THE

MOSQUITOS OF THE PHILIPPINE ISLANDS

THE DISTRIBUTION OF CERTAIN SPECIES, AND THEIR OCCURRENCE IN RELATION TO THE INCIDENCE OF CERTAIN DISEASES

A Thesis Submitted to the Faculty of Graduate Studies of The George Washington University in Part Satisfaction of the Requirements for the Degree of Doctor of Philosophy

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BY

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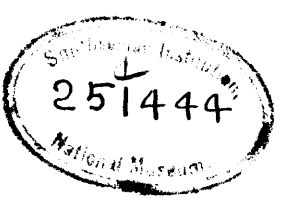

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PREFACE.

In this thesis we have a record of protracted and painstaking investigations undertaken by Dr. Ludlow in the interest of preventive medicine rather than as a contribution to natural history. The work included careful descriptions of many species of mosquitos which are new to science, but the principal object in view has been to determine what species, if any, have a geographic distribution and seasonal activity corresponding with the prevalence of certain infectious diseases known or suspected to be dependent for their propagation upon the mosquito, acting as an intermediate host for the specific germ. Dr. Ludlow is the pioneer in this work, and it is to be hoped that she may be able to continue her researches in this important field of investigation, especially as regards the mosquitos of the Philippine Islands, to which she has devoted her special attention and of which she has become the leading authority.

GEO. M. STERNBERG,
Professor of Preventive Medicine.

GEORGE WASHINGTON UNIVERSITY,
November 28, 1908.

THE MOSQUITOS OF THE PHILIPPINE ISLANDS; THE DISTRIBUTION OF CERTAIN SPECIES, AND THEIR OCCURRENCE IN RELATION TO THE INCIDENCE OF CERTAIN DISEASES.[1]

CLARA SOUTHMAYD LUDLOW, B. Sc., M. Sc.

HISTORY OF THE RESEARCH.

Being in Manila early in 1901, it was repeatedly suggested by some of the medical officers of the United States Army stationed there that I take up the study of mosquitos, and the thought strongly emphasized that the study of mosquitos was likely to be of real benefit to mankind, especially if carried on in connection with the occurrence of certain diseases, notably malaria. The latter part of this suggestion was very attractive, and after some hesitation I decided to undertake an anatomical problem suggested by Dr. W. J. Calvert, then First Lieutenant and Assistant Surgeon, U. S. Army, carrying on, in connection with the Board of Health, Manila, research work on bubonic plague. Through Dr. Calvert, the facilities of the "Plague Laboratory" were opened to me, and it thus came to pass that in April, 1901, at one of the desks of the "Plague Laboratory," then occupying the *Escuela de Pintura y Escultura,* Manila, the research was begun which developed into the present work.

At the very outset, however, it was found that the mosquitos taken were not described in the books available, and in a little while it became evident that no one knew the mosquitos of the Philippine Islands, as at that time only *Corethra manillensis Schiner,*[2] *Megarhina immisericors Walker,*[3] and *Culex pipiens Linne.* (probably *C. fatigans*)[4] had been reported from the Islands. Anatomical study of an unknown insect would be, of necessity, valueless; and while *Anophelinæ* are, of course, readily separated from the other sub-

[1] A thesis submitted to the Faculty of Graduate Studies of The George Washington University, Washington, D. C., for the Degree of Doctor of Philosophy.

[2] Oesten-Sacken: Berl. Ent. Ztschr., 1882.

[3] Padre Carto Elera: Catalogo de todo la Fauna Filipina (1895).

[4] Schiner: Reise der Novara Diptera (1868).

families, no *data* as to the species present, time or period of flight, occurrence coincident with that of disease, etc., existed, and systematic work became necessary as a preliminary for the proper conduct of the research undertaken.

The procuring of these *data* therefore became the research, and to the accomplishment of this have been given the time and effort of nearly seven years, while the original problem, though partly solved by others, is still waiting its complete solution.

When the Board of Health was transferred to the Civil Government, the mosquito work went with it, but in a few weeks it was found advisable, as the collections were made by Army Surgeons, that the work should come again under the jurisdiction of the Surgeon General's Office, and in August, 1901, the work was placed by Gen. George M. Sternberg, then Surgeon General, U. S. Army, on the footing which, with minor changes, it occupies today.

The research was interrupted by my return to the United States in October, 1901, but was soon in running order again. Each succeeding Surgeon General has added his authority to the work, advancing it and in various ways increasing its efficiency. Circular letters relative to the collections have been sent out from time to time to the surgeons, and slight changes, spoken of later, have made the working plan probably as good as is possible, under the conditions.

It must, however, be borne continually in mind that the collections are not made by entomologists, but by Surgeons and Hospital Corps men, busy with the duties pertaining to their special calling; and while many have done excellent work, giving the research valuable aid, many of the collections are made perfunctorily, and the conclusions to be drawn from them would be very misleading unless this factor be taken into account. However, one learns to recognize such collections, and they have practically been thrown out in making the estimate as to the disease conditions in relation to the mosquitos present.

METHODS.

The manner of obtaining collections was suggested by Dr. Calvert, the Board of Health having used it in getting specimens of pathologic tissue and blood.

Col. B. F. Pope, Assistant Surgeon General, U. S. Army, Chief Surgeon, Division of the Philippines, since deceased, interested himself in the work, put it under the Board of Health, and caused circulars to be printed and sent out to the Surgeons at such Posts as had

shown large percentage of malaria on the sick reports, suggesting that collections of mosquitos be sent to the Board of Health. Cyanide bottles were prepared for the use of the surgeons, and small paper pill or powder boxes in tin mailing cases were sent for shipping the insects to Manila.

Since then only small changes have been made in the manner of conducting the research, and these were practically developed in adapting it to a broader field. The circulars have been modified; it is now advised that collecting be done bi-monthly, and at three periods in the twenty-four hours—*i. e.*, very early morning, daylight, and after dark. The records have also developed somewhat from their original form, the number of each species in each collection being entered and "statement of disease" added, instead of being filed separately. The reports to the surgeons made on the receipt of each collection have also changed slightly, becoming more formal and more specific.

As it now stands, the mosquitos having been killed by means of the cyanide bottle or chloroform tube, and in no case to be allowed to be wet, are put in the small pill-boxes between a couple of wisps of absorbent cotton, a drop or two of 40 per cent formaldehyde solution in the bottom of the box to protect from mold, the boxes labeled with Post, date and hour of collection and prevalence of disease, packed in the small wooden boxes furnished for that purpose, and mailed to "The Laboratory of the Office of the Surgeon General, U. S. Army." On the receipt of the collection each specimen is examined and determined, and a record made of the Post from which it came, the date and hour of collection, name and number of each species, noting any unusual points, and, whenever given, a "statement of disease" is appended. Notes are made as to the condition of the Post, breeding places, the means used for reducing the number of mosquitos, and for prevention of infection by protection with nets or prophylactic use of quinine. A report as to the nature of the collection is then sent the Surgeon and the boxes returned to him for further use.

The classification used is Theobald's, and was originally adopted because (*a*) it was the only modern English work that covered oriental mosquitos, (*b*) because Mr. Theobald's work was done in connection with that of the School of Tropical Medicine, London, and as this research was also undertaken in connection with the study of tropical disease, it seemed wise that the same nomenclature should be used. It also seemed likely that Mr. Theobald's method of classification would clear up the terrible confusion of the *omnibus*

genus *Culex,* and make it possible to group certain forms instead of leaving them a heterogeneous mass.

MOSQUITOS REPORTED.

It was, of course, to be expected that the mosquitos found in the Philippine Islands would include many already described species reported from India, Africa, and the Celebes. This expectation has proven well founded, and the following have been taken during the period the work has been in progress.

ANOPHELINÆ:

Myzomyia rossii Giles.
Myzomyia funesta Giles.
Myzomyia ludlowii Theobald.

Myzorhynchus barbirostris Van der Wulp.
Myzorhynchus sinensis Wiedemann.
Myzorhynchus vanus Walker.

Nyssorhynchus fulginosus Giles.
Nyssorhynchus theoboldi Giles.

Myzomyia ludlowii,[1] strictly speaking, does not belong in this group, as it was the first "anopheles" taken in this work, and at first reported as *A. Rossii,* attention being drawn to the marked leg spots which were not typical for *Rossii.* Later specimens were sent Mr. Theobald, who decided it to be quite new, as I myself believed, and named it.

CULICINÆ:

Desvoidea fusca Theobald.
Desvoidea obturbaus Walker.

Stegomyia fasciata Fabricius (*calopus* Meigen).
var. *mosquito* R. Desvoidy.
var. *luciencis* Theobald.
Stegomyia scutellaris Walker.

A new variety of *fasciata* (*calopus*) has lately been founded—*i. e., persistans* Banks—which Mr. Banks says is the only form taken in the Philippine Islands, but the variety is based on a misconception. Mr. Banks has probably never studied the *Stegomyia* found in the Southern States, and so does not realize that his differences occur merely on account of inaccurate descriptions of *fasciata* (*calopus*). The insect is the same in both countries, except that, so far as I have seen them, the specimens from the Philippines seem, as a whole, more clearly marked.

[1] Journal Asso. Mil. Surg., February, 1903.

Reedomyia niveoscutela Theobald.

Culex caeus Theobald.
Culex gelidus Theobald.
Culex gelidus var. *caneatus* Theobald.
Culex microannulatus Theobald.
Culex sitiens Wiedermann.
Culex fatigans Wiedermann.
Culex annulioris Theobald.
Culex concolor Desvoidy.
Culex hirsutum Theobald.
Culex alis Theobald.

Tæniorhynchus whitmorei Giles.
Tæniorhynchus conopas Frauenfeld.
Tæniorhynchus ager Giles.

Chrysoconopas aurites Theobald.

Mansonia uniformis Theobald.
Mansonia annulifera Theobald.

Finlaya poicilia Theobald.

ÆDEINÆ:

Ædeomyia squammipenna Arribalzaga.

Skusea mediofasciata Theobald.

URANOTÆNINÆ:

[1] *Uranotænia cæruleocephala* Theobald.

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[1] In order that the list of mosquitos reported from the Philippine Islands should be as complete as possible, there should be added the following, which have been reported by Colonel Giles and by Mr. Banks, but have not been sent in the collections made for this work:

(By GILES:)

Pyretophorus pitchfordii Giles, *P. minimus* Theob., *Mansonia australiensis* Giles, *Finlaya flavapennis* Giles, *F. melanoptera* Giles, *Tæniorhynchus whitmorei* Giles, *Stegomyia desmotes* Giles, *S. crassipes* van der Wulp, *S. punctolateralis* Theob., *S. leucomeres* Giles, *S. striacrura* Giles, *Desvoidea ventralis* Walker, *D. panalectros* Giles, *Culex tigripes* de Grandpre et de Chamoy, *C. rubrithorax* Macquart, *C. vagans* Wied., *C. quassiunivittatus* Theob., *C. luteolateralis* Theob., *Hodsia sanguinia* Theob., *Rhunchomyia philippensis* Giles.

(By BANKS:)

Myzomyia mangyana Banks, *Pyretophorus freeræ* Banks, *Cellia kochii* Donitz, *Worcesteria grata* Banks, *Mucidus mucidus* Karsch, *Stegomyia aurostriara* Banks, *Stegomyia pseudotæniata* Giles, *Culex impellens* Walker, *C. rizali* Banks, *Mansonia annulipes* Walker, *Finlaya aranetana* Banks, *Uranotænia falcipes* Banks.

Also, as was to be expected in so unexplored a field, a number of new forms have been collected, of which it has been my good fortune to describe the following:

ANOPHELINÆ:

[1] *Anopheles formosus.*

Myzomyia thortonii.
Myzomyia indefinita.

Stethomyia pallida.

Myzorhynchus pseudobarbirostis.
Myzorhynchus philippinenss.

Cellia flava.

CALVERTIA, gen. nov., Ludlow.
Calvertia lineata.

MEGARRHININÆ:

Megarrhina lecaldii (probably a Toxorhynchites).

Toxorhynchites argenteotarsis.

CULICINÆ:

Desvoidea fusca var. *joloensis.*

Stegomyia amesii.
Stegomyia scutellaris var. *samarensis.*

Scutomyia nivea.

Pseudostegomyia gardnerii.

Ludlowia chamberlainii.
Ludlowia minima.

POPEA Ludlow:
Popea lutea.

REEDOMYIA Ludlow:
Reedomyia pampangensis.

Culex ludlowi Blanchard.
(*Culex annulifera* Ludlow).
Culex fragilis.

Tæniorhynchus argenteus.
Tæniorhynchus lineatopennis.

Etorleptomyia luzonensis.
(*O'Reillia luzonensis Ludlow*).

URANOTÆNINÆ:

Uranotænia cæruleocephala var. *lateralis.*

Anisocheleomyia (?) *albitarsis.*

Pseudouranotænia triangulata.
[1] *Pseudouranotænia parangensis.*

[1] In press.

DENDROMYINÆ:

Dendromyia scintillans.
(*Heizmannia scintillans*).[2]

DISTRIBUTION OF ANOPHELINÆ.

As this part of the work from the medical and hygienic standpoint has little value except in connection with the incidence of disease, it has seemed best, in preparing the tables showing distribution, to add the date of collection, the number indicated by the collection as presumably present, and the incidence of malaria at the time of collecting. Each member of this subfamily sent in since the research was begun is considered in a separate table, and the station, month and year of collection, prevalence as shown by the collection, and coincident malarial condition are given for each place in which the particular species was taken.

It is necessary, however, if the real value of each malaria-bearing species is to be considered, to study these tables with some points kept closely in mind, otherwise they are liable to misinterpretation.

(*a*) Not all of the malarial stations are given, because at some stations, where "malaria prevalent" was the almost continuous report, the collections were persistently taken only in the daylight—*i. e.*, 8 a. m. to 6 p. m.—and this in spite of repeated requests for collections taken in the very early morning and late at night, and no *Anophelinæ* were sent in.

My own experience in the Philippine Islands leads me to think that *Anophelinæ* are only exceptionally taken in the midday, and even then probably only when they are present in great numbers, and consequently that the stations referred to did not have an excessive number of these insects present. What species were present it is of course impossible to guess.

(*b*) From some of the stations, however, collections taken in the daytime did contain a few *Anophelinæ* (and of these some collections were not accompanied by a statement of disease), but several years' study of the collections and the accompanying disease reports has led me, when *Anophelinæ* are found in day collections, to expect the report "malaria prevalent" or "very prevalent." As a matter of fact, that expectation is rarely disappointed, and when the report is added that is its tenor.

[2] The types of these mosquitos are, with the exception of *Ludlowia chamberlainii*, deposited in the Army Medical Museum, Washington, D. C. The type of *L. chamberlainii* is also Theobald's type for the genus and as such is in the British Museum, Natural History, London, England.

It will be readily seen that these conditions do not give a just notion of the *Anophelinæ* present, nor of their real relation to the malaria present. I have not, however, indicated this in the tables, preferring to enter only what the collections really show. Hence the number of mosquitos entered is, in some instances, probably much lower than would have been the case if this point had been taken into consideration, and it must therefore be continually borne in mind that the small number of *Anophelinæ* reported where malaria is prevalent is probably largely due to "day collections."

(*c*) It is also necessary to remember that as the dates are given in months, the increase in *Anophelinæ* may not be followed by an increase in malaria until the following month.

Finally, the conditions have been much altered during 1906, 1907, and 1908 by the prophylactic measures instituted at most of the stations. In many places the ground has been drained and water-containers and pools oiled; the use of mosquito nets has been made compulsory, and while the Quartermaster's Department still issues the old square-net material, through which the most vicious of the Philippine mosquitos can easily enter, the Medical Department issues a small round-meshed net, which is really a protection against these insects. Wherever the structure of the building permits, wire screens to windows and doors have been used to some extent—at some stations very extensively—and the bamboo poles used in building and fencing have been bored at the nodes to prevent as much as possible the accumulation of water at these points. All over the Islands prophylactic doses of quinine are given when necessity arises, and at some places this is practically constant. All these measures materially lessen both the number of mosquitos and the amount of malaria.

TABLE I.

ANOPHELES.

Anopheles formosus Ludlow.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp John Hay, Benguet.	Mch. 1908	few	present	Supposed to have been contracted elsewhere.

TABLE II.

MYZOMYIA.

Myzomyia funesta Giles.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Catubig, Samar.	May 1903	moderate	present	
	June	moderate	prevalent	
Camp Eldridge, Laguna.	Dec. 1904	few	present	
	Jan. 1907	few	prevalent	
Camp Gregg, Pangasinan.	Sept. 1904	moderate	excessive	
	Oct.	moderate	excessive	
	Nov.	moderate	excessive	
	Dec.	few	prevalent	
	Jan. 1905	few	present	Post was abandoned Feb. 19, 1905, and re-established some months later.
	Feb.	few	present	
	July 1906	few	present	Prophylactic measures rigidly enforced.
	Sept.	few	present	
	Oct.	moderate	present	
	Nov.	moderate	present	
	Feb. 1907	few	present	
Infanta, Tayabas.	Jan. 1908	few	present	
	June	few	present	
Macabebe, Pampanga.	July 1907	moderate	prevalent	
Parang, Mindanao.	June 1907	moderate	present	
	Aug.	few	present	
	Sept.	few	present	
	Nov.	moderate	present	
	Dec.	moderate	present	
	Jan. 1908	moderate	present	
Siassi, Siassi.	Jan. 1904	few	present	Parasite found in blood of every man in the command.

TABLE II.—Continued.

Myzomyia funesta Giles (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Stotsenberg, Pampanga.	July 1905	few	present	From July 1—Sept. 30. Intermittent, 25. Remittent, 2. Estevo-autumnal, 27. Average strength of command, 847.
	Aug.	few	present	Anopheles most numerous in Nov., 1905, and malaria most prevalent at the same date.
	Dec.	numerous	prevalent	
	June 1907	few	prevalent	
	Sept.	few	prevalent	
Fort Wm. McKinley, Rizal.	Jan. 1907	few	prevalent	Dengue also prevailing.
Count Wilhelm, Tayabas.	June 1906	few	prevalent	
	Sept. 1907	numerous	prevalent	
Myzomyia rossii Giles.				
Calamba, Laguna.	Jan. 1906	few	present	
Cudarangan, Mindanao.	Jan. 1906	few	none	Present in Jan., 1907.
Camp Daraga, Albay.	July 1907	few	present	
Camp Eldridge, Laguna.	Sept. 1906	few	present	
Camp Gregg, Pangasinan.	Sept. 1904	moderate	excessive	
	Oct.	few	excessive	
	Nov.	few	excessive	
	Dec.	few	prevalent	
	July 1906	few	present	
Infanta, Tayabas.	Oct. 1906	few	present	
	Nov.	few	excessive	
	Sept. 1907	few	present	
Macabebe, Pampanga.	Feb. 1907	few	none	

TABLE II.—Continued.

Myzomyia rossii Giles (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp McGrath, Batangas.	Mch. 1907	few	present	
Polo, Bulacan.	Sept. 1905	moderate	no record	
	Apr. 1906	few	present	
Samal, Bataan.	June 1906	few	prevalent	
Camp Ward Cheney, Cavite.	Sept. 1907	few	present	
	Nov. 1908	few	present	
Fort Wm. McKinley, Rizal.	Oct. 1905	few	present	
	Nov. 1907	few	present	

Myzomyia ludlowii Theobald.

Balayan, Batangas.	May 1903	few	no record	
Baliuag, Bulacan.	May 1903	few	no record	
	June	few	no record	
Batangas, Bataan.	Nov. 1903	few	no record	
Benguet Road.	Jan. 1902	excessive	excessive	One collection of more than 50 specimens contained only *M. ludlowii*.
	Apr.	excessive	excessive	
	May	excessive	excessive	
	June	excessive	excessive	
Boac, Marinduque.	Nov. 1907	few	present	
Bongabong, Nueva Ecija.	Jan. 1903	few	"most prevalent"	
Calamba, Laguna.	Apr. 1903	moderate	no record	
	Jan. 1906	few	present	
Cottabato, Mindanao.	June 1905	moderate	no record	
Cudarangan, Mindanao.	Jan. 1906	few	no record	Present 4% in Jan., 1907.
Camp Daraga, Albay.	Aug. 1905	moderate	present	
	June 1908	few	present	
Dasmariñas, Cavite.	Jan. 1901	few	no record	

TABLE II.—Continued.

Myzomyia ludlowii Theobald (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Eldridge, Laguna.	Sept. 1906	few	present	
	May 1908	few	present	
Camp Gregg, Pangasinan.	July 1904	few	prevalent	
	Aug. 1904	few	excessive	About 10% of command.
	Sept.	numerous	excessive	About 10% of command.
	Oct.	numerous	excessive	More than 15% of command.
	Nov.	numerous	excessive	10% of command, 57% of admissions.
	Dec.	few	prevalent	
	Jan. 1905	few	present	
	Feb.	few	present	
	July 1906	few	present	In the meantime prophylactic measures used vigorously.
Hagonoy, Bulacan.	Sept. 1901	numerous	no record	
Ili-ilo, Panay.	Aug. 1903	few	none	No malaria originating in Ilo-ilo for a year.
	June 1904	few	none	
	June 1906	few		Malaria rarely seen—dengue present.
Imus, Cavite (Camp Ward Cheney).	July 1904	few	present	
	June 1906	moderate	prevalent	*Filaria philippinensis* also present.
	Aug.	moderate	prevalent	
	Sept.	few	present	
	Oct.	few	present	
	Dec.	few	none	
	May 1907	moderate	present	
	July	few	present	
	Sept.	few	present	
	Oct.	few	present	
	Nov.	few	present	
	Dec.	moderate	present	
	June 1908	few	prevalent	
	Aug.	moderate	prevalent	
Infanta, Tayabas.	Jan. 1906	few	present	
	Feb.	few	present	
	May	few	present	
	June	few	present	
	Oct. 1907	few	present	
	Nov.	few	present	
	Jan. 1908	moderate	present	
	Feb.	few	no statement	
	May	moderate	no statement	
	June	few	present	Present in June.
	July	few	present	

TABLE II.—Continued.

Myzomyia ludlowii Theobald (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp John Hay, Benguet.	Mch. 1907	few	present	
	Apr.	few	present	
Jolo, Jolo.	Sept. 1906	numerous	present	5% of command.
	Jan. 1907	numerous	prevalent	
	Feb.	excessive	prevalent	About 5% of command.
Camp Jossman, Guimaras Island.	July 1904	moderate	excessive	100–140 admissions for malaria.
	Jan. 1906	few	present	
	Feb.	few	present	Collections in 1905, taken in daytime, no *Anophelinæ*, but it was regarded as a malarial station.
Ligao, Albay.	Aug. 1904	moderate	present	
Macabebe, Pampanga.	July 1907	moderate	prevalent	
	Feb. 1908	few	none	
Malahi Is., Laguna (Mil. Pris.).	Apr. 1905	few	present	
	May	moderate	present	
Manila.	Aug. 1901	few	no record	
	Aug. 1904	few	prevalent	
Mariquina, Rizal.	Mch. 1905	moderate	present	"Practically no malaria."
	Apr.	few	present	
Montalbon, Rizal.	Apr. 1903	moderate	no record	
Camp McGrath, Batangas.	June 1906	moderate	present	
	July	few	none	But present in August.
	Feb. 1907	few	present	
	Apr.	few	none	
	Aug.	few	present	
	Oct.	moderate	present	"No prevailing diseases."
	Feb. 1908	few		"No prevailing diseases."
Naic, Cavite.	Apr. 1903	few	no record	
	May 1904	few	no record	
	Mch. 1908	moderate	no statement	
Nasugbu, Batangas.	July 1907	few	present	
Ormac, Leyte.	Mch. 1903	moderate	prevalent	
	May	moderate	prevalent	

TABLE II.—Continued.

Myzomyia ludlowii Theobald (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Orion, Bataan.	May 1901	moderate	no record	
	June	numerous	no record	But malaria was prevalent among the natives, and there were several deaths.
	July	numerous	no record	
Parang, Mindanao.	May 1906	few	prevalent	May, June and July, epidemic of malaria.
	Nov. 1907	few	none	
	Summer, '08	few	present	Collection undated.
Polo, Bulacan.	May 1905	numerous	no record	
	Sept.	numerous	no record	
	Apr. 1906	excessive	prevalent	
	June	few	prevalent	
Samal, Bataan.	Feb. 1906	few	no record	
	June	excessive	prevalent	
	July	excessive	prevalent	
	Aug.	excessive	prevalent	
	Sept.	excessive	none	
	Oct.	few	none	
	Dec.	few	none	
	Jan. 1907	few	present	
	Feb.	numerous	present	
	Mch.	excessive	no statement	
	Apr.	excessive	no statement	
	May	excessive	prevalent	
	June	few	present	
Santa Cruz, Laguna.	Jan. 1902	few	no record	Cholera present.
San Isidro, Nueva Ecija.	Sept. 1906	excessive	"not prevailing"	
	Mch. 1907	few	present	
San José, Abra.	Aug. 1901	moderate	no record	
	Sept.	moderate	no record	
San Mateo, Rizal.	Nov. 1906	moderate	excessive	Prophylactic doses of quinine and "19 cases in 9 days" were all that were recorded.
Siassi, Siassi.	Sept. 1903	few	present	In Jan., 1904, Surgeon writes: "Command reached Siassi from the U. S. Sept. 15, 1903; now the parasite is present in blood of nearly every man."

TABLE II.—Continued.

Myzomyia ludlowii Theobald (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Stotsenberg, Pampanga.	Oct. 1905	moderate	present	
	Nov.	numerous	prevalent	
	Dec.	moderate	present	
	Jan. 1906	moderate	present	
	Sept.	few	prevalent	
Tacloban, Leyte (Camp Bumpus).	Aug. 1902	few	present	
Fort Wm. McKinley, Rizal.	Oct. 1905	numerous	prevalent	
	Nov.	few	prevalent	
	Dec.	moderate	excessive	
	June 1906	few	present	
	Aug.	few	prevalent	
	Apr. 1907	numerous	prevalent	
	May	numerous	prevalent	
	June	moderate	present	
	Oct.	few	present	
	Nov.	few	present	
Zamboanga, Mindanao.	July 1907	moderate	present	
Myzomyia indefinita Ludlow.				
Aparri, Cagayan.	Oct. 1904	moderate	present	Dengue and elaphantiasis also present.
Boac, Marinduque.	Mch. 1907	few	present	Present in troops; enormous increase in June among natives; very prevalent in town since April.
Calamba, Laguna.	Apr. 1903	moderate	no record	
	June 1906	moderate	present	
Cottabato, Mindanao.	June 1904	few	no record	
	June 1905	few	no record	
Camp Daraga, Albay.	May 1907	few	prevalent	
	June	moderate	prevalent	
	July	few	prevalent	
	May 1908	moderate	present	
Camp Eldridge, Laguna.	Sept. 1906	few	present	
	Oct.	few	present	
	Mch.	numerous	prevalent	
	Mch. 1908	numerous	prevalent	50% of admissions for malaria.
	Apr.	numerous	excessive	"80% of admissions for malarial fever."
	May	numerous	present	

TABLE II.—Continued.

Myzomyia indefinita Ludlow (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Gregg, Pangasinan.	May 1904	numerous	present	
	July	numerous	prevalent	
	Aug.	numerous	excessive	
	Sept.	numerous	excessive	
	Oct.	excessive	excessive	
	Nov.	numerous	excessive	57% of admissions.
	Dec.	few	prevalent	
	Jan. 1905	few	present	
	Feb.	few	present	
	June 1906	few	present	
	July	excessive	present	
	Aug.	moderate	present	
	Sept.	few	present	
	Oct.	few	present	
	Nov.	excessive	no statement	
	Feb. 1907	excessive	present	
	May	excessive	prevalent	"Increased" malaria.
	July	excessive	prevalent	"Large increase of malaria."
	Aug.	excessive	prevalent	"Did you ever see so many *anopheles?*"
Imus, Cavite (Camp Ward Cheney).	July 1906	moderate	prevalent	*Filaria philippinensis* also present.
	Sept.	few	present	
	Oct.	few	present	
	Sept. 1907	few	present	
Infanta, Tayabas.	May 1906	excessive	present	Was prevalent in April.
	June	few	present	
	July	few	present	
	Oct.	moderate	present	
	June 1907	few	prevalent	
	July	few	prevalent	
	Aug.	moderate	present	"Very prevalent among natives in September."
	Oct.	moderate	present	
	Dec.	few	prevalent	
	May 1908	numerous	no statement	
	June	moderate	present	
	July	moderate	present	
Camp Jossman, Guimaras Is.	Sept. 1903	few	excessive	
Ligao, Albay.	Sept. 1904	few	present	Among natives.
	Nov.	few	present	

TABLE II.—Continued.

Myzomyia indefinita Ludlow (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Macabebe, Pampanga.	Nov. 1907	numerous	present	Prophylactic measures enforced.
	May 1908	few	no statement	
Manila.	Aug. 1904	few	prevalent	
Camp McGrath, Batangas.	Aug. 1906	few	present	
	Sept.	few	none	It is not known how much the prophylactic use of quinine may have affected the malarial conditions.
	Jan. 1907	few	none	
	Mch.	numerous	none	
	Apr.	few	none	
	Oct.	few	none	
	Nov.	few	no statement	"No prevailing diseases."
Mariquina, Rizal.	Mch. 1905	moderate	present	
	Apr.	few	present	
Naic, Cavite.	Dec. 1906	numerous	prevalent	
	Jan. 1907	moderate	prevalent	
	July	few	prevalent	
Nasugbu, Batangas.	Nov. 1906	few	present	
Parang, Mindanao.	May 1906	numerous	prevalent	Admissions, 71; strength of command, 413.
Polo, Bulacan.	Dec. 1905	few	no record	
Samal, Bataan.	July 1906	few	prevalent	
	Aug.	moderate	prevalent	
	Sept.	numerous	none	
	Oct.	numerous	none	
	Nov.	few	present	
	Dec.	excessive	none	
	Jan. 1907	few	present	
	Feb.	few	present	
San Isidro, Nueva Ecija.	Aug. 1906	moderate	present	"No prevailing diseases."
San Mateo, Rizal.	Feb. 1907	few	present	
Camp Stotsenberg, Pampanga.	Sept. 1905	numerous	no record	
	Sept. 1906	numerous	prevalent	246 cases in a command of 1,916.
	May 1907	moderate	present	
	Sept.	few	prevalent	

TABLE II.—Continued.

Myzomyia indefinita Ludlow (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Tiaong, Tayabas.	June 1902	few	no record	Dengue.
Fort Wm. McKinley, Rizal.	Oct. 1905	numerous	present	
	Nov.	few	present	
	Feb. 1907	few	prevalent	
	May	numerous	prevalent	
	June	numerous	prevalent	
	Aug.	few	present	

Myzomyia thorntonii Ludlow.

Cottabato, Mindanao.	June 1904	few	no record	
	June 1905	few	no record	
Camp Gregg, Pangasinan.	May 1904	few	present	
Infanta, Tayabas.	June 1907	few	prevalent	
	Oct.	few	present	
Macabebe, Pampanga.	Feb. 1908	few	none	
Oras, Samar.	July 1902	moderate	no record	
Parang, Mindanao.	June 1907	few	present	
Camp Stotsenberg, Pampanga.	Sept. 1907	few	prevalent	
Fort McKinley, Rizal.	Nov. 1905	moderate	prevalent	
	Aug. 1908	few	no statement	

TABLE III.

STETHOMYIA.

Stethomyia pallida Ludlow.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Stotsenberg, Pampanga.	Sept. 1905	few	present	

TABLE IV.

MYZORHYNCHUS.

Myzorhynchus barbirostris Van der Wulp.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Daraga.	Feb. 1908	few	no statement	Present in April.
Camp Gregg Pangasinan.	July 1904	few	prevalent	
	Aug.	moderate	excessive	
	Sept.	moderate	excessive	
	Oct.	moderate	excessive	
	Dec.	few	prevalent	
	Oct. 1906	few	present	
Infanta, Tayabas.	Nov. 1907	few	present	
Parang, Mindanao.	Dec. 1906	few	prevalent	71 admissions; 413 in command.
	Sumer,'08	moderate	present	Collections not dated.
Samal, Bataan.	Aug. 1906	few	prevalent	
San Isidro, Nueva Ecija.	Oct. 1906	few	present	
San Mateo, Rizal.	Nov. 1906	few	prevalent	"Only 19 cases in 9 days," prophylactic doses of quinine stopping the outbreak then.
Siassi, Siassi.	Sept. 1903	numerous	present	
	June 1904	few	excessive	In blood of every man examined.
	Mch.	few	prevalent	
Camp Stotsenberg, Pampanga.	Sept. 1904	moderate	prevalent	
Fort Wm. McKinley, Rizal.	Aug. 1907	moderate	present	

Myzorhynchus pseudobarbirostis Ludlow.

Boac, Marinduque.	Nov. 1907	few	present	
Cottabato, Mindanao.	June 1904	few	no record	
Daet, Ambos Camerines.	Oct. 1905	few	no record	But malaria prevailing as a whole.

TABLE IV.—Continued.

Myzorhynchus pseudobarbirostis Ludlow (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Gregg, Pangasinan.	Oct. 1904	few	excessive	
	Nov.	few	excessive	
	Nov. 1906	few	present	
	July 1907	few	present	"Large increase of malaria."
Hagonoy, Bulacan.	Sept. 1901	few	no record	
	Oct.	few	no record	
Infanta, Tayabas.	May 1908	few	no statement	Present in June.
	July	few	present	
Naic, Cavite.	Jan. 1907	few	prevalent	
Parang, Mindanao.	July 1907	few	present	Strength of command, 212; admissions, 5.
	Sumer,'08	few	present	Collections not dated.
Fort Pikit, Mindanao.	July 1904	few	prevalent	
Samal, Bataan.	Dec. 1906	moderate	none	
Fort Wm. McKinley, Rizal.	Nov. 1907	few	present	
Myzorhynchus sinensis Wiedemann.				
Jolo, Jolo.	Sept. 1906	numerous	present	
Fort Wm. McKinley, Rizal.	Aug. 1907	few	present	
Myzorhynchus vanus Walker.				
Camp Daraga, Albay.	Dec. 1905	few	no statement	
	Dec. 1907	few	present	
Camp Eldridge, Laguna.	Mch. 1908	few	no statement	
	Apr.	few	prevalent	
Camp Gregg, Pangasinan.	Sept. 1904	moderate	excessive	
	June 1906	few	present	
	July	numerous	present	
	Aug.	few	present	
	Sept.	few	present	
	Oct.	few	present	

TABLE IV.—Continued.

Myzorhynchus vanus Walker (continued)

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Hagonoy, Bulacan.	Sept. 1901	numerous	no record	
Infanta, Tayabas.	Nov. 1906	few	excessive	
Manila.	July 1901	moderate	no record	
	Aug.	moderate	no record	
	Sept.	moderate	no record	
	Jan. 1902	few	no record	
	Aug.	few	no record	
Naic, Cavite.	Dec. 1906	few	prevalent	
Samal, Bataan.	Aug. 1906	few	prevalent	
	Sept.	few	none	
	Oct.	few	none	
San Isidro, Nueva Ecija.	Aug. 1906	few	present	
Fort McKinley, Rizal.	Oct. 1905	excessive	present	
	Nov.	moderate	prevalent	
	Dec.	few	prevalent	
	Dec. 1906	few	prevalent	
	Jan. 1907	few	prevalent	
	Apr.	few	present	
Camp Ward Cheney, Cavite.	Sept. 1907	few	present	

TABLE V.

NYSSORHYNCHUS.

Nyssorhynchus theobaldii Giles.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp John Hay, Benguet.	Mch. 1907	few	present	
	Apr.	few	present	Nearly 10% of the command in April.
	Nov.	few	present	

TABLE V.—Continued.

Nyssorhynchus fulginosus Giles.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Gregg, Pangasinan.	July 1904	few	prevalent	
	Aug.	numerous	excessive	
	Sept.	excessive	excessive	
	Oct.	numerous	excessive	
	Nov.	few	excessive	More than 15% of the command; 57% of admissions.
	Dec.	few	prevalent	
	July 1906	numerous	present	Prophylactic measures.
	Aug.	few	present	
	Sept.	few	present	
	Feb. 1907	few	present	
Infanta, Tayabas.	May 1906	few	present	
	Oct.	few	present	
	Nov.	few	excessive	
Camp Jossman, Guimaras Is.	Feb. 1906	few	present	Prevalent in March.
Ligao, Albay.	Aug. 1904	few	present	
Fort Wm. McKinley, Rizal.	Oct. 1905	moderate	present	
Camp Ward Cheney, Cavite.	Nov. 1907	few	prevalent	
	Dec.	few	present	

Nyssorhynchus philippinensis Ludlow.

Camp Gregg, Pangasinan.	Aug. 1904	moderate	excessive	
	Sept.	moderate	excessive	
	Oct.	moderate	excessive	
	Nov.	few	excessive	
	Dec.	few	prevalent	
	Jan. 1905	few	present	
	June 1906	few	present	
Infanta, Tayabas.	Sept. 1906	few	present	"March, April, May, June, July, August, usually wet months at this station."
	Oct.	excessive	present	
	June 1907	moderate	prevalent	
	Dec.	few	prevalent	
	Jan. 1908	few	present	
San José, Abra.	Aug. 1901	moderate	no record	
	Sept.	moderate	no record	
Fort Wm. McKinley, Rizal.	Oct. 1905	few	present	
	Nov.	few	present	Increased number of cases.

TABLE VI.

CELLIA.

Cellia flava Ludlow.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Wilhelm, Tayabas.	Sept. 1907	few	prevalent	But only 13 cases in command of 330.

TABLE VII.

CALVERTIA.

Calvertia lineata Ludlow.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Malaria.	Remarks.
Camp Gregg, Pangasinan.	Aug. 1906	few	present	Not described until 1908.

Comparison of these tables shows *Myzomyia ludlowii* and *Myzomyia indefinita* to be much the most widely distributed throughout the Islands, the actual number of stations from which the different *Anophelinæ* were taken being:

Myzomyia ludlowii	42
Myzomyia indefinita	26
Myzomyia rossii	12
Myzorhynchus vanus	11
Myzorhynchus pseudobarbirostris	11
Myzomyia funesta	10
Myzorhynchus barbirostris	10
Myzomyia thorntonii	8
Nyssorhynchus fulginosus	6
Nyssorhynchus philippinensis	4
Myzorhynchus sinensis	2
Stethomyia pallida	1
Myzomyia theobaldii	1
Cellia flava	1
Calvertia lineata[1]	1
Anopheles formosus	1

Experiments made in India and Western Africa show *Myzomyia funesta* (Africa), *Myzorhynchus barbirostris* (India), *Myzorhynchus sinensis* (India), *Nyssorhynchus theobaldii* (India), *Nyssorhynchus fulginosus* (India) hosts of the malarial parasite, while *Myzomyia rossii,* placed on the list of hosts in Manson's "Tropical Diseases," third edition, originally on the authority of James, is declared negative by others, and held by Green to be responsible for some malarial outbreaks in Ceylon. This gives us four probable and two doubtful hosts of these sporozoites; but *sinensis* has been sent in from two Posts only, and *theobaldii* from only one, and their influence on the amount of malaria in the Islands seems likely to be small; *barbirostris* also is not widely distributed. Concerning *fulginosus,* James and Liston say, "*A. fulginosus* is the only member of this group which has up to the present time been found in nature with sporozoites *resembling* those of malaria," and it would seem that it must still be classed as doubtful, though, as it has never been sent in during the period of this work except when malaria was prevalent, it is probably connected with the transmission of this disease in the Islands. Of *Myzomyia rossii* James and Liston say that though the parasite can develop in it, it has never been found

[1] Originally referred to Chagasia, and removed from that genus because of the abdominal scales.

infected "in nature." Its appearance in the collections does not connect it definitely with malarial fevers in the Philippines.

M. funesta appears constantly in malarial outbreaks, so constantly in fact that the appearance of one specimen in a collection is enough to lead to a suspicion that malaria is present, and even a small number of them is usually accompanied or immediately followed by new cases, the number depending largely on the prophylactic control of the station.

None of these species shows a distribution at all comparable to that of *Myzomyia ludlowii* and *Myzomyia indefinita*, and it becomes of interest to see if these latter show indications of being connected with the transmission of malaria—a question which can, of course, only be definitely settled by proper experiments with the insect. Of the forty-two stations where *ludlowii* was taken, twenty-eight show the presence at some date of *indefinita* or of one or more of the species referred to; these stations are thrown out of consideration, as the disease may have been carried by one or the other of these insects. Of the remaining fourteen stations, some are, most unfortunately, among those whose "sick reports" are inaccessible to me, they being no longer in the Surgeon General's Office. Of two of these stations there are private records and the rest show rather suggestive entries.

Of Orion I have personal recollection, and know that "calentura" (the usual term for malarial fevers) was the prevalent disease, with some deaths, during the period when *M. ludlowii* was most numerous, while before its appearance there was little sickness in the town. It was there that the first specimen of *ludlowii* was taken, and no other species of *Anophelinæ* were taken from April to July (inclusive), nor later (in September).

At the camp on the Benguet road no other "anopheles" was taken during the months collections were taken; they were present in quantities almost to the exclusion of other mosquitos, and one collection of about fifty specimens contained only this species, though no especial effort was made to that end. During the period covered by the prevalence of this insect malaria was extremely prevalent and practically the only disease present, while later, when this mosquito disappeared and the collections were mostly *Culicinæ*, the fever also had largely disappeared.

Besides these two stations, the tables show six stations from which only *M. ludlowii* were sent, and which show coincident presence or prevalence of malaria. *Ludlowii* also appears in connection with the proven and doubtful hosts in malarial outbreaks.

The inaccessibility of a part of the sick reports interferes somewhat with the conclusions to be drawn, but the histories at Orion and the camp on the Benguet road, with the records from the remaining six stations, seem to point to *ludlowii* as acting as host for the malarial parasites, at least in some parts of the Islands.

Myzomyia indefinita is, however, as uncertain in regard to its properties as a host as in its physical characteristics. The tables show it appeared alone only at one station, Tiaon, and for this there is no available record of disease. It is a frequent companion of *ludlowii* and is therefore often present during malarial periods, but there is nothing to implicate it definitely as connected with the transmission of disease, though the records from Camp Gregg are suggestive.

No pathological work, either in dissection of the insects or experiments on transmission, has been done on any of the *Anophelinæ* in the Philippines,[1] and it is still to be seen if those proven hosts in Africa and India are in any way responsible for the malarial conditions in the Islands. At present we can only regard them as probable hosts and corroborate the work of other investigators so far as possible by general observations as to their coincidence with this disease.

Perhaps the most valuable of the collections, showing a great number of *Anophelinæ* and a long-continued presence and high prevalence of malaria, were those taken in 1904-05 at Camp Gregg, Pangasinan, a table of which is given below. These collections were commenced in May, 1904, and taken continuously, part of the time daily, until February, 1905. The incidence of malaria was highest in November, but was very large in August, September, and October, as will be seen by the previous tables.

[1] Two articles bearing on this point have appeared since this was written. One, by Captain P. M. Ashburn and First Lieutenant C. F. Craig, Assistant Surgeons U. S. Army (Journal of the Association of Military Surgeons, December, 1907), which states *M. ludlowii* probably does not carry malaria, the experiments not being given; the other, by C. S. Banks (Philippine Journal of Science, vol. II, Medical Science, December, 1907), in which the experiments in transmission, results of dissection of mosquito, and photomicrographs of sections showing development of the parasite are given to prove that *M. ludlowii* is capable of the transmission of that disease. Apparently the first investigators did their work in Panay, and Mr. Banks did his in Luzon. If both these workers are equally accurate, the condition would be parallel to that of *M. rossii* and suggests a new question in relation to the ability of certain *Anophelinæ* to transmit malaria.

TABLE VIII.

SHOWING DIFFERENT ANOPHELINÆ COLLECTED AT CAMP GREGG, PANGASINAN, MAY, 1904–FEBRUARY, 1905.

	May.[1]	June.	July.	August.	September.	October.	November.	December.	January.	February.	Largest No. in one collection.
Myzomyia funesta.....	0	0	0	0	43	21	16	2	4	0	12
Myzomyia rossi.....	0	0	0	0	22	5	1	1	0	0	14
Myzomyia ludlowii...	0	0	1	7	53	45	43	7	5	1	32
Myzomyia indefinita...	12	0	1	35	50	104	33	8	2	5	60
Myzomyia thorntonii..	1	0	0	0	0	0	0	0	0	0	1
Myzorhynchus barbirostris.....	0	0	2	9	25	9	0	1	0	0	9
Myzorhynchus pseudobarbirostris.....	0	0	0	0	0	3	2	0	0	0	2
Myzorhynchus vanus..	0	0	0	0	8	1	0	0	0	0	4
Myzorhynchus fulginosus	0	0	1	14	143	46	6	1	0	0	55
Myzorhynchus philippinensis	0	0	0	3	21	13	1	1	1	0	7
Total of *Anophelinæ*.....	13	0	5	68	367	247	102	21	12	6	
Total No. mosquitos collected in month.....	43	0	25	79	542	321	156	38	40	13	

Post was abandoned and no collections made after February 8, 1905.

The phrase "no record," which appears with such disheartening frequency in the tables, especially in IX, X, and XI, is used to show that the collecting Surgeons sent no "statement of disease" at the time, and that the sick reports sent to the Surgeon General's Office are no longer available.

All the tables showing distribution are prepared with reference to comparative prevalence between the species tabulated and the total number of mosquitos taken in the month. In studying those for *Stegomyia calopus* Meigen (*fasciata* Fabr.) and *Culex fatigans* Wied., the relative number of these two species should also be taken into account, as there seems to be some relation between them, the one usually increasing comparatively when the other decreases, and *vice versa*. It is, however, difficult to do this with accuracy, because at some Posts, or for some periods at a Post, the collections were taken

[1] The collections for May and June were together in the same boxes.

entirely during the daytime, while at other stations or periods they were taken only at night, and at still other stations or periods include both day and night collections. The last is naturally the only basis fair to these species, as *Stegomyia calopus* flies mostly in the daytime, its second flight, in the evening, not being, so far as I have had opportunity to judge, so general—*i. e.*, not in so large numbers—while *Culex fatigans* is for the most part a night-flyer. The question of perfunctory collection is here also of great moment, as mosquitos taken resting in the very early morning, at 9 a. m., at 2 p. m., and after 9 o'clock at night (these on screens) frequently belong more or less markedly to different species, and half a dozen insects taken at one period on one day are very misleading as to the actual mosquito condition of the locality for a month.

TABLE IX.

STEGOMYIA.

Stegomyia calopus Meigen (*fasciata* Fabr.).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Aparri, Cagayan.	Aug. 1901	unknown	no record	At this time the number of specimens was not entered.
	June 1904	few	dengue present	
	Oct.	few	dengue present	
Antimonan, Tayabas.	May 1904	few	no record	
	June	few	no record	
	Nov.	numerous	no record	
	June 1906	numerous	no record	
	July	numerous	no record	
	Aug.	numerous	no record	
	Sept.	numerous	no record	
	Oct.	numerous	no record	
	Nov.	numerous	no record	
	Dec.	numerous	no record	
	Jan. 1907	few	none	
	Feb.	few	none	
	Mch.	numerous	none	
	Apr.	few	none	
	May	numerous	none	
	June	numerous	dengue present	
	July	numerous	none	
	Aug.	numerous	none	
	Sept.	moderate	none	
	Oct.	numerous		"No prevailing disease; no admissions of any kind."
	Dec.	few		"No prevailing disease."
	Jan. 1908	numerous		"No prevailing disease."
	Feb.	few		"No prevailing disease."
	Mch.	few		"No prevailing disease."
	May	moderate	no statement	Malaria present.
	June	few		"No prevailing disease."
	July	few		"No prevailing disease."
	Aug.	moderate		"No prevailing disease."
Balayan, Batangas.	Jan. 1903	few	no record	
	June 1906	moderate	no record	
	July	numerous	none	
	Aug.	numerous	no record	
	Oct.	numerous	no record	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Balayan, Batangas (continued).	Sept. 1907	numerous	no record	
	Oct.	numerous	no statement	
	Nov.	numerous	none	
	Dec.	numerous	none	
	Jan. 1908	numerous	none	"Very few night mosquitos this month."
	Feb.	numerous	no statement	Malaria present.
	Mch.	numerous	none	
Baliuag, Bulacan.	Feb. 1903	few	no record	
	Apr.	few	no record	
	Sept.	numerous	no record	Malaria.
Bamban, Tarlac.	Jan. 1903	numerous	no record	
Batangas, Batangas.	Nov. 1901	unknown	no record	At this time the number of specimens was not entered.
Biñan, Laguna.	Jan. 1903	moderate	no record	Cholera.
	Mch. 1906	few	no record	Post abandoned.
Binangonan, Rizal.	July 1905	numerous	no record	
	Aug.	numerous	no record	
Boac, Marinduque.	June 1906	numerous	no record	
	July	numerous	no record	
	Sept.	numerous	no record	
	Nov.	numerous	no record	
	Feb. 1907	numerous	none	
	Mch.	few	none	
	May	few	none	
	June	few	none	
	July	moderate	none	
	Aug.	numerous	none	
	Sept.	moderate	none	
	Oct.	numerous	none	
	Nov.	few	none	
	Dec.	numerous		"No prevailing disease."
	Jan. 1908	numerous	no statement	Malaria present.
	Feb.	numerous	no statement	Malaria present.
	Apr.	numerous	no statement	Malaria present.
	May	numerous		"No prevailing disease."
	July	moderate		"No prevailing disease."
	Aug.	numerous		"No prevailing disease."
Borongon, Samar.	Jan. 1903	numerous	no record	
	Mch.	numerous	no record	
	May	numerous	during the	
	June	numerous	time	
	July	few	collections	
	Feb. 1904	numerous	were	
	Mch.	numerous	being	
	May	numerous	taken	Post abandoned.

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Bongabong, Nueva Ecija.	Jan. 1903	numerous	no record	Malaria.
	Feb.	numerous	no record	Malaria. Post abandoned.
Bulalacao, Mindoro.	June 1906	few	no record	
	Mch. 1907	few	none	
	May	moderate	none	
	Oct.	moderate	none	
Bulan, Sorsogon.	July 1904	numerous	no record	Post abandoned immediately afterward.
Camp Bumpus (Tacloban), Leyte.	June 1902	few	no record	
	July	moderate	no record	
	Aug.	moderate	no record	
	Mch. 1906	moderate	no record	
Cagayan, Mindanao.	Mch. 1903	moderate	no record	
	May	moderate	no record	
Calamba, Laguna.	Jan. 1906	few	no record	
Calaoag, Tayabas.	July 1904	few	no record	
	June 1905	moderate	no record	
Calapan, Mindoro.	Jan. 1904	moderate	no record	
	July	few	no record	
	May 1904	moderate	no record	
	Oct.	numerous	no record	
	Feb. 1905	few	no record	
	June	numerous	no record	
	June 1906	numerous	no record	
	July	numerous	no record	"Malarial fevers prevailing."
	Dec.	numerous	no record	
	Feb. 1907	numerous	no record	
	Mch.	numerous	none	
	Apr.	numerous	no record	
Catubig, Samar.	Apr. 1903	few	no record	
Camp Connell (Calbaog), Samar.	Feb. 1903	few	no record	
	July 1904	few	no record	
Corregidor Is.	July 1904	moderate	no record	
	July 1905	few	no record	
Cottabato, Mindanao.	May 1903	few	no record	
	Jan. 1905	moderate	no record	
	Feb.	few	no record	
	June	few	no record	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Daet, Ambos Camerines.	June 1906	moderate	no record	
	July	moderate	no record	
	Aug.	moderate	no record	
	Sept.	few	no record	
	Jan. 1907	few	none	Post abandoned May, 1907.
Camp Daraga, Albay.	May 1907	few	none	
	Dec.	few	none	
Dasmariñas, Cavite.	May 1902	numerous	no record	
Dumaguete, Negros.	Aug. 1901	unknown	no record	
Camp Eldridge, Laguna.	June 1907	few	none	
	Oct.	moderate	none	
Camp Gregg, Pangasinan.	Jan. 1905	few	no record	
	July 1907	few	none	
Hagonoy, Bulacan.	Aug. 1901	unknown	no record	
	Sept.	few	no record	
Camp Hartshorne (Laoag), Samar.	Mch. 1903	moderate	no record	
	Sept. 1904	numerous	no record	
	Oct.	numerous	no record	
	Jan. 1905	numerous	no record	
	Feb.	few	no record	
	Apr.	moderate	no record	
	Aug.	few	no record	
Ilo-ilo, Panay.	July 1903	few		"Dengue fever; sporadic cases constantly present in Ilo-ilo; epidemic toward the end of rainy season, when mosquitos are most in evidence."
	Aug.	moderate		
	Sept.	few		
	Feb. 1904	moderate		
	Apr.	few		
	May	few		
	June	moderate		
	July	moderate		
	June 1906	few		

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Infanta, Tayabas.	Jan. 1906	moderate	no record	
	Feb.	few	no record	
	Apr.		no record	Collection too eaten to be entered as to numbers.
	May	moderate	no record	
	June	moderate	for 1906	June *day* collection shows 12 *S. cal.*, 4 *C. fat.*; *night* collection, 14 *C. fat.*, no *S. cal.*
	July	numerous	no record	
	Aug.	numerous	no record	
	Sept.	numerous	no record	
	Oct.	moderate	no record	
	Nov.	few	no record	
	Dec.	moderate	no record	
	Feb. 1907	few	none	
	Mch.	moderate	none	
	Apr.	numerous	none	
	May	numerous	none	
	July	numerous	none	
	Aug.	numerous	no statement	Probably not present.
	Sept.	numerous	no statement	
	Oct.	few	none	Malaria present; probably no dengue.
	Nov.	moderate	none	Malaria present; probably no dengue.
	Dec.	few	none	Malaria present; probably no dengue.
	Jan. 1908	moderate	none	Malaria present; probably no dengue.
	Feb.	few	no statement	Probably none.
	Apr.	moderate	no statement	Probably none.
	May	few	no statement	Probably none.
	June	numerous	no statement	Malaria prevailing.
Jolo, Jolo.	Feb. 1903	few	no record	
	Mch.	few	no record	
Lucena, Tayabas.	July 1902	few	no record	Two mosquitos sent in; one is *S. calopus.*
Macabebe, Pampanga.	July 1907	numerous	none	
	Aug.	moderate	none	"A mild cholera epidemic."
	Oct.	numerous	no statement	Malaria present.
	Nov.	numerous	no statement	Probably none.
	Jan. 1908	few		"No prevailing disease."
	Feb.	few	no statement	"No malaria."
	May	moderate	no statement	
	Aug.	moderate	no statement	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Majayjay, Laguna.	Jan. 1902	numerous	no record	
Manila.	Aug. 1901	unknown	no record	
	Sept.	unknown	no record	
	Aug. 1902	numerous	no record	
	Oct.	few	no record	
	Nov.	few	no record	
	Jan. 1903	few	no record	
	Mch.	few	no record	
	July 1904	few	no record	
	Feb. 1907	few	dengue present	One case.
	Apr.	few	dengue present	One case.
	May	few	none	
Mariquina, Rizal.	June 1903	numerous	no record	
	Nov. 1904	few	no record	
	Mch. 1905	moderate	no record	
Meriveles, Bataan.	May 1904	numerous	no record	Only species in collection.
	Aug. 1905	numerous	no record	
Camp McGrath, Batangas.	July 1906	numerous	none	
	Aug.	numerous	none	
	Sept.	moderate	dengue present	
	Oct.	moderate	dengue present	
	Nov.	moderate	dengue prevalent	
	Dec.	moderate	dengue prevalent	
	Jan. 1907	moderate	dengue present	Also present in February and April.
	May	few	dengue present	
	Aug.	moderate	no statement	
	Oct.	moderate	none	
	Nov.	few	none	
	Dec.	few	no statement	The collection from November to April, inclusive, was entirely "bred from larvæ," and not indicative of the mosquitos present.
	Jan. 1908	few		"No prevailing disease."
	Feb.	moderate		"No prevailing disease."
	Apr.	few	dengue present	
	June	few	dengue present	
	July	numerous	none	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Naga, Cebu.	July 1908	moderate	no statement	
Naic, Cavite.	May 1904	moderate	no record	
	July	numerous	no record	
	Aug.	numerous	no record	
	June 1906	numerous	no record	*i. e.*, records not available.
	Aug.	numerous	no record	
	Sept.	numerous	no record	
	Mch. 1907	moderate	no statement	
	July	numerous	no statement	
Nasugbu, Batangas.	Sept. 1906	moderate	no record	*i. e.*, records not available.
	Oct.	numerous	no record	
	Nov.	few	no record	
	Apr. 1907	numerous	no record	
	May	numerous	no statement	Except as to malaria, probably not present.
	July	numerous	none	
	Aug.	numerous	none	
	Sept.	numerous	none	
	Oct.	numerous	none	
	Nov.	numerous	none	
	June 1908	few	no statement	
	July	few	no statement	
Orion, Bataan.	May 1901	unknown	no record	
	June	unknown	no record	
	Aug.	unknown	no record	
	Sept.	unknown	no record	
Ormac, Leyte (Camp Downes).	Feb. 1903	numerous	no record	
	Mch.	numerous	no record	
	Apr.	numerous	no record	
	May	moderate	no record	
Camp Overton, Mindanao.	Aug. 1905	few	no record	
Panique, Tarlac.	Mch. 1903	few	no record	
Pasig, Rizal.	Aug. 1901	unknown	no record	
Polo, Bulacan.	May 1905	numerous	no record	
	Sept.	few	no record	
	Oct.	few	no record	
	Nov.	few	no record	
	Apr. 1906	moderate	no record	
	May	numerous	no record	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Puerto Princesse, Paragua.	Oct. 1903	few	no record	
	Jan. 1904	few	no record	
Rombion, Romblon.	May 1902	numerous	no record	
Salomaque, Ilocos Sur.	July 1903	moderate	no record	
Samal, Bataan.	June 1906	few	no record	
	July	moderate	no record	
	Sept.	moderate	no record	
	Oct.	moderate	no record	
	Nov.	numerous	no record	
	Dec.	numerous	no record	
	Jan. 1907	few	none	Except as to malaria, and probably not present.
	Feb.	few	none	
	Apr.	few	none	Post abandoned.
Santa Cruz, Laguna.	June 1902	moderate	no record	Cholera present.
	Apr. 1903	moderate	no record	
San Francisco de Malaban, Cavite.	May 1902	numerous	no record	
	June	moderate	no record	
San Isidro, Nueva Ecija.	Sept. 1906	few	no record	
	Oct.	numerous	no record	
	Nov.	numerous	no record	
	Nov. 1907	numerous	none	
San José, Abra.	Aug. 1901	numerous	no record	
Santa Maria, Bulacan.	July 1904	numerous	no record	
San Mateo, Rizal.	June 1906	moderate	no record	
	July	numerous	no record	
	Aug.	moderate	no record	
	Sept.	moderate	no record	
	Oct.	moderate	no record	
	Nov.	few	no record	
	Dec.	few	no record	
	Jan. 1907	few	no statement	
	Feb.	numerous	no statement	
	June	numerous	no statement	
	Sept.	moderate	no statement	
	Oct.	numerous	none	
	Nov.	numerous	none	
	Jan. 1908	numerous		"malaria present"
	Feb.	moderate		"malaria present"

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Camp Stotsenberg (Angeles), Pampanga.	Aug. 1901	unknown	no record	
	Jan. 1902	few	no record	
	July	moderate	no record	
	Nov.	few	no record	
	Sept. 1905	numerous	no record	
	Nov.	few	no record	
	Dec.	few	no record	
	June 1906	few	no record	
	July	moderate	no record	
	Sept.	moderate	no record	Undated specimens received in 1907.
	Nov.	moderate	no record	
	Dec. 1907	moderate	no statement	Malaria present.
	Aug. 1908	moderate	no statement	
Santo Tomas, Batangas.	June 1906	numerous	no record	
	Aug.	numerous	no record	
	Oct.	numerous	no record	
	Jan. 1907	moderate	no statement	Post abandoned July, 1907.
Taal, Batangas.	Jan. 1903	few	no record	
Tanay, Rizal.	June 1904	numerous	no record	
Tarlac, Tarlac.	May 1902	numerous	dengue present	
Tiaong, Tayabas.	June 1902	moderate	no record	
Tobaco, Albay.	June 1904	moderate	no record	
Tuguegarao, Cagayan.	Mch. 1903	numerous	no record	
	May	numerous	no record	
Camp Wallace, San Fernando de Union.	Mch. 1906	few	no record	
	June	numerous	no record	
	July	few	no record	
	Aug.	few	no record	May, July, August and September day collections, and nothing but *S. calopus*.
	Oct.	numerous	no record	
	Jan. 1907	moderate	none	
	Mch.	moderate	none	
	Apr.	numerous	none	
	May	numerous	none	
	July	numerous	none	
	Aug.	numerous	none	
	Sept.	numerous	epidemic of dengue	110 cases of dengue in October.
	Nov.	numerous	present	
	Aug. 1908	numerous	no statement	

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Camp Ward Cheney, Cavite (Imus).	June 1906	moderate	filariasis present	"3 cases *filaria philippinensis.*"
	July	moderate	present	
	Aug.	numerous	present	
	Sept.	numerous	no record	
	Oct.	numerous	no record	225 *S. cal.;* 7 other mosquitos.
	Nov.	numerous	no record	"No malaria or filaria."
	Dec.	numerous	none	
	Jan. 1907	moderate	none	All these collections were taken in daylight.
	Feb.	moderate	none	
	Mch.	numerous	none	
	May	moderate	none	
	June	moderate	none	
	July	moderate	no statement	
	Aug.	numerous	no statement	
	Sept.	moderate	none	
	Nov.	few	none	
	Dec.	few	no statement	All these collections were taken in daylight.
	Jan. 1908	moderate	no statement	All these collections were taken in daylight.
	July	moderate	no statement	All these collections were taken in daylight.
	Aug.	moderate	no statement	
Warwick Barracks (Cebu), Cebu.	Apr. 1903	moderate	no record	
	Feb. 1904	few	no record	Rheumatic affection reported as prevalent during the whole period.
	Apr.	numerous	no record	
	May	numerous	no record	
	June	numerous	no record	
	July	few	no record	
	Aug.	few	no record	
	Sept.	few	no record	
	Oct.	few	no record	
	Nov.	few	no record	
	Dec.	few	no record	
	Feb. 1905	few	no record	
	Mch.	few	no record	
	Nov.	few	no record	
	Jan. 1906	few	no record	
Fort Wm. McKinley, Rizal.	Oct. 1905	few	dengue present	Continued from August, 1904.

TABLE IX.—Continued.

Stegomyia calopus Meig. (continued)

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Fort Wm. McKinley, Rizal (continued).	Apr.	moderate	dengue present	
	May 1906	few	dengue present	
	June	few	dengue present	
	Apr. 1907	moderate	dengue present	Dengue was epidemic in August, 1906, prevalent in November, December, January, February, and continued present till April, 1907.
	May	few	none	
	June	few	dengue present	
	Oct.	moderate	dengue present	
	Jan. 1908	few	no statement	Malaria present.
	May	moderate	dengue prevalent	
	July	few	dengue prevalent	
	Aug.	moderate	no statement	
Camp Wilhelm, Tayabas.	Oct. 1906	few	no record	
	Feb. 1907	numerous	none	
	Mch.	numerous	none	
	May	numerous	none	
	June	numerous	none	
	July	moderate	no statement	
	June 1908	numerous	none	Only malaria reported.
	July	moderate	no statement	

TABLE X.

CULEX

Culex fatigans Wiedemann

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Aparri, Cagayan.	Aug. 1901	unknown	no record	At this time the number of specimens was not entered.
	June 1904	numerous	dengue present	
	Oct.	few	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Antimonan, Tayabas.	May 1904	moderate	no record	
	June 1906	moderate	no record	
	Aug.	moderate	no record	
	Sept.	few	no record	
	Oct.	few	no record	
	Nov.	few	no record	
	Dec.	moderate	no record	
	Jan. 1907	few	none	
	Mch.	few	none	
	Apr.	moderate	none	
	May	numerous	none	Two cases dengue in June.
	July	moderate	none	
	Aug.	numerous	none	
	Sept.	numerous	none	
	Oct.	few		"No prevailing disease."
	Nov.	numerous		"No prevailing disease."
	Dec.	numerous		"No prevailing disease."
	Jan. 1908	few		"No prevailing disease."
	Feb.	moderate		"No prevailing disease."
	Mch.	numerous		"No prevailing disease."
	Apr.	moderate		"No prevailing disease."
	May	moderate	no statement	Malaria present.
	June	numerous		"No prevailing disease."
	July	numerous		"No prevailing disease."
	Aug.	moderate		"No prevailing disease."
Balanga, Batangas.	Jan. 1903	numerous	no record	
	Mch.	moderate	no record	
	May	moderate	no record	
	Mch. 1904	moderate	no record	
	Mch. 1905	moderate	no record	
	Jan. 1906	few	no record	
	June	numerous	no record	
	July	moderate	no record	
	Aug.	few	no record	
	Oct.	few	no record	
	Sept. 1907	few	no statement	"No prevailing diseases."
Balayan, Batangas.	Jan. 1908	moderate	no statement	
	Feb.	few	no statement	Only malaria reported.
	Mch.	few	none	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Baliuag, Bulacan.	Feb. 1903	numerous	no record	
	Apr.	moderate	no record	
	May	moderate	no record	
	June	moderate	no record	
	Sept. 1904	few	no record	
Biñan, Laguna.	Jan. 1903	moderate	no record	Cholera.
	Feb. 1906	moderate	no record	
	Mch.	numerous	no record	Post abandoned.
Binangonan, Rizal.	July 1905	few	no record	
	Aug.	few	no record	
Boac, Marinduque.	June 1906	few	none	All day collections.
	July	few	none	
	Feb. 1907	few	none	
	Mch.	moderate	none	
	May	moderate	none	
	Aug.	few	none	
	Nov.	few		"No prevailing disease."
	Jan. 1908	few	no statement	Malaria present.
	Feb.	few	no statement	Malaria present.
	July	few		"No prevailing disease."
	Aug.	few		"No prevailing disease."
Borongon, Samar.	July 1903	few	no record	
	Feb. 1904	moderate	no record	
	Mch.	few	no record	
	May	moderate	no record	
	Oct. 1907	numerous	none	
Bulalacao, Mindoro.	May 1906	few	no record	
	June	few	no record	
	Apr. 1907	few	none	
	Oct.	moderate	none	
Bulan, Sorsogon.	July, 1904	moderate	no record	
Camp Bumpus, Tacloban.	Feb. 1902	numerous	no record	
	June	few	no record	
	July	few	no record	
	Mch. 1906	numerous	no record	
Cagayan, Mindanao.	Mch. 1903	numerous	no record	
	May	numerous	no record	
Calamba, Laguna.	Apr. 1903	moderate	no record	
	Jan. 1906	numerous	no record	
	June	moderate	no record	
Calaoag, Tayabas.	July 1904	few	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Calapan, Mindoro.	Jan. 1903	moderate	no record	Malaria.
	Feb. 1905	numerous	no record	
	June	few	no record	
	June 1906	moderate	no record	
	Feb. 1907	moderate	no record	
	Mch.	few	none	
	Apr.	few	no record	
Catubig, Samar.	July 1903	moderate	no record	Post abandoned.
Cavite, Cavite.	Aug. 1901	unknown	no record	
	Sept.	unknown	no record	
Camp Connell, Samar.	Feb. 1903	moderate	dengue present	
	July 1904	moderate	none	
	Aug. 1907	few	no statement	
	Oct.	moderate	no statement	
	Dec.	few	no statement	"From January to March 19: Malaria, .143%; dengue .715%; filariasis, none."
	Mch.	few	present	
Corregidor Is.	July 1905	few	no record	
Cottabato, Mindanao.	Jan. 1905	moderate	no record	
	Feb.	moderate	no record	
Cudarangan, Mindanao.	Aug. 1905	few	no record	
	Jan. 1906	few	no record	
Daet, Ambos Camerines.	June 1906	moderate	no record	
	July	numerous	no record	
	Aug.	numerous	no record	
	Sept.	moderate	no record	
	Nov.	moderate	no record	
	Dec.	few	no record	
	Jan. 1907	numerous	none	
	Apr.	numerous	none	Post abandoned May, 1907.
Camp Daraga, Albay.	Aug. 1905	few	no record	
	Dec.	few	no record	
	Aug. 1906	moderate	no record	
	Nov.	numerous	no record	
	Dec.	moderate	no record	
	Mch. 1907	numerous	none	
	May	moderate	none	
	July	moderate	none	
	Sept.	moderate	none	
	Oct.	few	none	
	Nov.	few	none	
	Mch. 1908	few	none	
	Apr.	few	none	
	Summer,'08	few	none	Collections not dated.

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Dasmariñas, Cavite.	May 1902	few	no record	
	Jan. 1903	numerous	no record	
Dumaguete, Negros.	Aug. 1901	unknown	no record	
Camp Eldridge, Laguna.	Dec. 1904	few	no record	
	June 1907	moderate	none	
	July	moderate	none	
	Sept.	numerous	none	
	Oct.	few	none	
	Apr. 1908	few	none	
	Aug.	numerous	none	
Gandara River.	Feb. 1903	few	no record	
Camp Gregg, Pangasinan.	Nov. 1904	few	none	
	Jan. 1905	few	none	
	Feb.	moderate	none	
	July 1906	few	dengue present	
	Oct.	moderate	dengue present	
	Nov.	few	none	
	May 1907	moderate	none	
	July	few	none	
	May 1908	moderate	no statement	
Hagonoy, Bulacan.	Sept. 1901	unknown	no record	
	Oct.	unknown	no record	
	Nov.	unknown	no record	
Camp Hartshorne, Laoag, Samar.	Mch. 1903	moderate	no record	
	Feb. 1904	few	no record	
	Jan. 1905	moderate	no record	
	Feb.	moderate	no record	
	Apr.	numerous	no record	
Camp Hoyt, Samar.	Jan. 1908	few	no statement	
Ilo-ilo, Panay.	July 1903	moderate	no record	"Dengue fever: sporadic cases constantly present in Ilo-ilo; epidemic toward the end of rainy season, when mosquitos are most in evidence."
	Aug.	few	no record	
	Sept.	moderate	no record	
	Oct.	moderate	no record	
	Nov.	moderate	no record	
	Dec.	numerous	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Ilo-ilo (continued).	Feb. 1904	numerous	no record	
	Mch.	numerous	no record	
	Apr.	moderate	no record	
	May	numerous	no record	
	June	moderate	no record	
	July	numerous	no record	
	Sept.	numerous	no record	
	June 1906	numerous	no record	
Infanta, Tayabas.	Jan. 1906	moderate	no record	Day and night collections.
	Feb.	numerous	no record	
	Apr.	numerous	no record	
	May	numerous	no record	
	June	moderate	no record	
	July	moderate	no record	
	Aug.	moderate	no record	
	Sept.	moderate	no record	
	Oct.	moderate	no record	
	Nov.	numerous	no record	
	Dec.	numerous	no record	
	Feb. 1907	numerous	none	
	Mch.	moderate	none	
	Apr.	few	none	
	July	few	none	
	Aug.	moderate	none	
	Sept.	moderate	none	
	Oct.	numerous	no dengue	One case of filariasis and malaria present.
	Nov.	moderate	none	
	Dec.	few	none	
	Feb. 1908	numerous	no statement	
	Apr.	few	no statement	
	June	moderate	no statement	Malaria present.
Jolo, Jolo.	Mch. 1903	numerous	dengue present	
	Aug. 1906	few	none	
	Sept.	few	none	
Camp John Hay, Benguet.	Mch. 1907	moderate	none	
	Apr.	moderate	none	
	Nov.	numerous	none	
	Apr. 1908	numerous	none	
	May	numerous	none	
Camp Jossman, Guimaras Is.	July 1903	moderate	no record	
	July 1905	few	none	
	Jan. 1906	numerous	none	
	Feb.	moderate	none	
Camp Keithley, Mindanao.	Jan. 1906	few	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Ligao, Albay.	May 1904	few	no record	
	Sept.	moderate	no record	
	Nov.	moderate	no record	Beriberi.
Lucena, Tayabas.	July 1902	few	no record	Only two mosquitos sent; one is *C. fatigans.*
Macabebe, Pampanga.	July 1907	few	none	
	Aug.	few	none	
	Oct.	numerous	no statement	Malaria present.
	Nov.	few	no statement	Probably no dengue.
	Jan. 1908	few	no statement	
	Feb.	few	no statement	
	May	few	no statement	
	Aug.	moderate	no statement	
Majayjay, Laguna.	Jan. 1902	few	no record	"One death a day from cholera."
Malabang, Mindanao.	Jan. 1906	few	none	
Malahi Is., Laguna (Mil. Prison).	May 1905	numerous	none	
	June	moderate	none	
	July	numerous	none	
	Aug.	numerous	no record	
Malolis, Bulacan.	May 1904	numerous	no record	
Manila.	Aug. 1901	unknown	no record	Personally I know that comparatively they were moderately present and dengue present. In Jan. and Feb. *culices* were predominant.
	Sept.	unknown	no record	
	Feb. 1902	numerous	no record	
	Aug.	moderate	no record	
	Oct.	numerous	no record	
	Nov.	numerous	no record	
	Jan. 1903	numerous	no record	
	Feb.	numerous	no record	
	Mch.	numerous	no record	
	Apr.	numerous	no record	
	July 1904	moderate	no record	
	Aug.	moderate	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Cuartel de España (Manila).	Jan. 1906	numerous	no record	Only species in collection.
	Feb.	numerous	no record	In 1901, July, August, September, *culices* were predominant at the Plaque Laboratory, and *Stegomyia* at the Cuartel de Infanteria.
	June	numerous	no record	
	July	numerous	no record	
	Aug.	numerous	no record	
	Sept.	numerous	no record	
	Oct.	numerous	no record	
	Jan. 1907	numerous	no record	
	Feb. 1907	numerous	none	Only species in collection.
	Mch.	numerous	none	Only species in collection.
Division Hospital (Manila).	Nov. 1906	numerous	no record	
	Jan. 1907	numerous	no record	At the Post of Manila dengue was present in February, March, and April; one case each month.
	Mch.	numerous	no record	
	Apr.	numerous	no record	
	May	numerous	no record	
	June	moderate	no record	
	July	numerous	no record	Only night collection.
	Aug.	moderate	no record	
	Nov.	numerous	none	
	Jan. 1908	numerous	no statement	
	Feb.	numerous	no statement	
	Apr.	numerous	no statement	
	May	numerous	no statement	
Margosatubig, Mindanao.	Jan. 1906	moderate	no record	
Mariquina, Rizal.	Nov. 1904	numerous	no record	
	Mch. 1905	few	no record	
Meriveles, Bataan.	Aug. 1905	few	no record	
Camp McGrath, Batangas.	June 1906	moderate	none	
	July	few	none	
	Sept.	few	dengue present	
	Oct.	few	dengue present	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Camp McGrath.	Nov.	moderate	dengue prevalent	
	Dec.	moderate	dengue prevalent	
	Jan. 1907	moderate	dengue present	
	Feb.	moderate	dengue present	
	Mch.	few	none	
	Apr.	moderate	dengue present	
	June	moderate	none	
	Nov. 1907	few	none	The collections until April were entirely of "bred from larvæ" specimens and not indicative.
	Jan. 1908	moderate		"No prevailing disease."
	Mch.	numerous		"No prevailing disease."
	Apr.	numerous	none	
	May	numerous	none	
	June	few	dengue present	
	July	moderate	none	
	Aug.	few	dengue present	
Naga, Cebu.	July 1908	moderate	no statement	
Naic, Cavite.	Apr. 1903	numerous	no record	
	May 1904	moderate	no record	
	July	few	no record	
	Aug.	few	no record	
	June 1906	few	no record	
	Aug.	few	no record	
	Sept.	few	no record	
	Dec.	few	no record	
	Mch. 1907	few	none	
	June	few	none	
Nasugbu, Batangas.	Oct. 1906	few	no record	
	Apr. 1907	few	none	
	July	moderate	none	
	Aug.	few	none	
	Sept.	few	none	*S. calopus* 28, *C. fatigans* 2.
	Oct.	moderate	none	
	Nov.	few	none	
	June 1908	numerous	no statement	
	July	numerous	no statement	
Nueva Caceres, Camerines Sur.	June 1904	few	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Oras, Samar.	Nov. 1902	moderate	no record	
	Dec.	moderate	no record	
	Jan. 1906	few	no record	
Orion, Bataan.	Apr. 1901	unknown	no record	Personally I know they were comparatively decreased in May, June, and July, *M. ludlowii* and *S. fas.* appearing in May.
	May	unknown	no record	
	June	unknown	no record	
	July	unknown	no record	
	Aug.	unknown	no record	
	Sept.	unknown	no record	
Ormac, Leyte (Camp Downes).	Feb. 1903	few	none	
	Mch.	few	no record	
	Apr.	few	no record	
	May	few	no record	
Camp Overton, Samar.	Oct. 1906	numerous	no record	
	Feb. 1908	moderate	no statement	
Parang, Mindanao.	May 1906	few	no record	
	Mch. 1907	few	none	Dengue present in July.
	Jan. 1908	moderate	no statement	
	Summer,'08	moderate	no statement	Collections undated through July. Malaria present.
	Aug.	few	no statement	Malaria present.
	Sept.	moderate	no statement	
Pasig, Rizal.	Aug. 1901	unknown	no record	
	Nov.	unknown	no record	
Polo, Bulacan.	May 1905	few	no record	
	Dec.	moderate	no record	
	Apr. 1906	few	no record	
	May	moderate	no record	
	June	numerous	none	
	July	numerous	none	Specimens badly eaten. Number not determinable.
Puerta Princesse, Paragua.	Oct. 1903	numerous	no record	
	Nov.	numerous	no record	
	Jan. 1904	numerous	no record	
	Aug.	few	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Reine Regente, Mindanao.	Feb. 1904	few	no record	
	July 1907	numerous	no statement	
	Nov.	moderate	none	
	Feb. 1908	few	no statement	
Romblon, Romblon.	May 1902	moderate	no record	
Salomaque, Ilocos Sur.	May 1903	moderate	no record	
	July	moderate	no record	
Samal, Bataan.	Aug. 1906	few	no record	
	Sept.	few	no record	
	Oct.	moderate	no record	
	Dec.	few	no record	
	May 1907	few	no statement	Post abandoned.
Santa Cruz, Laguna.	June 1902	moderate	no record	Cholera present.
	Apr. 1903	moderate	no record	
	June 1904	numerous	no record	
San Isidro, Nueva Ecija.	Aug. 1906	few	none	
	Sept.	moderate	no record	
	Oct.	moderate	no record	
	Nov.	few	no record	
	Mch. 1907	moderate	none	
San José, Abra.	Aug. 1901	few	no record	
	Sept.	few	no record	
San Mateo, Rizal.	July 1906	few	no record	
	Aug.	moderate	no record	
	Sept.	moderate	no record	
	Oct.	few	no record	
	Nov.	moderate	no record	
	Dec.	moderate	no record	
	Jan. 1907	moderate	none	
	Feb.	few	none	
	June	few	none	
	Sept.	moderate	none	
	Oct.	few		"No prevailing disease."
	Jan. 1908	few	no statement	Malaria present.
	Feb.	few	no statement	Malaria present.
Sta. Maria, Bulacan.	July 1904	numerous	no record	
Santo Tomas, Batangas.	June 1904	numerous	no record	
	June 1906	moderate	no record	
	Oct.	moderate	no record	
	Jan. 1907	few	no statement	Post abandoned July, 1907.

TABLE X.—Continued.

Culex fatigans Wied. (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Siassi, Siassi.	Sept. 1903	numerous	no record	
	Jan. 1904	few	no record	
	Mch.	few	no record	
Camp Stotsenberg (Angeles), Pampanga.	Aug. 1901	unknown	none	
	Nov.	numerous	none	
	July 1905	moderate	none	
	Aug.	moderate	none	
	Nov.	numerous	none	
	Dec.	numerous	none	
	June	numerous	none	Specimens were received in 1907, but undated, and the month is not known.
	July 1906	few	none	
	Sept.	few	none	
	Nov.	moderate	none	
	Dec.	few	none	Malaria reported.
Taal, Batangas.	Jan. 1903	numerous	no record	
	Mch.	numerous	no record	
Talisay, Batangas.	Feb. 1903	few	no record	
Tanay, Tarlac.	June 1904	moderate	no record	
Tarlac, Tarlac.	Apr. 1902	few	dengue present	
	May	few	dengue present	
Tobaco, Albay.	June 1904	numerous	no record	
Camp Vicars, Mindanao.	Aug. 1907	numerous	no statement	Only two specimens in collection, both C. *fat.*
	Dec.	few	none	
Camp Wallace.	June 1906	few	none	
	July	moderate	none	
	Aug.	numerous	none	
	Dec.	few	none	Dengue epidemic in September.
	Aug. 1908	few	no statement	
San Fernando de Union.	Mch. 1907	moderate	none	

TABLE X.—Continued.

Culex fatigans Wied. (continued)

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Camp Ward Cheney (Innus), Cavite.	July 1904	numerous	no record	
	June 1906	moderate	3 cases filariasis	"Probably brought here by 34th Co."
	July	numerous	3 cases filariasis	
	Aug.	few	3 cases filariasis	All 1906-1907 are daylight collections.
	Sept.	few	none	
	Oct.	few	none	
	Nov.	few	none	
	Jan. 1907	few	none	
	Feb.	moderate	none	
	Mch.	few	none	
	Apr.	few	none	
	July	few	none	
	Aug.	moderate	no statement	
	Sept.	few	none	
	Nov.	few	none	
	Dec.	moderate	no statement	Malaria present, and probably neither dengue nor filariasis.
	Feb. 1908	moderate	no statement	Malaria present, and probably neither dengue nor filariasis.
	Apr.	few	no statement	Malaria present, and probably neither dengue nor filariasis.
	May	numerous	no statement	Malaria present, and probably neither dengue nor filariasis.
	June	few	no statement	Malaria present, and probably neither dengue nor filariasis.
	July	few	no statement	Malaria present, and probably neither dengue nor filariasis.
Camp Warwick (Cebu), Cebu.	Feb. 1903	moderate	no record	Rheumatic affection prevailing in 1903, 1904, 1905. Practically no mosquito taken except *S. calopus*.
	Feb. 1904	numerous	no record	
	Apr.	numerous	no record	
	May	numerous	no record	
	June	numerous	no record	
	July	numerous	no record	
	Aug.	numerous	no record	
	Sept.	numerous	no record	
	Oct.	numerous	no record	
	Nov.	numerous	no record	

TABLE X.—Continued.

Culex fatigans Wied. (continued)

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Camp Warwick, Cebu (continued).	Dec.	numerous	no record	
	Feb. 1905	numerous	no record	
	Mch.	numerous	no record	
	Apr.	numerous	no record	
	Nov.	numerous	no record	
	Jan. 1906	numerous	no record	
Fort Wm. McKinley, Rizal.	Oct. 1905	few	none	
	Nov.	few	none	
	Dec.	few		
	June 1906	moderate	dengue present	
	June 1907	moderate	dengue present	
	July	moderate	dengue present	
	Aug.	moderate	dengue present	
	Oct.	few	dengue present	
	Nov.	few	present	
	Dec.	moderate	present	
	Jan. 1908	moderate	no statement	Malaria present.
	Feb.	moderate	no statement	Malaria present.
	May	few	dengue prevalent	
	June	few	present	
	July	moderate	prevalent	
	Aug.	moderate	no statement	
Camp Wilhelm, Tayabas.	June 1906	few	none	
	Oct.	moderate	none	
	Nov.	numerous	none	
	Dec.	numerous	none	
	Jan. 1907	numerous	none	
	Feb.	few	none	
	Mch.	few	none	
	Sept.	few	none	
	Nov.	moderate	dengue present	Malaria present.
	Feb. 1908	numerous	dengue present	Malaria present.
	Mch.	numerous	dengue present	Malaria present.
	Apr.	numerous	dengue present	Malaria present.
	June	few	dengue present	Malaria present.
	July	few	dengue present	Malaria present.
Fort Wint Zambales.	July 1908	numerous	none	
Zamboanga, Mindanao.	Nov. 1903	numerous	no record	
	July 1907	moderate	none	

TABLE XI.

MANSONIA.

Monsonia uniformis Theobald.

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Aparri, Cagayan.	Oct. 1904	unknown	"elephantaisis" and dengue present	
Calapan, Mindanao.	Oct. 1906	few	no record	
Catubig, Samar.	Jan. 1903	moderate	no record	
	Feb.	moderate	no record	
	Apr.	few	no record	
Camp Connell, Samar.	Mch. 1908	few	none	
Cottabato, Mindanao.	May 1903	few	no record	
	June 1904	few	no record	
	Jan. 1907	few	none	
Cudarangan, Mindanao.	Jan. 1906	moderate	no record	
	July	moderate	no record	
Daet, Ambos Camerines.	Oct. 1905	few	no record	
	July 1906	few	no record	
	Dec.	moderate	no record	
Camp Daraga, Albay.	Aug. 1905	few	no record	
	Dec.	numerous	no record	
	June 1906	numerous	no record	
	July	numerous	no record	
	Aug.	moderate	no record	
	Nov.	moderate	no record	
	Dec.	moderate	no record	
	Mch. 1907	moderate	none	
	May	moderate	none	
	July	few	none	
	Oct.	moderate	none	
	Nov.	moderate	none	
	Jan. 1908	numerous	none	
	Feb.	numerous	none	
	Mch.	numerous	none	
	Apr.	numerous	none	
	May	few	none	
	Summer, '08	few	none	
Camp Eldridge, Laguna.	Dec. 1904	numerous	no record	Collections undated.
	Mch. 1906	numerous	no record	
	Sept.	few	no record	
	Jan. 1907	numerous	none	
Camp Gregg, Pangasinan.	Sept. 1904	moderate	no record	
	Oct.	few	no record	
	Nov.	few	no record	
	Jan. 1905	few	no record	
	Aug. 1906	few	no record	
	Sept.	few	no record	
	Nov.	few	no record	

TABLE XI.—Continued.

Mansonia uniformis Theobald (continued).

Station.	Date.	Prevalence of Mosquitos.	Incidence of Dengue or Filariasis.	Remarks.
Hagonoy, Bulacan.	Sept. 1901	unknown	no record	
Camp Hartshorne, Laoag.	Mch. 1903	few	no record	
	Feb. 1904	few	no record	
	Aug. 1905	few	no record	
	Dec.	numerous	no record	
Camp Hoyt, Oras, Samar.	Jan. 1908	few	no statement	
Infanta, Tayabas.	Jan. 1906	few	no record	
	June	few	no record	
	Nov.	few	no record	
Camp Jossman, Guimaras Is.	Jan. 1906	moderate	none	
	Feb.	numerous	none	
Ligao, Albay.	May 1904	few	no record	
	Sept.	moderate	no record	
	Nov.	moderate	no record	
Malabang, Mindanao.	Oct. 1903	few	no record	
	Aug. 1907	few	no statement	
Malahi Is., Laguna.	Aug. 1905	few	no record	
Mangarin, Mindoro.	Dec. 1903	few	no record	
Manila.	Sept. 1901	unknown	no record	
	July 1904	few	no record	
	Aug.	few	no record	
	Aug. 1907	few	no statement	
Mariquina, Rizal.	Nov. 1904	few	no record	
	Mch. 1905	few	no record	
Camp McGrath, Batangas.	Sept. 1906	few	none	
Nasugbu, Batangas.	Sept. 1906	few	no record	
Nueva Caceres, Cam. Sur.	June 1904	moderate	no record	
Parang, Mindanao.	May 1906	few	none	
	Dec.	numerous	none	
	Jan. 1907	moderate	none	
	Mch.	few	none	
	July	few	none	
	Aug.	few	none	
	Dec.	moderate	no statement	
Pasig, Rizal.	Aug. 1901	numerous	no record	Only this genus in one collection, reported as "fierce."

TABLE XI.—Continued.

Mansonia uniformis Theobald (concluded).

Station	Date	Prevalence of Mosquitos	Incidence of Dengue or Filariasis.	Remarks.
Polo, Bulacan.	Apr. 1906	few	no record	
Reine Regenta, Mindanao.	Feb. 1904	moderate	no record	
	Oct. 1905	numerous	no record	
Sta. Cruz, Laguna.	June 1902	few	no record	
Siassi, Siassi.	Sept. 1903	moderate	no record	
	Jan. 1904	numerous	no record	
	Mch.	numerous	no record	
Sorsogon, Mindanao.	June 1906	few	no record	
Camp Stotsenberg, Pampanga.	Jan. 1903	numerous	no record	
	July 1905	few	none	
	Sept.	few	none	
	Nov.	moderate	none	
	Dec.	moderate	none	
	Sept. 1907	few	none	
	Dec.	few	none	
Tacloban, Leyte (Camp Bumpus).	Feb. 1902	moderate	no record	
Camp Ward Cheney (Imus), Cavite.	July 1904	few	no record	
	Sept. 1906	few	no record	
	July 1907	few	none	
	Aug.	few	none	
Fort Wm. McKinley, Rizal.	Oct. 1905	few	none	
	Nov.	numerous	none	
	Dec.	numerous	none	
	Aug. 1906	few	none	
	Nov.	numerous	none	
	Dec.	numerous	none	
	Jan. 1907	numerous	none	
	July	few	none	
	Aug.	few	none	
	Nov.	moderate	no statement	Malaria reported.
	Dec.	numerous	dengue present	65 cases in a command of 273.
	Jan. 1908	numerous	no statement	Malaria reported.
	Feb.	numerous	no statement	
	Mch.	numerous	dengue epidemic	
	May	few	prevalent	
	July	moderate	prevalent	
	Aug.	few	no statement	
Camp Wilhelm, Tayabas.	Nov. 1907	moderate	no statement	Malaria reported.

GENERAL SUMMARY.

The question of period of flight is hardly touched on in this paper. *Culex fatigans* is probably present at all times, but though increasing greatly in numbers at certain periods of the year, is then relatively present in less numbers on account of the large increase in the actual number in other species. It seems probable that *Stegomyia calopus* as well as the *Anophelinæ* have in this sense a "period of flight"—*i. e.,* are present in such increased numbers as to be relatively more numerous—and at this time *Culex fatigans* is relatively less, even though actually present in greatly increased numbers. Nothing definite is known as to the "hibernation" of species in the Philippines, but some of them probably spend the dry season as adults hidden in the numerous shelters that tropical vegetation and habits of life afford them. The periods of rest and those of increased numbers are not coincident for given species in all parts of the Islands, the climatic differences in regard to the rainy season varying enough to account for it. In places where the rainy season begins in showers in April and it is distinctly rainy in June, *Stegomyia calopus* apparently appears in June or July, increases greatly in numbers, and is most noticeable in July, August, September, October, and then gradually diminishes again. The *Anophelinæ,* under the same conditions, seem to increase about the same time, but continue longer, and if breeding places are abundant, may hold their large numbers through a good part of the dry season. An exception, which is at times an important factor, occurs when the rains are so excessive and constant as to wash out the breeding places so completely that the immature forms are repeatedly destroyed; then the increase comes later and is perhaps markedly lessened. Indeed during the time of such rains mosquitos are frequently very scarce.

It is perhaps a matter of some interest shown by the collections that where *Stegomyia calopus* is infrequent its place is largely taken by *Stegomyia scutellaris* or its variety, *Samarensis,* and where *Culex fatigans* is not so numerous one of the *sitiens* group, usually *microannulatus* Theob. or *alis* Theob., largely replaces it.

Mansonia uniformis Theobald. is apparently a winter species and is taken infrequently and generally in small numbers during the summer months.

To summarize briefly, the records show among the *Anophelinæ*, giving preference to those which have been studied in reference to their ability to act as host in diseases, the following:

Myzomyia funesta Giles.	A proven host of the malarial parasite in Africa, with a moderate distribution in the Philippines; is taken always when malaria is present or prevalent.
Myzorhynchus barbirostris Van de Wulp.	A proven host in India; appears infrequently in the Philippines, but coincident with malarial fevers, and was present in large numbers at Siassi at the time when malaria was so extremely prevalent.
Myzorhynchus sinensis Wiedemann.	A proven host in India; has been taken at too few stations to show that it affects markedly the malarial conditions in the Islands .
Myzorhynchus theobaldi Giles.	A proven host in India; has been taken at only one station and cannot be held responsible for much of the transmission of malaria.
Myzorhynchus fulginosus Giles.	Questioned as a host in India; has a moderate distribution in the Philippines, appears always in connection with malarial outbreaks, and seems likely to be transmitting this disease.
Myzomyia rossii Giles.	Doubted as a host in India; has a moderate distribution, is taken infrequently and in small numbers in the Philippines, and its connection with malaria is not indicated.
Myzomyia ludlowii[1] Theobald.	Never a subject of experiment; is widely distributed, taken in large numbers, appears coincident with malaria in the Philippines, and seems likely to be connected with its transmission.
Myzomyia indefinita Ludlow.	Never the subject of experiment, though widely distributed, taken in large numbers and present during malarial outbreaks, does not occur alone in a sufficient number of stations to be indicative, and its ability as host must be left in doubt.

The remainder of the *Anophelinæ* have either moderate or narrow distribution, and their occurrence does not seem to indicate any connection with malarial fever.

No conclusions can be drawn from the table of *Stegomyia calopus, Culex fatigans,* or *Mansonia uniformis.* The first is a proven carrier of yellow fever, but yellow fever has so far never been present in the Philippines. The wide distribution of *Stegomyia calopus* is, however, very suggestive, taken in connection with the building of the Panama canal, as to the result likely to follow should yellow-fever-infected mosquitos or patients in the proper stage of the disease reach the Islands.

[1] See note on page 30.

Culex fatigans is a proven host of *Filaria bancroftii* and more than suspected as a host of *Filaria philippenensis,* while Graham and Ashburn and Craig claim it as a host for dengue. There are entirely too few *data* gathered here to be in the least indicative, but the epidemicity of dengue and the constant presence of *fatigans* suggest the possibility of another host.

Mansonia uniformis is a proven host, in Africa, for *Filaria bancroftii,* but in the Philippines *filariasis* is confined to native scouts, so far as it is seen by the Army Surgeons, and there have been almost no entries of it on the sick reports; so there is no evidence connecting any mosquito with that disease.

We have, then, four *Anophelinæ—funesta, barbirostris, fulginosus,* and *ludlowii*—which seem likely to be acting as hosts for the malarial parasite in the Philippines, and concerning *Stegomyia calopus, Culex fatigans,* and *Mansonia uniformis* there are too few *data* to judge if they be carriers of disease, and the subject must be left in abeyance.

It would be impossible to mention by name all those who have contributed to this work, but in closing this paper I desire to express my earnest thanks to the Surgeon-General and the Medical Officers to whom my work has been referred, and to the Officers of the Medical Department, U. S. Army, without the authority, interest, and efficient support of the former, and the collections of the latter, the conduct of this research would have been impossible; the Curator, Librarian and Assistant Librarian, Army Medical Museum and Library, Washington, D. C., for many kindnesses; to Mr. Fred. V. Theobald, M. A., Cantab., England, for his cordial interest and courteous assistance; and to Dr. John B. Nichols, of Washington, for friendly help and encouragement during the progress of the work.

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