lands, for his help in identifying the specimen, and Dr. Pike for allowing his specimen to be used.

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Influence of Photoperiod on Imaginal Diapause in Acridids

It has recently been shown[1] that the rate of sexual maturation in the desert locust (*Schistocerca gregaria* Forsk.) in the laboratory in London is influenced by the length of the daily photoperiod. Adults emerging in winter or kept in artificial photoperiods corresponding with winter day-length mature more rapidly than those emerging in summer or kept in artificial summer day-length.

The red locust (*Nomadacris septemfasciata* Serv.) has its main outbreak area in the Rukwa Valley of Tanganyika, between latitudes 7 and 9° S. The adults emerge in March or April and undergo a prolonged diapause of 8 or 9 months, finally laying their eggs during the rainy season in November and December. Uvarov[2] and Hamilton[3] showed that this diapause was not obligatory and that rapid oviposition could be induced by keeping the locusts at high temperatures. Hamilton found, however, that this could only be done for one generation, after which diapause intervened in spite of high temperature. A series of breedings which has been carried out in this laboratory over a period of three years has shown that the occurrence of diapause in conditions of constant temperature and humidity is seasonal. Locusts which emerge as adults in spring and summer mature fairly rapidly in 5–10 weeks, whereas those which emerge after the end of July or the middle of August fail to mature until the following March or April. They have, therefore, a diapause of 7–8 months, comparable with that of field locusts. Whether or not a group enters diapause depends entirely on the time of the year and not on the generation. Thus the latest members of the $F1$ progeny of overwintered parents may enter diapause at the same time as the $F2$ progeny; on the other hand, the earliest emerging $F2$ progeny may emerge before August, in which case a third generation is produced without diapause.

The windows of the breeding-room are not screened, and it has been shown that the occurrence of the diapause is entirely governed by length of day. Two artificially lit cabinets were set up, in one of which the daily photoperiod was gradually increased as in spring and in the other it was decreased as in autumn. Newly emerged adults were kept at various times in these two cabinets, and it was found that, whatever the time of the year, maturation periods appropriate to the artificial seasons were induced. Adults, for example, which emerged in the 'spring' cabinet when the photoperiod had increased to 11½ hr. (as in mid-March) matured in 69 days, while those which emerged in the 'autumn' cabinet when the photoperiod had decreased to 12½ hr. (as in mid-September) took 223 days to mature. Continuous breeding without the intervention of diapause has now been maintained for more than two years by the use of artificial lighting. Full details of the experiments will be published later.

Maturation of natural diapause adults occurs in spring; but it has been shown that the lengthening days are not required for the termination of diapause, which occurs at the same time if the locusts are deprived of the extra hours of daylight after the shortest day.

Seasonal change in length of day at the northern end of the Rukwa Valley (about 7° S.) amounts to only 50 min. in the year; but the most rapid decrease in length of day occurs in March, at the time when the adults are emerging. From March 1 to April 1 length of day falls by 14 min., from 12 hr. 12 min. to 11 hr. 58 min. It has not so far been practicable artificially to reduce photoperiod by such small amounts. Preliminary experiments with stationary photoperiods suggest that these are less effective in establishing prolonged diapause than decreasing ones, even although the latter may start at a much higher level. Stationary 8-hr. photoperiods allow maturation in 5 or 6 months, and in one experiment adults kept with photoperiods of 8, 11 and 13¾ hr. matured in 163, 154 and 78 days respectively. This suggests that there is a critical field for effects on maturation lying between 11 and 13¾ hr. Since length of day in the natural habitat varies from about 11½ to 12½ hr. the possibility that it is responsible for the establishment of diapause must be considered.

The grasshopper *Anacridium aegyptium* L., which inhabits the Mediterranean region, normally has only one generation in the year, the adults emerging in July and August but not ovipositing until the following spring. This species, like *Nomadacris*, also enters diapause in the constant laboratory environment. Adults which emerge in spring mature in 7–12 weeks, whereas those which emerge after the end of May usually do not mature until January, February or March. Here again rapid maturation of summer-emerged individuals can be induced by keeping them in artificially increasing day-length. In this species diapause appears so early in the year that it is necessary to suppose that it is only the increasing spring day-length which allows rapid maturation and that it is inhibited by the long days of summer as well as by the decreasing day-length of autumn. This has been shown by Corbet[4] to be the position in the larval diapause of the emperor dragonfly, in which immediate metamorphosis from the last larval instar to the adult occurs in increasing photoperiods, but is inhibited both by diminishing and by stationary long photoperiods.

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Ultra-Structure of the Choanocyte Collar-Cells in Freshwater Sponges

As early as 1896 Bidder[1] mentioned the presence of fibrils in the collars of the relatively large collar cells of calcareous sponges. Later, the very existence of such a structure was denied by several authors though confirmed by a few, particularly De Saedeleer[2] and Dubosq and Tuzet[3]. Kilian[4] has succeeded in demonstrating the existence of fibrillar struc-