April 3, 1900.
Mombasa ... J. D. McKay, East Africa Protectorate.	7 Culicidæ, some broken.	727/1900	April 17, 1900.
Canada ... E. M. Walker ... 99, St. George St., Toronto, Ontario.	2 boxes, 128 speci- mens: 92 Culex, 36 Anopheles, in good condition, brought by Donor's father.	728/1900	April 14, 1900.
Penang, Straits Settle- ments. G. D. Freer, M.B., Lond., Colonial Surgeon Resident, General Hospital, Penang.	5 Culex, 12 Ano- pheles.	821/1900	April 30, 1900.
Fiji ... Chief Medical Officer, B. Glanvill Corney, Suva, Fiji. Collected by H. Noble Joynt, M.D., D.P.H.	Fragments of 21 Culex.	885/1900	May 8, 1900.
Dacca ... Collected by Lt.- Colonel R. Macrae, I.M.S., assisted by Assistant - Surgeon Jogeesur Mukerjee. Forwarded by Colonel T. H. Handley, C.I.E., I.M.S., Surgeon- General of Civil Hos- pital, Bengal.	196 Mosquitoes, Culex and Ano- pheles; nearly all in fragments eaten by Psoci.	820/1900	May 9, 1900.
Italy ... Professor Grassi.	7 Mosquitoes. Typical named specimens of 4 species.	—	May 11, 1900.

POSTSCRIPT.—Since the above list was in type additional collections have been received at the Museum.

British Museum (Natural History),
Cromwell Road, S.W.

July 16th, 1900.

