many as 12,000 adults may be exposed in 1 hour.

ACKNOWLEDGMENT. The authors are indebted to Mrs. Hazel K. Colcock for her assistance and diligence in performing these tests.

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A LIST OF LABORATORY COLONIES OF ANOPHELINE MOSQUITOES

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Recent developments in the fields of malariology, virology, entomology and genetics have renewed interest in anopheline mosquitoes. The rise of drug resistant strains of *Plasmodium falciparum* in Brazil, Colombia, Thailand and other areas has posed new problems in chemotherapy. One of these has been the need to use different vectors in mosquito-induced malarial infections. Studies on simian malaria have emphasized the need for additional laboratory transmission experiments. O'nyong-nyong fever, an epidemic virus disease in East Africa, has been isolated from *Anopheles gambiae* and *A. funestus*. Investigations on mosquito behavior, the genetics of insecticide resistance, mosquito cytogenetics and the genetics of vector susceptibility have further emphasized the need for a compilation of anopheline mosquitoes which are presently colonized in various institutions and laboratories.

This enumeration contains twenty species and subspecies of the genus *Anopheles* that are presently being reared in over fifty laboratories. We have included information on insecticide resistance and experimental malaria transmission when it has been available. Certain laboratory stocks have been given common names, i.e., one of the more widely dispersed *A. quadrimaculatus* colonies is known as the "Orlando strain." These names are indicated with capitalized letters following the geographic origin of the colony. Every effort has been made to make this list as complete as possible. The lack of inclusion of a colonized strain indicates that it was not brought to our attention. We would appreciate receiving information concerning other laboratories which maintain *Anopheles*.

We strongly advise that exotic malaria vectors should not be imported into climates where they can become established. Most investigators are aware of the grave potential for damage to the program of eradication of malaria which could result from the escape and establish-

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ment of a dangerous vector or a resistant strain of a vector in a favorable area where it did not previously exist. For most research purposes, other than infectious disease work, non-vector species should be used in all potentially malarious parts of the world.

Before dangerous or potential malaria vectors are requested for importation and before shipment out of a country, both the requester and the shipper must make sure that the consignee meets the qualifications established in the WHO Seventh Report of the Expert Committee on Malaria (1959). They state that malaria vectors should only be established and studied in a few selected and adequately staffed laboratories where proper precautions can be ensured to avoid any dissemination of dangerous strains. In the United States permits are required by both the U. S. Department of Agriculture (Animal Inspection and Quarantine Division, Agricultural Research Service, Washington, D. C. 20250) and the U. S. Public Health Service (Office of the Surgeon General, Washington, D. C. 20201) for the importation and transfer of disease vectors. A separate application for a permit is required for each such action. We feel that if a laboratory in the United States has been certified by these agencies, it will fulfill the recommendations of the World Health Organization.

We gratefully acknowledge the assistance of the many investigators who responded to our letters of inquiry for information concerning anopheline colonies. The advice of Dr. Oswaldo J. da Silva, Chief, Malaria Eradication, Pan American Health Organization was especially helpful.

Table 1, below, is a list of anopheline colonies, with data on origin, insecticide resistance, malaria transmission and locations of the laboratories where the colonies are maintained. These locations are indicated by appropriate letters ("symbols") which are explained in Table 2.

TABLE 1.—List of anopheline colonies.

Species	Origin of Stock	Insecticide resistance [1]	Malaria transmission [1]	Location of laboratory
A. albimanus	St. Andrew & St. Catherine Parishes, Jamaica	Dln.[2]	. .	METC
"	Jamaica	Dln.	. .	RI
"	Tampico, Tamps., Mexico	S [3]	. .	CNEP
"	Baios de Chila, Oax., Mexico	Dln.	. .	CNEP
"	Mexico	S	. .	BNI; ENCB
"	Mexico (SHELL)	Dln.	. .	RI; CDC; SDL
"	Sanarate, Dept. El Progreso, Guatemala	DDT & Dln.	. .	SNEM-G
	Hacienda La Lagunita, Canton Metapan, El Salvador (METAPAN)	S	. .	AMRO; CNA
"	Hacienda Borbollon, Canton El Jocotal, El Salvador (JOCOTAL)	DDT & Dln.	. .	AMRO; CNA
"	El Salvador (A-9)	DDT & Dln.	*P. falciparum* at LPC-G	JH; LPC-G RI; UIZ
"	Tocomatal, El Salvador (TOCOMATAL)	Dln.	. .	CDC
"	Santa Rosa, Panama	S	. .	IMEM
"	Panama	S	. .	GML; JH; RI
"	Rio Chagres, Colon Prov., Panama	S	. .	SNEM-P
A. aquasalis	Trinidad	S	. .	IVCD
A. balabacensis introlutus	Selangor, Malaya	S	*cynomolgi*	IMR

TABLE 1.—List of anopheline colonies—(continued)

Species	Origin of Stock	Insecticide resistance [1]	Malaria transmission [2]	Location of laboratory
A. aztecus	Mexico	S	*bastianellii, gonderi, inun* & *knowlesi*	LSTM
A. bellator	Trinidad	S	..	IVCD
A. fluviatilis	Kallar, Nilgiris, India	S	*P. vivax, falciparum, inui* & *cynomolgi*	CICD-C
A. freeborni	Fresno Co., California	S	..	BVC
"	Marysville, California (F-1)	S	*P. inui* & *cynomolgi* at CHIMR; *vivax, falciparum, malariae, Fieldi, cynomolgi* (3 strains), *coatneyi* & *brasilianum* at LPC-G.	CHIMR; LPC-G; UIZ; NYUSM
"	United States	..	..	IGC
A. gambiae	Ambursa, Nigeria	Dln.	..	INEM; RI
"	Diggi, Nigeria	S	..	RI; WARC; SAIMR
"	Kano, Nigeria (KANO)	Dln.	..	PD; RI; WARC; BNI
"	Lagos, Nigeria	S	..	BNI; RI
"	Maidihini, Nigeria	S	..	RI
"	Harbel, Liberia	S	*P. vivax, ovale* & *falciparum* [4]	LI
"	Kpain, Liberia	S	..	RI
"	Kpain, Liberia	Dln.	..	RI
"	Man, Ivory Coast	Dln.	..	RI
"	Sassandra, Ivory Coast	Dln.	..	RI
"	Nkolmekok, Cameroons	Dln.	..	RI
"	Bobo Dioulasso, Upper Volta	Dln.	..	RI
"	Kisumu, Kenya	S	..	IMEM; RI; SAIMR; TPRI; WHO-K
"	Taveta, Kenya	S	..	RI; TPRI
"	Bumba, Pare area, Tanganyika (BUMBA)	S	..	BNI; RI; SAIMR
"	Muheza, Tanganyika (MUHEZA)	S	..	BNI; RI
"	Tanga, Tanganyika	S	..	SAIMR
"	G.S.W., East Africa	S	..	IMEM
"	Gololei, Somalia	S	..	IMEM
"	Somalia	S	..	RI

TABLE 1.—List of anopheline colonies—(continued)

Species	Origin of Stock	Insecticide resistance [1]	Malaria transmission [1]	Location of laboratory
A. gambiae	Tinonganine, Mocambique	S	..	SAIMR
"	Plateau de Madagascar	..	..	IRSM
"	Cote Est, Madagascar	..	..	IRSM
A. homunculus	Trinidad	S	..	IVCD
A. labranchiae atroparvus	Epsom, England	S	*P. vivax* & *falciparum*	IMEM
"	Grain, Kent, England	S	*P. vivax*	MRL
"	London, England	S	*P. vivax gonderi, inui* & *knowlesi* at LSTMH	LSTMH; STI
"	East Frisia, Germany	S	..	BNI
"	Hamburg, Germany	..	..	ISS
"	Ferrara, Italy	..	..	ISS; IIM
"	Volturno, Italy	S	*P. vivax* & *falciparum*	IMEM
"	Aguas de Moura, Portugal	S	*P. vivax*	IM
"	Cagliari, Italy	..	..	IGG
"	Podgoria, Rumania	S	*P. vivax* & *falciparum*	IMI
A. maculatus	Selangor, Malaya	S	*bastianellii* & *cynomolgi*	IMR
A. melas	Harbel, Liberia	S	..	IMEM; LI; RI
A. neomaculipalpus	Trinidad	S	..	IVCD
A. pharoensis	Cairo, Egypt	DDT & Dln.	..	RI
"	Cairo, Egypt	Dln.	..	RI
"	El-Marg., Egypt (EL-MARG)	Dln.	..	ICL
"	Kharga Oasis, Western Desert, Egypt (OASIS)	S	..	ICL
A. punctipennis	Allerton Park, Monticello, Illinois (ALLERTON)	..	..	UIZ
A. quadrimaculatus	Allerton Park, Monticello, Illinois (ALLERTON)	..	..	UIZ
"	Maryland (AEHA STRAIN; also known as EDGEWOOD)	DDT & Dln.	..	AEHA; RI; UIZ; USDA-G
"	Cleveland, Mississippi (CLEVELAND)	Dln.	*P. vivax; falciparum* & *cynomolgi* (3 strains) at LPC-G	LPC-G; CDC
"	Wilson Dam, Alabama	..	..	TVA
"	Southeastern U.S. (Q-1)	S	..	RI

TABLE 1.—List of anopheline colonies—(continued)

Species	Origin of Stock	Insecticide resistance [1]	Malaria transmission [1]	Location of laboratory
A. quadrimaculatus	Hartwell Reservoir, Georgia (HARTWELL)	. .	. .	CDC
"	? Savannah, Georgia (SAVANNAH-DIELDRIN)	Dln.	. .	RI; UIZ
"	Laboratory stock mixture from JHU, TVA and USDA-G (SAVANNAH)	S	. .	CDC; ERC; ND
"	Tallahassee, Florida (ORLANDO)	Dln.	*P. gallinaceum* at WRAIR	USDA-G; RI; WRAIR; UIZ; LTV
"	Laboratory stock mixture (BETHESDA)	. .	*P. gallinaceum* at NMRI	NMRI; UIZ
A. stephensi mysorensis	Moawaiya, Iraq	DDT	. .	RI; BNI
"	Bezin, Kazeroun, Fars, Iran (STRAIN K)	DDT & Dln.	*P. falciparum*	IPM
"	Rahgerd, Jirott, Kazeroun, Iran (STRAIN R)	DDT & Dln.	. .	IPM; RI
"	Makian, Bandar-Abbas, Kerman, Iran (STRAIN M)	DDT & Dln.	. .	IPM
A. s. stephensi	Coonoor, India	DDT	*P. berghei; cynomolgi bastianelli, inui & knowlesi*	CICD-D
"	Calcutta City, India	S	*P. vivax; falciparum & malariae*	CSTM
"	Madras City, India	S	*P. vivax; falciparum; inui & cynomolgi*	CICD-C
"	Erode, India	DDT	. .	CICD-C
"	Delhi, India	S	*P. vivax & falciparum* at MRL; *P. Knowlesi* at LSTMH	IMM; IMEM; LPC-G; MRL; LSTMH; RI; WRAIR; PD; (MI ?)
A. sundaicus	Rembang, Java	S	. .	RI
"	Pasir Aedangan, Java	Dln.	. .	RI
"	India	?	. .	LPC-G
A. tangensis	Tanga coast, Tanganyika	S	. .	BNI

[1] The symbol . . indicates that studies of the susceptibility of the colony to insecticides or malarial infection have not been made.

[2] Dln.=resistant to dieldrin.

[3] S=susceptible to normal insecticide exposure.

[4] Dr. R. S. Bray, formerly of the Liberian Institute, has informed us, "The Harbel colony of *A. gambiae* has transmitted *P. vivax* of the chimpanzee, but only with difficulty as the sporozoites are killed by *A. gambiae*. It has failed to transmit *L. reichenowi*, *P. malariae* of chimpanzees, *P. gonderi*, *H. agamae* (=*P. agamae*) and *H. giganica* (=*P. giganteum*); last two of lizards."

TABLE 2.—Location of laboratories with anopheline colonies.

Symbol	Laboratory
AEHA	U.S. Army Environmental Health Agency, Army Chemical Center, Edgewood, Maryland
AMRO	Organizacion Panamericana de la Salud, 4A Calle Pte. No. 943, San Salvador, El Salvador
BNI	Bernhard-Nocht-Institut fur Schiffs—und Tropenkrankheiten, Hamburg 4, Germany
BVC	Bureau of Vector Control, Dept. of Public Health, State of California, Fresno, California
CHIMR	The Christ Hospital Institute of Medical Research, 2139 Auburn Ave., Cincinnati 19, Ohio
CICD-C	Central Institute for Communicable Diseases, Southern India Branch, Pasteur Institute, P.O., Coonoor (The Nilgiris), India
CICD-D	Central Institute for Communicable Disease, 22 Alipur Road, Delhi, India
CNA	Campana Nacional Antipaludica, San Salvador, El Salvador
CNEP	Dept. de Entomologia, CNEP, Lieja 8, Piso 11, Mexico 6, D.F., Mexico
CDC	Communicable Disease Center, Technical Development Laboratories, P.O. Box 769, Savannah, Georgia
CST	Calcutta School of Tropical Medicine, Chittaranhan Ave., Calcutta, India
ENCB	Escuela Nacional de Ciencias Biologicas, Apartado Postal No. 19186, Mexico, D.F., Mexico
ERC	Entomology Research Center, P.O. Box 308, Vero Beach, Florida
GML	Gorgas Memorial Laboratory, Panama City, Panama
ICL	Insect Control Laboratory, Ministry of Public Health, Dokki-Cairo, Egypt, UAR
IDM	Instituto de Malariologia, Aguas de Moura, Portugal
IGC	Instituto di Genetica, Universito, Caghori, Italy
IIM	Instituto d'Igiene d Microbiologia, Universita, Palermo, Italy
IMI	Institute of Medicine, Iasi, Rumania
IMEM	Instituto di Malariologia Ettore Marchiafava, Policlinico Umberto 1, Rome, Italy
IMR	Institute for Medical Research, Kuala Lumpur, Malaya
IMM	Institute of Marine Medicine, Gdansk, Poland
IPM	Institute of Parasitology & Malariology, Teheran University, P.O. Box 1310, Teheran, Iran
IRSM	Institut de Recherches Scientifiques a Madagascar, Boite Postale No. 434, Tananarive, Republique Malgache
ISET	Instituto de Salubridad y Enfermedades Tropicales, Box 19205, Mexico 4, D.F., Mexico
ISS	Laboratorio di Parrisotologia, Istituto Superiore di Sanita, Rome, Italy
IVCD	Insect Vector Control Division, P.O. Box 556, Port of Spain, Trinidad
JH	School of Hygiene and Public Health, Johns Hopkins University, 615 N. Wolfe Street, Baltimore, Maryland
LI	Liberian Institute, Harbel, Liberia
LPC-G	Laboratory of Parasitic Chemotherapy, NIAID, P.O. Box 195, Chamblee, Georgia
LSTM	London School of Hygiene and Tropical Medicine (Dr. J. R. Busvine), London, W.C. 1, England
LTV	Laboratory of Tropical Virology, NIAID, National Institutes of Health, Bethesda, Maryland 20014
METC	Malaria Eradication Training Center, P.O. Box 37, Jones Town, Kingston 12, Jamaica
MI	Mikrobioloski Institut Vojno-Medicinska Akademiia, Beograd, Pasterpva 2, Yugoslavia
MRL	Malaria Reference Laboratory, Horton Hospital, Epsom, Survey, England
ND	Department of Biology, University of Notre Dame, Notre Dame, Indiana
NYUSM	Dept. of Preventive Medicine, New York University School of Medicine, New York, New York
NMRI	Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland 20014
PD	Tropical Pesticides Research Unit, Porton Down, Salisbury, Wilts, England
RI	Ross Institute of Tropical Hygiene, Keppel Street (Gower Street), London, W.C. 1, England
SAIMR	The South African Institute for Medical Research, P.O. Box 1038, Johannesburg, South Africa

TABLE 2.—Location of laboratories with anopheline colonies—(continued)

Symbol	Laboratory
SDL	Shell Development Laboratory, Modesto, California
SNEM-G	Servicio Nacional de Erradicacion de la Malaria, 7A Avenida 0–61, Zona 10, Guatemala, Guatemala
SNEM-P	Servicio Nacional de Eradicacion de la Malaria, Apartado 3469, Panama, Panama
STI	Swiss Tropical Institute, Socinstrasse 57, Basle, Switzerland
TPRI	Tropical Pesticides Research Institute, P.O. Box 3024, Arusha, Tanganyika
TVA	Tennessee Valley Authority, Division of Health and Safety, Wilson Dam, Alabama
UIZ	University of Illinois, Department of Zoology, Urbana, Illinois
USDA-G	USDA, Agricultural Research Service, 1600 SW 23rd Dr., Gainesville, Florida
WARC	Woodstock Agricultural Research Center—Shell Research Ltd., Sitting Bourne, Kent, England
WHO-K	World Health Organization, Kilifi, Kenya
WRAIR	Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. 20012

NOTES ON THE FEEDING HABITS OF *AEDES SOLLICITANS* IN THE CHINCOTEAGUE-ASSATEAGUE ISLAND AREA OF VIRGINIA

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During 1962, as part of a study of the ecology of equine encephalitis in the Assateague-Chincoteague Island area of Virginia, 93,874 mosquitoes were collected for virus isolation studies. Approximately 85 percent of the mosquitoes in these collections were *Aedes sollicitans* (Walker). As part of a study of the vector potential of this species, 243 freshly engorged *A. sollicitans*, collected from a variety of sites, were tested by means of the precipitin test to determine the sources of their blood meals.

The mosquitoes covered in this report were collected from light and CO_2 traps, by sweeping in salt marshes and by aspiration from personnel wearing heavy clothing. These collections were made several times weekly between May and October. The gut contents of the engorged mosquitoes were expressed onto filter paper and each smear labeled as to species, date, location and method of collection. Several smears were made on each paper, and when full, the filter papers were stored in petri dishes and placed in a petri dish can until the end of the collecting season. A supply of silica gel was placed in the can in order to keep the smears dry.

Antisera against human, horse, deer, rodent (Norway rat) raccoon and bird (chicken) sera were prepared by the alum-precipitation method of Weitz (1952). Titers of the various antisera ranged from 8,000 to 512,000 when tested against

[1] The authors gratefully acknowledge the guidance and criticism of Dr. D. J. Gould, Chief, Department of Entomology, Walter Reed Army Institute of Research, Washington 12, D. C.