OPERATIONAL AND SCIENTIFIC NOTES

THE USE OF VERTICAL AERIAL PHOTOGRAPHS IN RURAL YELLOW FEVER MOSQUITO SURVEYS

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The use of aerial mosaics has long been recognized in forestry and other vegetation zone surveys. Closely bound up with this is the value of aerial surveys in tse-tse fly investigations and control, where different species are frequently associated with clearly-defined woodland or other vegetation types. In mosquito surveys, the unique value of such photographs was first strikingly demonstrated in the extensive mangrove swamps surrounding Freetown estuary, Sierra Leone, West Africa (Muirhead-Thomson, 1945). In these aerial mosaics there was a clear distinction between the more extensive Rhizophora zone, and the more limited pure stands or 'orchards' of Avicennia, to which dense breeding of the saltwater *Anopheles melas* was mainly confined.

In March and April, 1971 an Aedes YF-mosquito survey was carried out in a coastal area of southern Africa, the proposed site of a new international airport. No previous mosquito surveys of any kind had been done in that locality, although the mosquito fauna of similar coastal regions had been thoroughly investigated by Muspratt (1955, 1956). In the comparatively short period of 6 weeks allowed for this survey, progress would have been considerably retarded if it had not been for the fact that this area had very recently been covered by aerial photography, and that a fine series of overlapping photographs (1:20,000) was available. Two examples (plates, 1 & 2) covering the proposed airport site, and the main part of the mosquito survey area, are shown.

The remarkable clarity and detail of these plates is self-evident and as a result of these, vastly greater information was immediately available than was possible from any of the existing conventional maps. Of particular value were the following. The location of all houses and settlements, together with their access roads and paths, was clearly defined. The patches of woodland in this predominantly sugar cane belt, were also clearly defined, as well as their access roads or paths through the cane. This was of particular significance in the case of a large patch of woodland, D (plate 2), 35 acres in extent and composed mainly of gum trees with a mixed vegetation fringe, situated less than ½ mile from the NE end of the proposed runway, which was also the site of the proposed airport terminal buildings. In this undulating sugar-cane country, this patch of woodland—in a fold in the hills—was effectively concealed from surrounding roads and nearby viewing points, and it might well have escaped attention by conventional ground survey until too late in the investigation. As it was, it was one of the first places to be visited and established as a collecting station, and sufficient time could be spent there to disclose its unusual significance in the context of YF potential. Four species of sylvan culicine were taken regularly on human bait by day, and these were kindly identified by Dr. B. M. McIntosh of the Arbovirus Research Unit, SAIMR, as follows, *Eretmapodites quinquevittatus, Eret. subsimplicipes, Aedes (Aedimorphus) subdentatus?, Ae. tarsalis* group—*phyllolabis?* Absence of associated males made exact identification of the *Aedimorphus* difficult to establish.

Aedes aegypti breeding was found in a nearby small settlement, E (plate 2), and a male *aegypti* was taken in the woodland itself. In addition, the existence of a troop of 4 monkeys *(Cercopithecus)* in the woodland, suggested the ease with which a focus of imported YF might be established.

Much more intense breeding of *Aedes aegypti* was found in a wide variety of water containers in a settlement, C (plate 1), at the other end of the proposed runway. In additon *Aedes simpsoni* was found breeding in *Bilbergia* plant axils in the tropical garden of an estate, A (plate 1, 2), situated right at the point of the airport runway.

Deep pit shelters constructed in these sampling stations produced large numbers of *Culex* spp *(nebulosus, insignis* and *decens),* but yielded only a single specimen of *Aedes*—at site B (plate 1), —viz *Aedes (Finlaya) circumluteolus.* This survey failed to reveal any sign of *Aedes (Stegomyia) strelitziae* which breeds in wild banana, *Strelitzia Nikolai* (Muspratt, 1950) and which has recently been recognized as the dominant species of *Stegomyia* in parts of Durban on the Natal coast.

Aedes surveys in an Indian township just beyond the NW corner of Map 2 showed the enormous potential for breeding when favourable habitats exist. Great numbers of *Aedes aegypti* larvae were taken throughout the survey from water collections in discarded tractor tires which were stacked in piles in the grounds of the sugar factory within this township. In day-time collections on human bait, *aegypti* was taken at the rate of up to 20 per man hour.

Although the period of the year was not a particularly favorable one for mosquito breeding, a great deal of information was obtained in a comparatively short time due mainly to the fact that the existence of vertical aerial photographs enabled a variety of sampling stations to be set up with the minimum of delay. Provided that

Plates 1, 2.—Two of a series of overlapping vertical aerial photographs covering site of proposed international airport, and showing locations of mosquito sampling stations A–E. (1:20,000).

there is sufficient overlap in the photographic series to allow any one feature to be visible on three consecutive prints, a simple stereoscopic viewer can be used with advantage to assist in the identification of individual huts, houses and buildings. The three-dimensional effect—although exaggerated—is also of assistance in appreciating general topographical features such as ravines, gullys, contours and slope of the land. For this purpose the prints should be kept loose, and not arranged as a more fixed and permanent mosaic.

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THE OCCURRENCE OF *AEDES BARRI* RUEGER IN ALASKA WITH NOTES ON ITS DISTRIBUTION

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Aedes barri Rueger, a banded-legged species belonging to the *Aedes excrucians* complex was described from Minnesota by Rueger (1958). It was subsequently reported from Michigan (Beadle, 1963) and from Canada in the provinces of Ontario (Steward and McWade, 1961) and Manitoba (Brust and Kalpage, 1967).

In early July, 1969, Horsfall made collections of biting *Aedes* females in Michigan and in late July, 1969, made similar collections in Alaska. Viable eggs were obtained from these females from which larvae and adults were reared. Two collections from the Chena River Valley near Fairbanks, Alaska, produced *A. barri* and the same species was taken in eight collections in Michigan, 10 miles east of West Branch in Ogemaw County. These collections greatly extend the known range of *barri*. The presence of *barri* in Alaska indicates that the species is probably distributed across Canada. Beadle's (1963) collection of *barri* was from Isle Royale National Park in Lake Superior. The West Branch collections are in central Michigan and represent the southernmost collection of this species. Further collections and examinations of existing material should reveal *barri* to be widely distributed in the northcentral and northeastern United States.

We also have in possession an interesting larval slide of *A. barri* supplied to us by S. J. Carpenter. It was identified by H. G. Dyar as *Aedes excrucians* (Walker) and was collected in Winnipeg, Manitoba, May 16, 1922.

Aedes barri most closely resembles *Aedes excrucians* (Walker). The male genitalia of the two species appear to be indistinguishable. The larvae are also similar, the most obvious difference occurring in the pecten teeth. In *excrucians* they do not extend beyond the middle of the siphon and the siphonal tuft is inserted near the middle. In *barri* these teeth extend well beyond the middle, usually to the outer third of the siphon with the siphonal tuft inserted distal to the last tooth. Both species have detached pecten teeth although the number is greater in *barri*, generally 3–4 (range 2–5) with the usual number in *excrucians* being 1–2 (range 1–3). Brust and Kalpage (1967) also have pointed out that the spine on each valve of the siphon is larger and much more strongly curved in *excrucians* and 1.5 to 2 times as long as these spines in *barri*. This appears to be a very reliable character, which has held up in all the material we have examined. The adult females of *barri* are very similar to those of *excrucians, A. fitchii* and *A. stimulans*. The structure of the tarsal claws will readily separate *barri* from *excrucians*, but no reliable characters are yet known that will separate *barri* from *fitchii* and *stimulans*.

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