The present communication forms the fifth of a series of papers, four of which have already appeared in the transactions of this Society, three of these are upon the recent marine sponges of the Pacific and one on those of the Atlantic or eastern coast of Canada, mainly from the Gulf of St. Lawrence and the coast of Nova Scotia. The paper now submitted is supplementary to the one last mentioned and treats of the more northern forms. It is based upon a collection received from Professor D'Arcy Thompson of University College, Dundee, Scotland. The Monaxonida, Tetractinellida, and Calcarea are represented by twenty species, half of which are described as new. Six octavo plates of drawings illustrate the descriptions and show the spicules and their position in the skeleton as well as the general form of the sponges.

The Cerebral Neurons in relation to Memory and Electricity: By Sir James Grant, K.C.M.G., M.D.

The brain neurons and cells, like the cells in other tissues of the body, as years pass on, give evidence of lessening power and activity. The line of present investigation demonstrates that the electrical current through the brain rotates its molecules to such a degree as to produce a most noticeable physiological response, in the direction of improved memory.

Un éboulement à St. Thuribe-de-Vincennes, comté de Champlain: Par Mgr. J. C. Laflamme.

Modifications remarquables causées dans le régime de la rivière Ste-Anne par l'éboulement de St-Alban: Par Mgr. J. C. Laflamme.

These two papers by the Rector of Laval University, Quebec, deal with important geological phenomena affecting the Pleistocene or later Quaternary boulder clays, marine clays, sands and gravels of the north shore of the St. Lawrence. There the streams which flow into this river are now cutting into these newer and uncemented rock-materials in order to form a river bed, and what appears to be a period of unstable equilibrium has set in, leading to many disastrous landslides and landslips in which many human lives have been lost, not to speak of destruction of other life and property.

The Honorary Secretary's Annual Report dealt with the progress of research in the various sections throughout Canada. The preservation of the site of Louisbourg, Nova Scotia, the proposed National Museum, the death and loss to science and the Society of its first president, Sir William Dawson, the proper equipment of a Hydrographic Survey for Canada, tidal observations and other historical as well as literary results were referred to in an able and eminently practical manner.

The following is a list of the officers of the society elected for the ensuing year: *President*, Dr. Louis Honoré Fréchette, C.M.G.; *Vice-President*, President Loudon of Toronto University; *Honorary Secretary*, Sir John G. Bourinot; *Honorary Treasurer*, Dr. James Fletcher.

In the Geological and Biological Section the following officers were elected: *Chairman*, Dr. A. H. Mackay, Halifax, Nova Scotia; *Vice-Chairman*, Professor F. D. Adams, McGill University, Montreal; *Secretary*, Professor G. U. Hay, St. John, New Brunswick.

In the Physical and Mathematical Science Section, the following were chosen: *Chairman*, President Loudon; *Vice-Chairman*, Dr. R. F. Ruttan; *Secretary*, E. Deville, Surveyor-general of Canada, Ottawa.

H. M. Ami.

SCIENTIFIC BOOKS.

The Logical Bases of Education. By J. Welton, M.A. London, Macmillan & Co. 1899. Pages xvi + 288.

This book is one of a series, 'Macmillan's Manuals for Teachers,' edited by Oscar Brown-

ing, M.A., Principal of the Cambridge University Day Training College, and S. S. F. Fletcher, B.A., Ph.D., Master of Method in the same institution. Although the book is written especially for teachers, it is not a book on education, save indirectly and incidentally. Only one chapter deals directly with Education, and elsewhere throughout the book, even the word education is rarely used.

But it should be said at once that the book is none the worse for that. There are many books —books on psychology, ethics, hygiene, for example—which do not deal specifically with education, yet no teacher can afford to dispense with a serious study of the subjects of which they treat. Mr. Welton's 'Logical Bases of Education' is such a book. At the same time, the title is somewhat misleading. The reader who expects to find here a logical, *i. e.*, a well-reasoned discussion of the fundamental principles of education—of the scope and meaning of the education of children and youth for individual development and for social service—will be disappointed. So also will the reader who expects to find an exposition of the application of logic to the processes of education, in detail—to teaching and governing.

It is only fair to say that the author had no intention of meeting such expectations. His purpose is stated in the first paragraph of his preface: "The aim of this book is to set forth the rational bases of all true educational work. It is believed that such bases can only be found in those modern developments of logical theory which have marked the latter half of this century." In accordance with this purpose, Mr. Welton's book is an elementary treatise on epistemology and logic. It consists of chapters on the 'General Nature of Knowledge'; 'Postulates of Knowledge'; 'Knowledge and Language'; 'Knowledge and Logic'; 'Nature of Judgment'; 'Types of Judgment'; 'Formal Relations of Propositions'; 'The Method of Knowledge'; 'Deductive Inference, Syllogism, Construction'; 'Outline of Inductive Method'; 'Observation'; 'Testimony'; 'Hypotheses'; 'Direct Development of Hypotheses'; 'Indirect Verification of Hypotheses'; 'Definition, Classification and Explanation'; 'Logic and Education.' And these chapters are followed by fourteen pages of 'Exercises in Inference'. There is also a serviceable index.

The author's discussion of the topics enumerated is clear and interesting. His only claim to originality consists in the form in which the materials are presented. The sources on which he has drawn for inspiration and guidance, and even for much of his subject-matter—for quotations abound—are referred to in footnotes, and these footnotes are very numerous. At the same time it is clear that he has an independent command of his subject; and he has generally chosen his authorities well.

When Mr. Welton comes to discuss specifically, in the last chapter, the bearing of logic on education, we find him, very properly, cautioning the teacher against expecting to derive detailed rules of procedure from logic any more than from psychology. "Both sciences give general guidance only. Psychology investigates the forms of actual mental activity common amongst men and children, and, therefore, a study of psychology aids the educator by suggesting to him the best ways of awakening such activity. Logic, on the other hand, is regulative, and helps the educator to determine the general lines on which such activity should proceed to attain the goal of knowledge. . . . But the subject matter of the thought and the consequent character of the knowledge gained by the pupils can be determined neither by psychology nor by logic. . . . Logic warns us to insist on sufficient evidence; but logic alone cannot decide when the evidence is sufficient."

So much, in brief, for logic. "The function of education," Mr. Welton tells us, "is to lead the child to find his true place and his true work in the universe." Without stopping to comment on the adequacy or inadequacy of this definition of the function of education, or on its full meaning, as stated, particularly on the phrases 'true place' and 'true work,' we may assume that the definition is intended to cover an education broad enough and deep enough to meet the needs of individuals, both as individuals and as members of a democratic society.

To fulfill this function education must enable every one to understand 'the universe,' at least to some extent; and further, "the universe which a child must learn to understand is a

social and a moral universe as well as a physical one; the facts of experience with which he starts are found in his relations to his fellows as well as in those of the material world. In these facts, too, he must find laws, and through laws he must pass to the conception of that moral system, in which alone he can find the true freedom of rational and self-realizing activity."

Having set forth his view of the function of logic and of education, Mr. Welton is prepared to discuss their relation to each other. The points which logic emphasizes in educational theory, he says, are (1) 'that all true education must be relative to the society in which it is given'; and (2) 'that logic equally with psychology, teaches the educator that the attainment of knowledge is the result of mental exertion.'

That these are fundamental principles of a rational educational theory, every one will admit. Both deserve strong emphasis; and at the present stage of the development of educational theory, particularly the first. I say particularly the first, because the second has been emphasized from time immemorial, while the first has only recently come to receive the attention it deserves at the hands of writers and speakers on education. Education is primarily a social study, like economics, or government. The development of the individual is fruitless unless it proceeds with constant reference to his membership in the contemporary social organism; and the maintenance, organization, and direction of education constitute one of the most important functions of society.

Both of these points are discussed briefly by Mr. Welton. One finds himself regretting that so little space is devoted to the discussion of these important topics; and the value of the book consists, not in a fresh contribution to educational theory, nor in a discussion of the relation of logic to educational theory; but in the general intellectual stimulus such a book must give to every earnest teacher.

The teacher may learn from this book what knowledge is, and how knowledge is tested and assimilated. But he will not find in it an enumeration of the kinds of knowledge to be sought, nor a discussion of the relative efficacy of different kinds of knowledge in promoting individual and social well being. He will get from it no teaching devices, but he may expect to derive from it valuable assistance toward gradually developing within himself the right professional attitude throughout the whole range of his activity.

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The Theory and Practice of Interpolation, including Mechanical Quadrature and other Important Problems concerned with the Tabular Values of Functions, with the requisite tables. By HERBERT S. RICE, M.S., Assistant in the Office of the American Ephermis, and Professor of Astronomy in the Corcoran Scientific School, Washington, D. C. Lynn, Mass., The Nichols Press. 1899.

Perhaps the first impression which this book produces is one of surprise that the author has found enough material relating to interpolation to fill 234 pages of small quarto. A brief inspection, however, shows that we have to do with a work dealing with most if not all of the important problems which arise in connection with the formation and use of the numerical tables which play so conspicuous a part in applied mathematics. In short, we find here a development not only of the familiar processes of interpolation, but those of numerical differentiation and integration, with a variety of applications to astronomical and other problems.

The author's preface informs us that he has attempted no marked originality, either in subject matter or method. "Indeed, sufficient has hitherto been written of interpolation, quadratures, etc., to firmly dissuade one from such an endeavor." * * * "But while viewing the matter in this practical sense, the writer regards his work as no mere compilation."

In the development of the subject the derivation and discussion of the important formulæ of Newton, Stirling and Bessel naturally constitute the basis of the structure. As this work progresses we have each important step illustrated by a number of numerical examples, together with the development of such precepts as are important in the practical application. For instance, in the great majority of cases we have to do with numerical quantities which, like the familiar logarithmic and trigonometrical