

tion, the ventral surface is uppermost, the pectoral, ventral, anal, caudal fins can be more or less satisfactorily made out; the dorsal surface is absent. The length is 3 feet $8\frac{1}{2}$ inches, of which the head measures about 10 inches, and the tail (from the end of which 5 or 6 inches may be wanting) about a foot. Judging by the large skull figured by Agassiz and preserved in the Leeds Museum, *Megalichthys* may have attained a length of from 4 to 5 feet.

The skull shows the mandible and mandibular teeth, the end of the snout, the opercula, and the jugular plates. The pectoral fins show the obtuse lobate character, previously suspected by Huxley to obtain in this genus. Large basal scales lie on each side of each pectoral fin.

The ventral fins are abdominal. The right, which is best preserved, exhibits the arrangement of the scales which is described, and which gives a clue to the disposition of the underlying bones or cartilages. This must have closely resembled that in some Elasmobranchs. The same type of fin may be traced, though with important modifications, in *Polypterus*, *Polyodon*, and *Acipenser*, whilst in other recent Ganoids and in Teleostei the arrangement is widely different.

Between the ventral fins are three large scales, one median and two lateral. On the left side of the median scale lies what appears to be the anus. A similar arrangement seems to occur in *Pterichthys*. This region is rarely exposed in fossils.

The anal fin has also its pair of large basal scales. The caudal fin cannot be well made out. There are indications of the underlying skeleton, but nothing can be distinctly made out.

All the features of the present fossil confirm the opinion long ago expressed by Pander and Huxley as to the near affinity of *Megalichthys* to *Osteolepis* and *Diplopterus*.

BIBLIOGRAPHICAL NOTICE.

Geological and Natural-History Survey of Canada: Catalogue of Canadian Plants.—Part I. *Polypetalæ*. By JOHN MACOUN, M.A., F.L.S., F.R.S.C. Montreal, 1883.

Most of our colonial governments have recognized in an enlightened manner the great importance, even from a merely commercial stand-point, of a complete stock-taking of their natural productions. Mineral wealth has no doubt generally been looked to first; and the necessity for the conservation of forests and of animals yielding food and clothing has not always been recognized so readily as the immediate profit to be obtained from them; but the value of the knowledge of what plants and animals the country contains has led to the frequent conjunction of Natural History departments with State Geological Surveys. This healthy sign of wise counsels is seen in the work before us—the first part of a catalogue of Canadian

plants, issued by the "Geological and Natural-History Survey" of the Dominion; and the colony is to be congratulated on the business-like manner in which Mr. John Macoun has begun his task. The form, paper, and printing of the work are admirable, the type being especially clear; and beyond the dropping of a letter here and there, as in the generic initial of the fourth species mentioned, the appearance of *Alianthus* for *Ailanthus*, and one or two slips of the kind, no fault can be found under this head. In a short preface the Author summarizes the brief literature of his subject and the history of botanical exploration in the country, enumerating also the collections examined for the purposes of the work. From this it appears that the Survey-staff have been collecting for the last ten years, but that the examination of the Rocky-Mountain region and of British Columbia is still very imperfect. When we remember that the area of the Dominion is estimated at over three and a half million square miles, or little less than that of Europe, we cannot expect it to be as yet at all completely known to the botanist, as is perhaps evident from Mr. Macoun's Catalogue, which enumerates 907 species of Polypetalæ under 243 genera, as against 616 species in the 193 genera of the same group in our British flora, according to the 'London Catalogue.' One useful detail in Mr. Macoun's work is that both the genera and the species are numbered continuously throughout, thus facilitating the above comparison, which gives the possibly significant result of an average of 3.73 species to every genus in the continental, as against 3.18 in the insular flora. It must, however, be noticed that Mr. Macoun has included in his numbering not only "introduced plants," "garden escapes," and those "spontaneous in gardens," but also planted trees, such as the horse-chestnut and *Tilia europæa*, and even species "likely to be found"! There are at least a hundred of these in the present part, and their inclusion without typographical distinction seems perfectly unjustifiable, though the indication of the western migration of such plants as *Papaver somniferum* and *P. Rhœas*, *Chelidonium*, *Armoracia*, *Capsella*, *Thlaspi arvense*, and the *Brassicæ* is undoubtedly of interest.

It is remarkable that the list includes so many migrants from the east and but very few from the south. There are, of course, many names and authorities for names that might be called in question according to the law of priority; but this is no new fault in recent systematic works; blemishes perhaps of a more practical bearing and more readily remediable, however, are, first, that no apparent distinction is made between *bonâ fide* local names, as May-flower, Yellow Puccoon, and White Cohosh, and mere "book-" names, such as Virgin's-Bower, Awl-wort, or Thyme-leaved Pinweed; and, secondly, that the localities are stated continuously, with no obvious grouping under provinces or natural divisions. In a catalogue it may have been inevitable to insert under the genus *Astragalus* two unnamed species without descriptions, which can only be referred to by their numbers or localities; but it is a course open to considerable objection. When all is said, however, these are but slight faults in a generally excellent piece of work, and the

continuation of Mr. Macoun's list will be looked forward to with interest. The apparent occurrence of natural hybrids of *Nuphar* (a characteristic, as appears from Mr. Thomas Meehan's publications, of the allied genus *Sarracenia*) is one among many points of interest in the work, and the flora with which it deals is characterized by possessing 37 species of *Astragalus*, 29 of *Potentilla*, 27 of *Ranunculus*, 26 of *Saxifraga*, 22 of *Viola*, 17 of *Ribes*, 16 of *Arenaria*, 14 of *Lupinus* and of *Anemone*, 13 of *Stellaria*, 12 of *Cornus*, 10 each of *Geum*, *Oenothera*, *Desmodium*, and *Claytonia*, 8 of *Acer*, 7 of *Rhus*, and 5 of *Parnassia*. Such a catalogue makes a botanist hope that it may be speedily followed by such a descriptive flora as shall be a credit to the largest of our colonies.

G. S. BOULGER.

MISCELLANEOUS.

Freshwater Sponges as Improbable Causes of the Pollution of River-water.

MR. POTTS reported that on the 9th of February he had visited and partially examined the forebay at Fairmount Waterworks, on the Schuylkill River, from which the water had been temporarily withdrawn, with a view to discover the winter condition of the freshwater sponges and the other inhabitants of that locality. He found by far the larger part of the wall-surface below the water-line inaccessible on account of a thick deposit of mud upon the bottom and much water remaining in the forebay. Wherever reached, however, and so far as the eye could detect in other places, it was covered by a mud-coloured incrustation of considerable thickness, which a more minute examination showed to be composed almost wholly of the statoblasts and spicules of the sponge *Meyenia Leidyi*. Some few fragments of *Meyenia fluviatilis* and *Spongilla fragilis* were seen, but the first-named was clearly the prevailing species.

A sluiceway which formerly supplied the last of the old "breast wheels" used in pumping into the reservoir, but from which the water had been for many months excluded, was entered and examined. Here the remaining incrustation (much having doubtless crumbled and fallen away) was from one fourth to one half an inch thick, of the appearance of crumbling plaster, and, as in the other cases, it consisted of the sponge before named, with but a small proportion of intruded material.

While considering the effect of the presence of so large a sponge-growth at the very inlet to the supply-pumps, Mr. Potts stated that this particular species was conspicuous among the known North-American sponges by its great relative density and the small proportion of its sarcode or flesh. Its decay, therefore, at the termination



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