once that is high enough, but is a *reaction* to air temperature. It is well known that it is inaccurate to speak of *the* body temperature of a locust, for the abdomen is often much cooler and nearer air temperature than the thorax. Presumably, the antennæ and legs will have a temperature approximating fairly closely to that of the air, so there is no sensory difficulty in postulating such a reaction. Air temperature, too, is not uniform when the locusts leave; there is often a gradient from the hot ground to the cooler upper air.

The important point is that mass departure appears to be correlated with air temperature, so that other factors affecting it can be studied with a sling or Assmann hygrometer, and the expensive apparatus and skill required for taking body temperatures are not necessary. Further data could therefore be accumulated fairly quickly and easily by workers on different species under widely varying conditions.

Some further observations made in Kenya this season on an immature swarm in conditions of higher air humidity confirm the general conclusion reached above, but put the air temperature of mass departure at between 17° and 19° C. There is also evidence that the settling of a swarm in the evening is correlated quite closely with air temperature.

This work is part of a programme of research under the Anti-Locust Research Centre and is sponsored by the Inter-Departmental Committee for Locust Control.

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F. C. Perry.
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E. N. Wright.
D. Yeo.

Anti-Locust Flight,
Eastleigh,
East Africa.
Sept. 27.

Detection of Birds by Radar

In view of Lack and Varley's recent letter on this subject[1], it may be of interest to quote some passages from a German document prepared this year. Under the heading "Spurious Echoes" (*Scheinziele*), it is stated that "under special weather conditions up to 120 spurious echoes may be observed in an hour. Spurious targets occur especially near the mouths of rivers. Water temperatures which are higher than the temperature of the air seem to favour their appearance. There seems to be a definite connexion between wind direction and the direction of movement of the spurious echoes. Velocities up to 600 km./hr. The ratio of amplitudes between horizontal and vertical polarization is 3 : 1."

Apart from the figure for the velocity, all the facts given suggest that the spurious echoes are due to birds. I suggest that 600 km./hr. is either a misprint for 60, or else has arisen because one or two aircraft echoes have erroneously been reported among the *Scheinziele*. If the Germans really had observed false echoes travelling at such high speeds, we should surely have found them on our own very similar sets as well.

That birds are the cause of spurious echoes does not seem to have occurred to the Germans, for the document goes on: "The physical origin of spurious echoes is so far unexplained. It is probably a matter of sharply bounded layers of discontinuity in the atmosphere. Charges, cloud movements, aerial vortices, as well as the boundary region between two layers of air can be suggested as possibilities." It is then stated that such discontinuities have not been located hitherto, but that this may be due to the crudeness of the methods employed for the exploration of the atmosphere. A programme of research was, therefore, to be initiated on Heligoland, with the object of finding discontinuities only half a metre thick!

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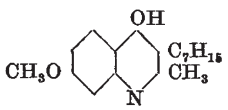
Miscellaneous Weapon Development Dept.,
Admiralty.
Oct. 29.

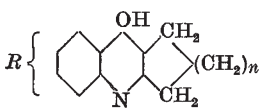
[1] *Nature*, **156**, 446 (1945).

Antimalarial Activity in Tetrahydroacridones and Related Substances

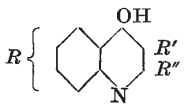
Fitch[1] has revealed the discovery by German workers of prophylactic activity in 4-hydroxy-7-methoxy-3-*n*-heptylquinaldine (I) against avian malaria. We have examined a number of tetrahydroacridones (II; $n = 2$), hydroxydihydro-β-quinindenes (II; $n = 1$) and 4-hydroxyquinolines for prophylactic activity in *P. gallinaceum* infections in chicks and have found noteworthy activity in certain compounds which, so far as the work has proceeded, conform to type (III), of which (I) and (II) are representative, R' and R'' being saturated hydrocarbon residues.



(I)



(II)



(III)

For example, 7-methoxyacridone shows no activity whereas its 1 : 2 : 3 : 4-tetrahydro derivative has a marked action.

The substances were prepared by the Conrad–Limpach reaction from the appropriate β-arylamino-αβ-unsaturated esters. A device which we have used for several years consists of effecting the cyclization in vigorously boiling diphenyl (b.p. 255°) instead of in liquid paraffin[2] heated to 260°; by this means the decomposition frequently accompanying this reaction is avoided and clean products are obtained in excellent yield.

A full account of this work will be published elsewhere at a later date.

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Oct. 22.

[1] Fitch, W. K., *Pharm. J.*, 182 (Oct. 20, 1945).
[2] Limpach, L., *Ber. dtsch. chem. Ges.*, **64**, [B], 969 (1931).

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