

Freshwater Fauna of the Malay Peninsula.

By CEDRIC DOVER.

VERY little is known of the freshwater fauna of the Malay Peninsula, though the late Dr. N. Annandale, the father of freshwater biology in the East, extended his studies outside Indian limits. A beginning is, however, being made in Malaya, as the institution of a series entitled "Papers on Malayan

the curious tadpoles of the genus *Megalophrys*. Among vegetation at the edges, or among rocks in the quieter parts (Fig. 1), prawns and, more rarely, molluscs of the genus *Melania* may sometimes be seen, while leeches are often abundant enough to be troublesome.

The fauna at the source of the stream presents little essential difference from that found in its lower reaches, and the fauna of any one stream, on the west coast at any rate, is similar to that of any other stream, even though they be widely separated in distance. This is not surprising, for physico-chemically nearly all these streams are similar, their hydrogen ion concentration, for example, being always in the immediate neighbourhood of the standard of neutrality, while their temperature does not as a rule vary by more than two or three degrees Centigrade. Their rate of flow is usually very swift and the food supply afforded by them is so scarce that much specific variety cannot be expected, for only a few species, prolific in reproduction and having a short life-history, can establish themselves in these streams. The well-established forms are therefore characterised by an abundance of individuals, the collector often being able to obtain a few hundred specimens of such species as the hemipteron *Perittopus breddini* with a single sweep of the net. But while the fauna of Malayan hill-streams is



FIG. 1.—A hill-stream in Selangor showing the rocky bed and the quiet areas formed by the rocks.

Aquatic Biology" in the *Journal of the Federated Malay States Museums* proves, and it is the object of this note to indicate the general interest of the subject.

Comparing the Malayan freshwater fauna with that of India, one is struck with its poverty from the viewpoint of specific variety. Insects, of course, are abundant, particularly the aquatic Rhynchota (of which a very large and thorough collection has been made), mosquitoes, dragon-fly and various neuropterous larvæ, and coleoptera, especially the Hydrophilidæ and Gyrinidæ. Such groups as the fishes and tadpoles, however, though they occur in Malayan ponds and streams, are not abundant either specifically or individually, while molluscs are rare, and only one polyzoan, and no hydrozoa or sponges, has yet been found.

In the hill-streams the surface fauna consists entirely of water-bugs of the family Hydrometridæ, particularly the long-legged striders of the genera *Ptilomera* and *Metrocoris*, with occasionally one or two species of gyrenid beetles which swarm in the quieter areas at the edges. There are no other visible planktonic organisms. Below the surface the only fauna, except in still areas caused by a large boulder or a bend in the stream where fishes are found in some abundance and a few Notonectidæ sometimes occur, is that attached to stones and rocks on the bottom. This fauna consists chiefly of the larvæ of certain mayflies, dragonflies, and Pyralid moths, and

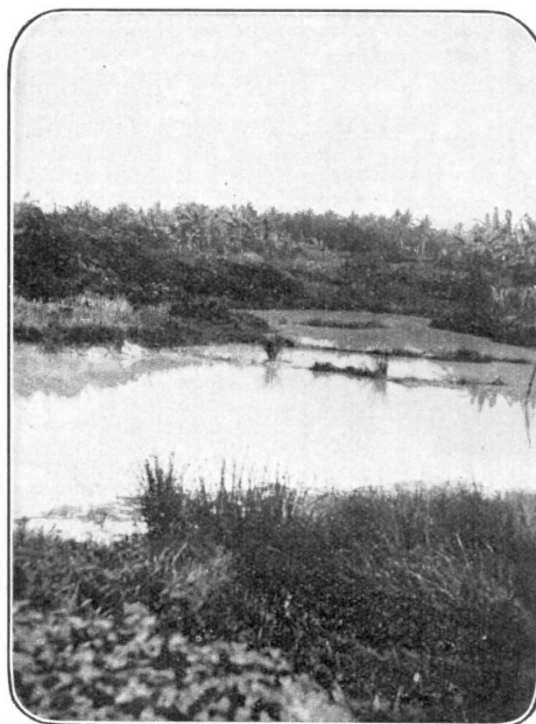


FIG. 2.—A swamp on the outskirts of Kuala Lumpur, divided off by Chinese agriculturists, showing nature of vegetation.

poor, it is of absorbing interest, and this very poverty, combined with the abundance of easily accessible streams, would facilitate intensive studies along the lines of Annandale and Hora's work in India and Dodd's researches in America.

Turning to the biota of still-water areas, we find the same comparative paucity of species so far as the animals and higher plants are concerned, but a rich

algal flora. In the ponds the aquatic Rhynchota are also the most conspicuous organisms, being represented by all the known families, especially the Gerridae, Microveliadae, Notonectidae, (*Plea* and *Nychia* especially), Corixidae (*Micronecta* only), and the smaller Belostomatidae (*Sphaerodema rusticum*); the Nepidae are comparatively rare. Coleoptera, mostly Hydrophilidae, are quite common, while dragon-fly and dipterous larvae, chiefly those of the Culicidae and Chironomidae, and shrimps, are usually abundant. Molluscs are rare, though occasionally a dirty Chinese duck-pond may be found in which Ampulariidae, Viviparidae, Milaniidae, Limnæidae, and Planorbidae occur in fairly large numbers. Nematodes and oligochaetes are scarce, and the polyzoa, hydrozoa, and sponges are entirely absent. The microscopic fauna is abundant, though not very varied, the Entomostraca being particularly common. Rotifers occur in some numbers, and there is generally a rich Protozoon fauna, *Euglena* forming a thick scum on the surface of some ponds.

The algal flora is rich, especially in blue-green algae and in desmids, but the higher plants are generally rare and are often absent. In some swampy ponds there is a dense growth of rushes, weeds, and grasses at the edges (Fig. 2), consisting of such species (kindly identified by Mr. R. E. Holtum) as *Enhydris angustipetala* Ridley, *Limnophila erecta* Bentham, *Cyperus hesperi* Linn., *Rhynchospora aurea* Vah., *Tuviena umbellata* Rottb., *Scirpus mucronatus* Linn., *Mariscus microcephalus* Pusch., and *Eleocharis variegata* Kunth.,

while in others the water-hyacinth, *Eichornia crassipes*, is very common. *Pistia stratiotes* is also sometimes abundant, while below the water at the edges the bladderwort, *Utricularia* sp., and the peculiar star-shaped *Blyxa malayana* Ridley may often be found.

The specific paucity of the macroscopic pond biota may be accounted for by the fact that many of these ponds are situated in limestone, and are thus detrimental to the life of such organisms as molluscs or sponges, while the water is generally very impure and varies from extreme acidity to extreme alkalinity, owing usually to the proximity of Chinese dwelling-houses and piggeries.

Sponges are entirely absent, and so are Polyzoa, with the exception of *Plumatella emarginata* Allman, which I have taken in the Ampang Waterworks near Kuala Lumpur, where the conditions for Polyzoan life are ideal. But even *P. emarginata* is living on the edge of extinction, though it seems to have the inherent hardihood which enables an organism to stand a certain amount of what Grinnell, the American ornithologist, so aptly calls ecologic punishment.

Of other freshwater areas on the west coast of the Malay Peninsula there is little to say. There are no natural lakes, and the larger rivers, which are often fouled with the tailings from tin mines, have not been carefully investigated. It is well known, however, that they are infested with crocodiles, while the insect fauna is more or less similar to that of the hill streams. The fauna of the mouths of these rivers is essentially marine.

Ninth International Congress of Psychology.

THE ninth International Congress of Psychology met at Yale University, New Haven, on Sept. 1-7 under the presidency of Prof. J. McKeen Cattell. The attendance numbered 1089 professional psychologists, of which, however, only 122 came from countries outside the United States. But this is not surprising when it is remembered that more than one hundred institutions in the United States provide for psychology an annual budget of £1500 or more, and that for the larger universities this figure averages about £10,000, and reaches its maximum of £40,000 at Columbia.

The president, doyen of American psychologists, outlined the colossal development of the subject in the United States since the time, nearly fifty years ago, when he was a pupil of Wundt at Leipzig. Cattell's work on individual differences will always rank as an outstanding pioneer achievement in this field which is now so universally systematised. Tables were presented which showed the number of contributions by the psychologists of the various countries during particular periods, and, as might be expected from the foregoing remarks, they demonstrated the quantitative and financial superiority of the United States. More interesting would be tables showing what percentage of the total population in each country consisted of professional psychologists.

More than 470 papers were listed at the Congress, and they covered all the various cross-divisions of psychology: theoretical, experimental, comparative, social, educational, industrial, æsthetic, religious, legal, physiological, etc. Sessions were also devoted to special topics such as the effects of drugs, sleep, the psycho-galvanic reflex, the psychology of music, and the nature of *g*.

In addition to researches on traditional lines, there are at least two branches in the United States which at present are carrying on research at high pressure.

The first is that of animal behaviour, which was represented by thirty papers at the Congress. Several of the chief universities, such as Chicago, Clark, Columbia, Harvard, Michigan, Minnesota, Stanford, and Yale possess well-equipped laboratories for comparative psychology, although it is yet too early to attempt an assessment of the importance of their numerous studies. One of the chief workers in this field is Prof. K. S. Lashley of Chicago, the present president of the American Psychological Association, whose address on "Basic Neural Mechanisms in Behaviour" was acknowledged as a masterpiece, and showed further that not all workers in this field can be classed as narrow-minded behaviourists.

The second branch which displays marked activity is that of child development, especially prominent being the child research centres of the Universities of Columbia, Iowa, Minnesota, and Yale. The mode of attack appears to be a co-operative study by psychiatrists, psychologists, physiologists, anatomists, bio-chemists, and statisticians armed with elaborate machinery. They work at a common centre, usually attached to a university. It may be true that many of the results obtained are already known in general terms to our clinical experts. Nevertheless, the careful tabulation by exact statistical methods may still be worth while and may well repay the labour and expense entailed and lead to results as important as they are unexpected. Certain it is that the American nation intends to leave no stone unturned in order to ensure that the rising generations and their successors will not lack any physical or mental benefit which modern science can supply.

Prominent amongst European leaders present at the Congress may be singled out Prof. I. P. Pavlov, whose public lecture, "A Brief Sketch of the Highest Nervous Activity", was lucidly interpreted by Dr. G. Anrep;