antly white sea-birds, among them some albatrosses and shearwaters, do not feed mainly on living fish, but on organisms not endowed with sufficiently long sight for the coloration of the bird predator to be of importance. Some of these birds feed chiefly by night, when white coloration is not of any obvious advantage. Gulls are primarily scavengers.

It is difficult to believe that dark coloration would be a disadvantage to such a bird as a gannet plunging almost vertically at high speed on its prey. There is no evidence that gannets or boobies in immature brown plumage are thereby handicapped in catching fish. The same may be said of the dark-plumaged immature sooty terns.

Diving birds which hunt fish are not infrequently brilliantly coloured or dark—both those which dive from a perch or hovering position, such as kingfishers, or others, such as guillemots, mergansers and cormorants, which dive from the surface of the water.

The white coloration of some large birds, such as swans, appears to be related to their relative immunity from predators and not to feeding habits.

EDWARD A. ARMSTRONG.

St. Mark's Vicarage,
Cambridge.

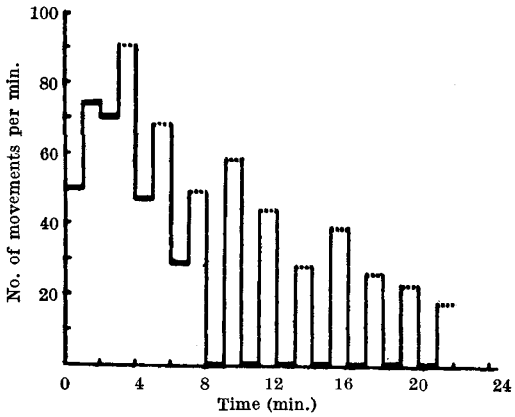
[1] NATURE, 153, 288 (1944).

Immediate Effect of X-Rays on the Movements of Larvæ and Pupæ of Mosquitoes

DURING X-ray experiments with larvæ and pupæ of mosquitoes (Culex), irradiated specimens were observed to accelerate their movements immediately after the onset of irradiation. When the irradiation is interrupted, they return at once to normal behaviour. Since we could find no description of the phenomenon, we attempted to study it in detail, as it appeared to constitute an immediate reaction to X-rays.

Larvæ and pupæ of the mosquito *Aedes ægypti* were used, because they were available in numbers, and their movements can be readily counted. The number of movements per minute was taken as a measure of activity. In order to determine the activity of the larvæ and pupæ under normal conditions, their movements were counted during three consecutive minutes before the beginning of irradiation. This number varies in different individuals from 30 to 80 per minute. The individuals were then subjected to successive irradiations of one minute, alternating with interruptions of the same duration. One larva or pupa at a time was exposed to irradiation in hollow slides filled with water, the diameter of the hollow being 9 mm. Throughout each experiment the specimen remained in position under the X-ray tube, the interruptions of the treatment being effected by closing the X-ray exit with a lead shutter.

A demountable tube was used as X-ray source. The anticathode consists of copper and the exit of the rays is closed by a thin aluminium sheet 30 μ in thickness. The tube was operated with a tension of about 35 kV. max. and a current of 10 m. amp., the intensity being 38,000 r./min., the irradiated specimen being 38 mm. from the anticathode. The characteristic course of the experiments is shown in the accompanying graph. The activity during irradiations and interruptions was determined as described above.



Activity of a pupa of *Aedes ægypti*

The difference in activity during irradiations and breaks is clearly seen. Activity is distinctly increased during irradiation by 20–60 movements per minute. As the experiment progresses the activity diminishes and finally ceases entirely during the breaks, whereas during the irradiation the specimen continues to move actively for a period of about half an hour and even more. Different individuals may react differently to the irradiation with regard to both rate of movement and time of cessation, but the general course of the experiment is uniform.

G. GOLDHABER.
B. FELDMAN-MUHSAM.

Radiological Department,
Cancer Laboratories,
Hebrew University,
Jerusalem.
March 2.

Cultures of Excised Leguminous Roots

WITH the development by White, Robbins, Bonner and others of a technique permitting the culture of root systems from excised root tips, the possibility arose that the method might profitably be employed in studies of leguminous root nodules. Certainly if it proved possible to secure nodule formation on root cultures, then the investigation of some problems associated with the symbiosis between legume and nodule organism would be facilitated. So far as I am aware, there has been only one published record of an attempt to secure the nodulation of excised leguminous roots, namely, that of Lewis and McCoy[1]. Working with excised bean roots growing in agar, they observed the development of four nodules upon one root out of sixty that were cultured.

I have investigated the possibility of inducing the formation of nodules on excised roots of maple pea (Pisum). Excellent growth of roots of this species has been obtained in the medium formulated by Bonner[2], which includes inorganic nutrients, sucrose, vitamin B_1 and nicotinic acid. The procedure adopted is to germinate surface-sterilized and imbibed seeds of maple pea on agar plates until the radicles are 1–2 cm. long. Tips 0·5 cm. in length are then excised and transferred to flasks containing a shallow layer of the sterile nutrient solution. From such tips, roots 10–12 cm. long have developed within two weeks, while after longer periods roots up to 40 cm. in length have been obtained, well supplied with laterals, without any renewal of the medium. The roots bear short root-hairs, but as noted by Bonner[3], no secondary thickening has been observed.