meric series comparable to that of the segmental organs in the Worms.—*Comptes Rendus*, t. cxv. no. 3 (July 18, 1892), pp. 191–193.

On the Freshwater Fauna of Iceland.
By MM. Jules de Guerne and Jules Richard.

In spite of their extreme abundance, and although numerous explorations have been made in the country, the fresh waters of Iceland have never been properly studied from a zoological point of view. M. Charles Rabot was able partly to supply this deficiency in the course of a scientific mission carried out in 1891, during the months of July and August. The collections were made in three different districts of the island:—(1) in the north, at Akureyri; (2) in the west, in the vicinity of Reykjavik; (3) in the east, in the region of the Eskifiord. The examination of them enables us to add *twenty-nine* species to the Icelandic fauna, among which the Entomostraca, which are by far the most numerous, amount to *twenty-six* (16 Cladocera, 8 Copepoda, 2 Ostracoda). The remainder include only 2 Rotifera and 1 Protozoon. Not one of these forms is new, but several of them are of genuine interest for different reasons which are stated below.

It is worth noticing in the first place that a certain number of species which are common throughout the whole of Europe (and even in the United States) are found in the three regions of Iceland visited by M. Rabot. These are *Simocephalus vetulus*, O.-F. Müller; *Alona affinis*, Leydig; *Chydorus sphæricus*, Jurine; *Cyclops strenuus*, Fischer; *C. viridis*, Fischer; and *C. serrulatus*, Fischer. Certain other forms, which are likewise very widely distributed in Europe, appear to be rarer in Iceland. *Daphnia longispina*, Leydig, *D. pulex*, de Geer, and *Cypris pubera*, O.-F. Müller, for instance, were only found in the Lake of Reykjavik in the case of the first, and at Akureyri in that of the other two. On the other hand, *Eurycercus lamellatus*, O.-F. Müller, *Acroperus leucocephalus*, Koch, *Pleuroxus excisus*, Fischer, and *Polyphemus pediculus*, de Geer, are absent only in the latter of these localities. *Alona testudinaria*, Fischer, a tolerably rare form, and *Cyclops fuscus*, Jurine, were only found in the east. *Pleuroxus nanus*, Baird, on the contrary, was met with only in the western region. *Cyclops fimbriatus*, Fischer, lives in the pit of a spar-mine near Eskifiord equally as well as in the waters of the Laugarvatn, where there is also found, just as in the Lake of Reykjavik, an undetermined species of *Canthocamptus*. *Cypris aculeata*, Lilljeborg, is found in great abundance on the shores of the same lake.

Near Reykjavik, in Lake Thingwalla, which is the largest in Iceland, M. Rabot collected the following Crustaceans:—*Scapholeberis mucronata*, O.-F. Müller; *Bosmina arctica*, Lilljeborg; *Eurycercus lamellatus*, O.-F. Müller; *Acroperus leucocephalus*, Koch; *Alona affinis*, Leydig; *Chydorus sphæricus*, Jurine; *Polyphemus pediculus*, de Geer; *Diaptomus minutus*, Lilljeborg; *Cyclops strenuus*,

Fischer; *C. viridis*, Fischer; and *C. serrulatus*, Fischer. In the same region lies the Laugarvatn Lake, from which sulphurous thermal springs arise. Here M. Rabot captured, at a spot where the water attained the temperature of 19° C.: *Sida crystallina*, O.-F. Müller; *Macrothrix* sp.?; *Alona affinis*, Leydig; *Eurycercus lamellatus*, O.-F. Müller; *Pleuroxus nanus*, Baird; *Cyclops viridis*, Fischer; *C. serrulatus*, Fischer; *C. fimbriatus*, Fischer; and *Canthocamptus* sp.? With the living specimens there was obtained in the neighbourhood of the mineral and warm springs a very large quantity of remains of the same Entomostraca, whence we may conclude that the animals live only at a certain distance from these springs; their existence is menaced as soon as they approach them for any reason whatever.

Holopedium gibberum, Zaddach, which it is extremely interesting to meet with in Iceland, was found only at the most elevated point of the plateau which separates the Seydisfjord from the Lagarfljöt (eastern region), in a pool a few centimetres deep, with a sandy bottom and bordered with marsh-plants. This Cladoceron was hitherto considered as one of the most characteristic forms of the pelagic region of the great lakes. Moreover it occurs, in the case in question, in company with *Diaptomus minutus*, Lilljeborg, and a variety of *Cyclops strenuus*, Fischer, both species and variety having a pelagic facies. In the same pool, in which the temperature of the water was 9° C., *Diaptomus glacialis*, Lilljeborg, was also very abundant. An analogous condition of things is exhibited by a sheet of peaty water in the valley of the Lagarfljöt; here we find associated together *Bosmina arctica*, *Diaptomus minutus*, and *D. glacialis*, with the variety of *Cyclops strenuus* mentioned above, in addition to certain pelagic Rotifera, *Asplanchna helvetica*, Imhof, and *Anurea* sp.?, for example, and a Protozoon, *Ceratium longicorne*, Perty, not to speak of several common littoral forms which have already been enumerated.

In accordance with our directions M. Rabot did not fail to search for specimens with a very small net in the puddles of water only 1 or 2 centim. deep and 7 or 8 centim. broad, situated on the cone of the great geyser; but nothing alive was obtained there. As for the other geysers, their waters flow rapidly away towards the Hvita without forming any pools.

The most remarkable general fact concerning the fauna of the fresh waters of Iceland is unquestionably the mixture of the Entomostraca of the arctic with those of the temperate zone. Within the high latitudes in the Commander Archipelago (Behring Straits) and in Greenland there occurs, among other forms, *Eurycercus glacialis*, Lilljeborg. We might expect to meet with this Cladoceron in Iceland; nevertheless it is not found. Everywhere, in the east as in the west of the island, it is the common *E. lamellatus*, O.-F. Müller, so widely distributed in Europe, that constantly appears. On the other hand, characteristic arctic species, such as *Bosmina arctica*, *Diaptomus minutus*, and *D. glacialis*, are very common in Iceland. The only localities hitherto known for the two Calanidæ

last mentioned were the Island of Waigatsch and Nova Zembla in the case of the first and Greenland and Newfoundland in that of the second *.

In conclusion, the researches of M. Charles Rabot furnish us, in the first place, with new and precise evidence for zoological geography, and, secondly, enable us to assert that the fauna of the fresh waters of Iceland, in that which especially concerns the Entomostraca, presents mixed characters, recalling at once the analogous faunæ of Europe and, although in a less degree, of North America, in the temperate and arctic zones. The explanation of this fact is apparently to be looked for in the climatological conditions of Iceland, since it lies, as we know, almost at the point of contact of the warm and cold currents of the North Atlantic †.—*Comptes Rendus*, t. cxiv. no. 6 (February 8, 1892), pp. 310–313: from a separate impression communicated by the Authors.

On a Sporozoon parasitic in the Muscles of Decapod Crustacea.

By MM. F. Henneguy and P. Thélohan.

In 1888 one of us ‡ mentioned the existence of sporozoon parasites in the muscles of *Palæmon rectirostris* and *P. serratus*. The infected individuals are distinguishable at a glance by their opacity; they are of a chalky white, which contrasts with the normal transparency of these Crustacea. This opacity is due to the existence in the bundles of muscular fibrils of a considerable number of little granular masses. Each of these masses represents a little vesicle 10 μ in diameter, surrounded by a very delicate membrane and enclosing eight refringent corpuscles. The latter, which are slightly pyriform, measure from 3 to 4 μ in their greatest diameter. Their most swollen portion contains a clear vacuole, which occupies more than half of the corpuscle; the small extremity is constituted by a refringent substance. Owing to their aspect these corpuscles recall those of pebrine and the spores of certain Myxosporidia, such as those of the Gobies and the Stickleback. The fact that they are met with exclusively in the muscular fibres of the infected prawns had led us to assign these parasitic bodies to the Sarcosporidia, while at the same time regarding them as transitional between these on the one hand and the Microsporidia and Myxosporidia on the other.

Unfortunately all the specimens of *Palæmon* which we had examined exhibited the parasite at the limit of its evolution, in the

* *Vide* J. de Guerne and J. Richard, "Sur la faune des eaux douces du Groënland" ('Comptes Rendus,' March 25, 1889), and "Revision des Calanides d'eau douce" (Mém. Soc. Zool. de France, vol. ii., 1889).

† Mohn, "Nordhavets Dybder, Temperatur og Strömminger" ('Norske Nordhavs-Expedition,' Christiania, 1887).

‡ Henneguy, "Note sur un parasite des muscles du *Palæmon rectirostris*," Mémoires publiés par la Société philomathique à l'occasion du centenaire de sa fondation, 1888.