3. *Elaphria salzi*, Brsn.
4. *Elaphria wiltshirei*, Brsn.
5. *Elaphria surchica*, Brsn.
6. *Elaphria zernyi*, ssp. *debilis*, Brsn.
7. *Elaphria belucha*, Swinh.

RECORDS ABOUT THE DEVELOPMENT OF A FEW PAPILIO.

By Orazio Querci.

The object of the following notes is to record what we have learnt during the rearing of *Papilio polyxenes*, Fab. at Philadelphia, Pa., and of *P. machaon*, Linn. in Portugal, Spain and Morocco.

Hatching.—In the hottest periods of the year the eggs hatched in six days, but if the sky was often cloudy the hatching was delayed one to two days longer. When the heat was moderate but the sun was generally shining some eggs hatched in a week; however, if the solar radiation was scarce and feeble, the hatching was sometimes delayed for twelve days.

Feeding larvae.—The larvae hatched all together but never started for their first moult at one and the same time. Those that took to their food the more readily grew more rapidly than the others.

While the larvae of some Lepidoptera died on the advent of a cold spell or a heat-wave, those of the *Papilio* never died in our cages. They fed both at about 50° F. if the sun was shining, and at over 90° if the sky was cloudy. When the heat was moderate and the radiation was not strong the larvae were caught by a temporary stupor. If it was hot and the rays were intense the larvae, even in the shade, ceased feeding, but became active again if a fan was set going near them.

Moulting larvae.—When the temperature was fairly low, the larvae, that had started to moult, were unable to throw off their skins, and remained inactive as long as the radiation was not a little stronger than that at which they could feed. The caterpillars that began to moult in the morning often succeeded in casting their skins in a short time, but those that started in the afternoon were caught by stupor when radiation decreased, and delayed moulting until it was again strong enough on the following days. Sometimes the moulting larvae became inactive, even during the day-light, after the sky grew cloudy.

In a hot environment, while the larvae that were feeding continued to do so, those moulting became dormant from an excess of radiation, and delayed casting their skins until it became more feeble in the night. On the other hand, the larvae, which started to moult at sunset, cast their skins rapidly. Often both the feeding and moulting larvae were very active while it was hot and raining, and the sky was covered by thick clouds.

Varying rate of growth of the larvae.—Those larvae that matured, when radiation was balanced both by temperature and other climatic factors, hung up at once and in a perfect manner. If it was rather cold and the radiation was feeble, the mature larvae were unable to hang up; if it was hot and the rays were strong, the larvae became excited and afterwards dormant. In both cases they became active again after the radio-thermic environment returned to a suitable rate. Sometimes

the mature larvae that had remained dormant hung up imperfectly, while the weakest ones remained on the ground, but did not die.

Suspended larvae.—The larvae, that had hung up in a short time, formed pupae in a few hours if the environment continued to be suitable after suspension. When the influences of the climatic factors were balanced, pupae were formed in our cages at any temperature between 50° and 95°.

If the intensity of the radiation changed suddenly after suspension even those larvae that had hung up rapidly became dormant.

The larvae that had lain in lethargy became feeble and, even under the most favourable conditions, they needed some days to recover and so form pupae.

Active pupae.—The pupae that were formed rapidly produced adults in a week to a fortnight, according to their degree of activity, provided that the weather was suitable sufficiently long.

Arrested pupae.—Neither heat above 90° with a strong radiation, nor cold down to 45° with a feeble radiation, produced any change in the *recently formed* active pupae. Instead their development was arrested, either above 85°, when the sun was shining, or below 60°, when the sky was cloudy, while the pupae were *nearing their physiological change.*

The active pupae of which the development had been arrested delayed emergence until after the temperature settled between 65° and 85° with a moderate radiation and a big amount of sunshine. The arrested pupae in our cages produced adults in one to four months according to their degree of latent vitality and the fluctuations of the climate.

Dormant pupae.—None of the pupae formed by weakened larvae have ever been seen to emerge in our cages during the same year in which they have been formed. Most of them produced adults gradually in the following year, but some pupae of *P. machaon* went over two winters. Many dormant pupae either rotted, or dried inside, and their shells remained empty.

Adults.—The adults mated when the combined effects of light, radiation, temperature and humidity were nearing their favourable rate. Light has a preponderant effect, radiation is beneficial in a certain moderate amount.

LIMONISCUS VIOLACEUS, MULL. (ELATERIDAE), A GENUS AND SPECIES OF COLEOPTERA NEW TO BRITAIN.

By A. A. Allen.

The genus *Limoniscus*, Reitter (*Bestimmungs-Tabellen*, 56, 1905, p. 12, 14) is closely related to *Limonius*, Esch. According to its author, it is distinguished from the latter by having the posterior margin of the thorax excised near the angles, which extend forward in a point beneath (*Fauna Germanica*, 1911, vol. iii, p. 224). These characters, however, do not appear very obvious, at any rate in my specimen, and at least as far as the British fauna is concerned, the two genera may be more readily separated as follows:—

1. Penultimate joints of antennae fully as broad as long; posterior angles of thorax projecting slightly outwards, with a strong keel not