REVIEWS AND ABSTRACTS

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DURATION OF THE PUPAL STAGE OF *Aedes taeniorhynchus* WITH A DISCUSSION OF THE VELOCITY OF DEVELOPMENT AS A FUNCTION OF TEMPERATURE. By Nielsen, E. T. and Evans, D. G. Oikos 2(2):201–221. 4 tables, 6 figs. 35 refs. (in English) Copenhagen, 1960. Experiments were carried out to determine the duration of the pupal stage of *Aedes taeniorhynchus* at different constant temperatures. By means of techniques described in detail, it was possible to keep the temperature constant within $\pm$ 0.02° C. and determine the moment of transformation within an interval of less than 0.3 percent of the shortest duration of the stage. The analysis of the material was carried out as a determination of the regression of the velocity of development against the temperature, the velocity (v) being $\frac{1000}{d}$ where (d) is the duration of hours. The relation between (v) and the temperature (t) is best expressed by the equation

$$v = a + b \cdot c^t$$

which is the same function Krogh found for the effect of temperature on the respiratory metabolism, and which seems to be generally valid for biological processes as a function of temperature. At high temperatures a negative correction has to be added. The correction has a temperature coefficient which may be expressed by the same function but with different values for the parameters. —Authors' summary.

MEDICAL ENTOMOLOGY. By William B. Herms. Fifth Edition, revised by Maurice T. James, New York: The Macmillan Company, pp. XIV + 616, (185 figures) 1961. $12.00. For more than ten years, this reviewer has used Herms' *Medical Entomology* quite successfully as a textbook. During this period, there have been so many major developments in the field of medical entomology that this reviewer looked forward to the new edition of this book with interest and even trepidation. However, it is with considerable satisfaction that this user of the book can say that the revision is most satisfactory; Dr. Maurice James has done an excellent job of an exceedingly difficult task.

The general plan of presentation of preceding editions has been preserved, as Dr. James points out in his introduction, although certain parts have been strengthened by the inclusion of additional keys and more anatomical material. Two additional changes have also been made of which this reviewer definitely approves: the references at the end of each chapter are arranged alphabetically by author, and some of the case histories of the preceding edition have been omitted. There are twenty-one chapters, the first of which defines medical entomology, outlines the training a medical entomologist should have, and gives a brief history of the subject. This is followed by a chapter on how arthropods cause and carry disease, and one on general control methods. After a chapter on arthropod anatomy, Dr. James discusses the medically important arthropods, beginning with cockroaches and beetles. As might be expected, the Diptera receive major attention, there being no less than nine chapters devoted to the various members of this order.

The first edition of this book was entitled *Medical and Veterinary Entomology*. As knowledge progressed, arthropod transmission of human diseases, as opposed to those of other animals, was emphasized in succeeding editions. This procedure has been followed in the present edition, and as a consequence, some of the veterinary aspects of former editions have been eliminated in order to keep the book within reasonable textbook length.

This reviewer was especially interested in the last chapter, "Venomous and Urtical Arthropods' since this is a subject in which he has been interested for many years. It was most gratifying to note such relatively recent subjects included as Stahnke's L-C treatment of scorpion sting, the dangers to some individuals of wasp and bee sting, and loxoscelism, or spider bite necrosis. Although treatment of various conditions is not emphasized—as it should not have been—the writer would have been happier if the successful use of calcium gluconate for the sting of the puss moth caterpiller, *Megalopyge opercularis* (J. E. Smith), had been mentioned.

Only one incidental error has come to this reviewer's attention so far as the use of up-to-date scientific names is concerned. On page 50, the generic name, *Pediculoides,* is used for a group of viviparous mites that occasionally cause dermatitis in man. This name has been replaced by *Pyemotes,* and this newer designation is used on pages 508 and 509 where one species is discussed.

Dr. James is to be congratulated upon an outstanding achievement.—Osmond P. Breland, The University of Texas.

THE INCIDENCE OF ARTHROPOD-BORNE VIRUSES IN A POPULATION OF CULICINE MOSQUITOES IN TONGALAND, UNION OF SOUTH AFRICA (JANUARY, 1956, THROUGH APRIL, 1960). By Worth, C. B., Paterson, H. E., and de Meillon, Botha. Amer. Journ. trop. Med. Hyg. 10(4):583–592. 4 tables, 1 graph, 14 refs. 1961. From January, 1956,

through April, 1960, 171, 210 mosquitoes from Ndumu, Natal, Union of South Africa, were inoculated into mice in 2,325 lots for attempted virus isolation. Fifty-nine recoveries of viruses were effected.

The viral isolates, including nine identified viral types, were recovered from nine species of mosquito. Among these the ones principally concerned were *Aedes* (*Neomelaniconion*) *circumluteolus* (Theo), *Culex* (*Culex*) *univittatus* Theo., *Mansonia* (*Mansonioides*) *africana* (Theo.), and *Mansonia* (*Mansonioides*) *uniformis* (Theo.), in the order named.

The incidence of viral isolates in time and space at Ndumu indicates the possibility of the following assumptions having some basis in fact: (a) host specificity of most of the viruses concerned is not strict among genera of the tribe Culicini; (b) the virus types occurring in the Ndumu region may have undetected local cryptic cycles, their episodic reappearances being accounted for less by foreign reintroduction than by the occasional conjunction of ecological conditions that permits them to enter mosquito cycles detectable by current methods of investigation.—Authors' summary and conclusions.

THE EFFECT OF A RESIDUAL HOUSE-SPRAYING CAMPAIGN IN EAST AFRICA ON SPECIES BALANCE IN THE *Anopheles funestus* GROUP. THE REPLACEMENT OF *A. funestus* GILES BY *A. rivulorum* LEESON. By Gillies, M. T. and Smith, A. Bull. ent. Res. 51(2):243–252. 4 refs. 1960. In an inland region of Kenya and Tanganyika, in the course of an experiment in malaria control by means of house spraying with dieldrin, routine catches of mosquitoes resting in artificial outdoor shelters were maintained. During the 18 months of the pre-spraying period, catches in the South Pare district of Tanganyika consisted mainly of the principal vectors: *Anopheles gambiae* Giles, and *A. funestus* Giles, together with small numbers of *A. rivulorum* Leeson. During the three years following the spraying, *A. funestus* disappeared almost completely from the catches, while *A. rivulorum* showed an increase of about seven times above the former level. It is concluded that this change in numbers of *A. rivulorum* was associated with the disappearance of *A. funestus* from breeding sites formerly occupied by both species. Precipitin tests indicated that *A. rivulorum* is mainly zoophilous and had not played any part in malaria transmission.—From author's Summary.

THE BREEDING BEHAVIOUR OF THE TYPE FORM OF *Aedes (Stegomyia) aegypti* (L.) IN SOUTH-WESTERN NIGERIA IN RELATION TO INSECTICIDAL CONTROL. By Surtees, G. Bull ent. Res. 50(4): 681–686. 15 refs. 1960. The type form of *Aedes (Stegomyia) aegypti* (L.) is widespread in south-western Nigeria, breeding in the basins of rotting tree stumps in the coastal mangrove swamp, in holes in living trees in the freshwater swamp zone, and near Lagos and in domestic containers restricted to village clearings in the inland forest zone. Pot surveys were carried out in a rain forest village 50 miles northwest of Lagos and in the capital itself. Baked clay pots holding half a gallon of water were used in each case and were placed in three situations: inside houses, outside but in otherwise sheltered positions, and in fully exposed positions. The degree of larval infestation in both cases was greatest inside houses, but the behaviour pattern was less domestic in Lagos. Larvae were found in pots contaminated with decaying vegetable matter in Lagos but not in the village. Spraying tests indicated that houses and foliage afforded varying degrees of protection to the immature stages of the mosquito. Control of this species is made difficult by the localization of the immature stages in relatively inaccessible sites, and it is suggested that individual treatment of larval habitats by insecticidal pellets before the commencement of the rainy season would ensure a high mortality of first-generation larvae. The toxicity hazard to man is not considered to be great.

A further difficulty involved in the control of the species is that it rapidly develops resistance to an insecticide such as DDT, and naturally occurring resistant populations are known. . . . Finally, the possibility must not be overlooked of the establishment of wild populations in forested areas when a campaign is directed against a domestic mosquito. This may be caused by the development of behaviouristic resistance, in which case oviposition behaviour of the female may be altered, or by naturally occurring tree-hole breeders building up in numbers and becoming the dominant population in the area. Both possibilities must be considered in view of the marked plasticity in breeding behaviour of this species.—Excerpts from author's Discussion, Conclusion, and Summary.

THE BIOLOGY OF TWO SPECIES OF MOSQUITO, *Mansonia africana* (THEOBALD) AND *Mansonia uniformis* (THEOBALD) BELONGING TO THE SUBGENUS *Mansonioides* (DIPTERA, CULICIDAE). By Laurence, B. R. Bull. ent. Res. 51(3):491–517. 4 tables, 9 figs. 66 refs. 1960. The author sets forth in detail the life histories, habits, and certain environmental responses of *Mansonia africana* and *M. uniformis* in the laboratory, and reviews the literature on investigations in both laboratory and field.

There are 2 small maps, depicting the distribution of the 2 species. *M. africana* is confined to Africa. *M. uniformis* extends southward from 40° N. in east China, through Cambodia, Thailand, Malaya, India, Ceylon and the Seychelle Islands, into Africa; eastward, it extends through Japan, Java, Borneo, New Guinea, into Australia and the Solomon Islands.

In the adult stage, the 2 species differ in the

color and distribution of scales on scutum and legs, and in the structure of the genitalia of the male and female.

Laboratory colonies on which observations were made include *africana* from Uganda and Tanganyika, and *uniformis* from Malaya, Ceylon, and Uganda. Detailed rearing methods are not given, but reference is made to "The breeding of *Taeniorhynchus* (subgenus *Mansonioides*) mosquitoes in the laboratory," by Laurence, B. R. and Smith, S. A. Proc. R. Soc. trop. Med. Hyg. pp. 518–526, 1958.

Both species are stenogamous; they mated in small cubical cages 25 cm. (approx. 10 in.) on a side, and even in test tubes. Males and females fed on a sugar solution from cotton-wool pads, and on fruits such as apples or raisins. Females of both species fed readily on the blood of man, cat, rabbit, or guinea pig. We assume that the blood was taken by bite and not from blood on cotton-wool. Both species fed approximately 24 hours after emergence and usually fed again immediately after oviposition. At 25°–30° C. oviposition occurred about 3 to 5 days after the blood meal. At 25°–30° C. adults of both species emerged 21–31 days after the eggs hatched.

Fertility between the strains of *uniformis* was established in laboratory experiments, although there was noted a reduction in the fertility of crosses between the African strain and those from Malaya and Ceylon. Attempts to cross *africana* and *uniformis* were not successful.

In both species, the actions of the females prior to and during oviposition are recorded. Oviposition responses to different backgrounds of breeding sites and to water pollution are described in interesting detail. *M. uniformis* appeared to have more visual sensitivity and so was more influenced by the types of background offered for oviposition than was *africanus*. This latter species reacted more acutely to organic pollution of the water offered for oviposition.

Both species react similarly to leaf surfaces when ovipositing. A comparison is made of their responses to 3 species of plants, *Salvinia, Lemna,* and *Azolla.*

The feeding and attachment habits of the larvae were explored in the laboratory, and the conclusion reached that both are filter feeders, will feed on the same type of food, and, if food is present, will attach readily to almost any surface containing air. The pupae of both species develop attached to plants. If they are detached one or 2 days before emergence of the adult, up to 51 percent will continue development and adults will emerge.

In conclusion, the author discusses the similarity of the biologies of *africana* and *uniformis,* the partial infertility between the African strain and the Malayan and Ceylon strains of *uniformis,* and the possible competition in Africa of the two species. He suggests that *uniformis* may be a recent invader, although, so far, there is no evidence of its extending its range or taking over at the expense of *africana.*

It is often difficult for the reader to maintain his train of thought, for throughout the text there is an intermingling of original data and interpretation along with laboratory and field reports from literature.

I wish that Dr. Laurence could have had available for comparison and comment Dr. G. J. Burton's five papers on Indian *Mansonioides.* (Indian J. Malar. 13(2–3) 1959, and 14(2–3) 1960; reviewed in *Mosquito News* 21(2):166, June 1961).

Dr. Laurence has a good knowledge of the literature; his familiarity with and interest in the implications and applications of the findings of others, in addition to his own careful research, makes this an excellent contribution—H. L. Trembley Durkee.

The 14th Annual Meeting of the **UTAH MOSQUITO ABATEMENT ASSOCIATION** will be held March 16th and 17th, 1962, in the Union Building, University of Utah, Salt Lake City, Utah. Dr. George Knowlton, Vice President of the Association, Extension Entomologist of Utah State University, is preparing a program which will stress the role of Education in Mosquito Control. Other recent developments in mosquito control also will be discussed. Dr. Archie Hess will be the banquet speaker on the evening of March 16th.