and by melanin concentration in same if placed in the darkness. In later stages of development, this primary type of colour response is replaced by a secondary type of response, which consists in the main in a background adaptation. Here the differences can possibly be explained by the respective significance of the chromatophoral system in the life of the larvae and in that of the adults. In the latter, the colour change makes it possible to effect concealment through background adaptation; in the larvae, the activity of chromatophores may lead to protection of internal organs against the harmful effect of light.

This evidently also holds true of the zoea of *Crangon*. In contrast to the adults, the larvae have a planktonic mode of life and float in the superficial water layers, being exposed to an intensive solar irradiation. In this connection it may be interesting to note that their chromatophores are located very closely to the chief internal organs, especially to the nervous system (see the big paired chromatophores between the eyes, Fig. 1 and Fig. 2).

Unfortunately, it was not possible, in my experiments, to observe the metamorphosis of the *Crangon's* zoea into the subsequent larval stages, and for the same reason no observations could be made at which point of development the primary colour response is replaced by the secondary one. It seems rather probable, however, that in settling this question, a comparative consideration of the properties of the chromatophores in other crustacean groups might prove useful.

It is well known that the decapod larvae, the zoea and even more the following mysis stage show a striking resemblance to the adult forms of the *Mysidae*. That also holds true of the chromatophoral system of the shrimp's zoea. It has been proved by KOLLER and MEYER[1] and later by CHICEWICZ[2] that in the *Mysidae* there is a neurohumoral regulation of the chromatophores, comparable to that of the decapods. But CHICEWICZ found also that the pigmentary cells of the mysid species *Praunus flexuosus* can to a certain degree be stimulated directly by light.

Taking for granted that the morphological resemblance of the decapod larvae and the *Mysidae* justifies our making some assumptions as to the existence of common phylogenetic stages in the development of the chromatophoral system, it seems probable that the primary type of response is replaced by the secondary one before the former has developed into the latter. According to this theory, *Praunus* represents the stage in which the response has already developed into the secondary type but the system of chromatophores still persists on the primary level. The same is probably true of the ontogenetic development. This can be presumed from the observations of KEEBLE and GAMBLE[3], according to which the decapod larvae show signs of background reaction at the moment at which the eye-stalks grow out.

In this way, the following stages can be assumed to exist in the ontogenetic and phylogenetic development of the chromatophoral system in higher crustaceans and in the types of reactions:

	System	Type of response
1st stage (decapod zoea) . .	primary	primary
2nd stage (*Praunus*)	primary	secondary
3rd stage (adult decapods) .	secondary	secondary

Zusammenfassung

Das Chromatophorensystem der Zoëa-Larve der Sandgarnele *Crangon crangon* L. ist einfacher ausgebildet als das der erwachsenen Garnele und zeigt auch ein anderes Verhalten Lichtreizen gegenüber. Dieses sogenannte primäre Chromatophorensystem reagiert nur auf einfallendes Licht, und zwar durch Pigmentdispersion, wobei kurzwelliges Licht mehr aktiv ist. Das sekundäre Chromatophorensystem der erwachsenen Garnele dagegen zeigt Anpassung an den Untergrund, wobei der jeweilige Zustand der Farbzelle abhängig ist von dem Verhältnis: reflektiertes Licht: einfallendes Licht (Albedo).

Der Farbwechsel des sekundären Systems ist bekanntlich von einem neurohumoralen Reflex mit Einschluss der endokrinen Tätigkeit der Sinusdrüse abhängig, in dem primären System dagegen scheint eine direkte Reizung der Chromatophoren durch Lichtstimuli stattzufinden.

Ein Vergleich mit dem Farbwechsel der *Mysidae* erlaubt zu vermuten, dass auch in der phylogenetischen Entwicklung des Chromatophorensystems der höheren Kruster ähnliche Stadien aufeinanderfolgten.

[1] G. KOLLER and E. MEYER, Biol. Zbl. *50*, 759 (1930).
[2] M. CHICEWICZ, Bull. Acad. Sci. Cracovie [B] *II* (1951), in print.
[3] F. KEEBLE and F. W. GAMBLE, Philosoph. Transact. Roy. Soc. London [B] *196*, 295 (1904).

CONGRESSUS

Suisse

XIe Congrès ornithologique international

Le XIe Congrès ornithologique international, présidé par Sir LANDSBOROUGH THOMSON, Londres, aura lieu à Bâle (Suisse) du 29 mai au 5 juin 1954.

Pendant la semaine du Congrès, probablement 5 jours seront réservés aux discussions et 2 jours aux excursions. Avant et après le Congrès (25–28 mai et 7–19 juin) des excursions sont prévues pour faire connaître aux congressistes l'avifaune suisse, avant tout celle des Alpes et Préalpes. L'organisation du Congrès est confié au Secrétaire général, le professeur A. PORTMANN, Bâle.

Secrétariat du XIe Congrès ornithologique international: Jardin Zoologique, Bâle (Suisse).