

due chiefly to the continued expansion of the mining industries of British Columbia, that province dividing the honours with the Yukon District in the matter of gold.

With this voluminous report the volume concludes, and we have only now to congratulate Dr. Dawson and his able staff on the results of their labours as set forth with so much completeness and wealth of detail.

ARTHUR H. FOORD.

II.—CONTRIBUTIONS TO CANADIAN PALÆONTOLOGY. Vol. IV, Part 1.

A Revision of the Genera and Species of Canadian Palæozoic Corals. The Madreporaria Perforata and the Alcyonaria. (Geological Survey of Canada.) By LAWRENCE M. LAMBE, F.G.S. Pages 1-96, plates i-v. (Ottawa, 1899.)

A REVISION of the Palæozoic Corals has long been a desideratum. Since the great works of Milne-Edwards and Haime, no comprehensive treatise has been produced, though the labours of De Fromentel, Lindström, Duncan, Hinde, Koch, and others in Europe, and Hall, Billings, and Rominger in America, and Nicholson on both sides of the Atlantic, have greatly extended our knowledge of many groups. It need scarcely now be maintained that to Nicholson science is deeply indebted for the initiation of methods of study in this complicated group of organisms whereby a fuller and more exact comprehension of their structure has been acquired than was possible to the earlier workers in this field of study. His work on the Palæozoic Tabulate Corals laid the foundation upon which all subsequent investigators have built, and the fact of his having made use of much American material gives a peculiar value to his writings for those who have to deal with the Palæozoic Corals of that continent.

In the work before us the genera and species of the Canadian Palæozoic Corals are redescribed, and "it is attempted to show that some forms hitherto considered of little value as regards the determination of the age of the deposits in which they occur, on account of their wide range in geological time, are capable of indicating definite horizons through the possession of distinctive structural peculiarities." Thus, as Rominger has observed ("Fossil Corals of Michigan," 1876), Cambro-Silurian (Ordovician) and Silurian species of *Favosites* have spiniform septa, while those of the Devonian have squamulæ. Again, it is found that the forms of *Halysites* of different geological horizons have distinctive characteristics which are apparently constant. A table (at p. 74) shows the distribution in time (from the Niagara to the Trenton), with the physical characters—shape of corallites, size of their tubes, septation, tabulæ, etc.—of *Halysites catenularia* and six varieties, illustrating this point.

With respect to distribution in time *Favosites Gothlandica* has a very wide one in Canada. It is recorded as occurring at many localities in the Niagara, Guelph, and Lower Helderberg formations, in divisions 2, 3, and 4 of the Anticosti Group, and in rocks of supposed Hudson River age at Stony Mountain, Manitoba. Its

regional distribution is also very considerable: it extends from the shores of the Gulf of St. Lawrence to the Saskatchewan River. Another species, widely distributed in time and space, is *Lyellia affinis*, occurring in the "Hudson River and Niagara formations, in the four divisions of the Anticosti Group, and in the Lower Helderberg Group," and ranging from the Island of Anticosti to the Saskatchewan River.

The detailed descriptions of the species and their mutual relations, distribution, and synonymy are all worked out by the author with great care, and he seems to have sounded his authorities at all points.

Though in respect to the classification of the Palæozoic corals we are, and perhaps shall ever be, on very debatable ground, yet it may not be amiss to take a survey of our present position in the light of the more recent attempts made in this direction. Hæckel ("Systematische Phylogenie der Wirbellosen Thiere") includes in his class Scyphopolypti the fossil Cnidarians, such as the Favositidæ, Chætetidæ, Auloporidæ, Halysitidæ, etc., which built the coral reefs of the Silurian, Devonian, and Carboniferous seas, and are generally assigned to the Tabulata. Nicholson, discarding the latter group as originally constituted, as containing an incongruous assemblage of forms, places the Favositidæ, Syringoporidæ, and Thecidæ in the Madreporaria Perforata, while the Helioporidæ, Heliolitidæ, Halysitidæ, Chætetidæ, and Auloporidæ are referred to the Aleyonaria ("Manual of Palæontology," Nicholson & Lydekker, vol. i). Von Zittel, in his "Grundzüge der Palæontologie," while affirming that the greater number of the typical Tabulata (Favositidæ, Syringoporidæ, Halysitidæ) show close relationship to the Hexacorallia, concludes that any definite decision as to their systematic position seems to be unattainable. On this ground, though retaining them as a suborder of the Madreporaria, he relegates them as an appendix to the Hexacorallia, and places *Heliolites* in the Octocorallia (Aleyonaria), its generally accepted position.

The uncertainty regarding the zoological status of the various groups enumerated above (excepting perhaps the Heliolitidæ) is not likely to be dispelled, unless evidence is forthcoming in the shape of a living reef-building coral whose affinities with the fossil reef-builders of the favositoid and other kindred types will satisfy the most searching investigation. Even the remarkable discovery by Mr. J. J. Quelch¹ of a living coral (*Moseleya*) of Cyathophylloid affinities does not seem to have carried with it evidence of such a convincing character as to shake the position of the Rugosa (or Tetracorallia) as a distinct group.

Much light is thrown upon the structure and affinities of the Heliolitidæ in a recent and valuable contribution to the subject by Professor Lindström (Kong. Svenska Vetenskaps-Akad. Handl., Bd. xxxii, No. 1). It is noticeable that the genus *Lyellia*, M.-E. & H., is rejected by Lindström on account of its similarity to *Propora*, M.-E. & H.

¹ Ann. Mag. Nat. Hist., vol. xiii (1884), p. 293; "Challenger" Reports, vol. xvi (1886), p. 110; see also Nicholson, in "Manual of Palæontology," Nicholson & Lydekker, vol. i (1889), p. 274.

In the present work the author's suppression of certain species is, we trust, done with sufficient justification. It is a proceeding which should be carried out with the utmost caution, because, however inconvenient a multitude of species may be to the systematist, their presence is a lesser evil than that which may result from the loss of information respecting the mutations which groups of individuals undergo, and which are best recorded and stereotyped under a specific or varietal name. The disadvantage of burying such records, so to speak, is of course very much lessened when there is abundance of material at the disposal of the palæontologist, in which case transition forms may be found to bridge over the gaps and to unite what had before been mistaken for independent forms. The following genera are included in this Revision:—

Favosites.	Syringolites.	Heliolites.
Alveolites.	Romingeria.	Plasmopora.
Cœnites.	Fletcheria.	Lyellia.
Cladopora.	Nyctopora.	Lyopora.
Michelinia.	Syringopora.	Protarea.
Striatopora.	Cannapora.	Stylarea.
Trachypora.	Halysites.	Tetradium.
Calapœcia.		

The illustrations are few, and though excellent, considering the mode of reproduction adopted, are more suitable for the text than for plates. The details, doubtless most faithfully rendered in the original drawings, are in some instances reproduced on too small a scale to give satisfactory results. Moreover, we miss representations of the entire corallum, which is inserted only in one instance (pl. v, fig. 4, $\frac{1}{2}$ nat. size). Apertures of corallites, sketched in outline, with the tubular parts from which they proceed omitted, have a strange and unnatural appearance (plates i and iii).

We cannot commend the practice adopted by the author of employing two terms of measurement—one for the corallum, in inches; the other for the individual corallites, in millimetres.

This work will be of especial value to students of the Palæozoic corals of North America, while other palæontologists may learn much that is interesting respecting variations in structure, both external and internal, so minutely and carefully recorded by Mr. Lambe from the rich material at his command.

ARTHUR H. FOORD.

REPORTS AND PROCEEDINGS.

GEOLOGICAL SOCIETY OF LONDON.

February 16th, 1900.—W. Whitaker, B.A., F.R.S., President, in the Chair.

ANNUAL GENERAL MEETING.

The Secretary read the reports of the Council and of the Library and Museum Committee for the year 1899. In the former the Council referred to the continued increase in the number of Fellows and the steadily maintained financial prosperity of the Society.