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THE OTTAWA NATURALIST

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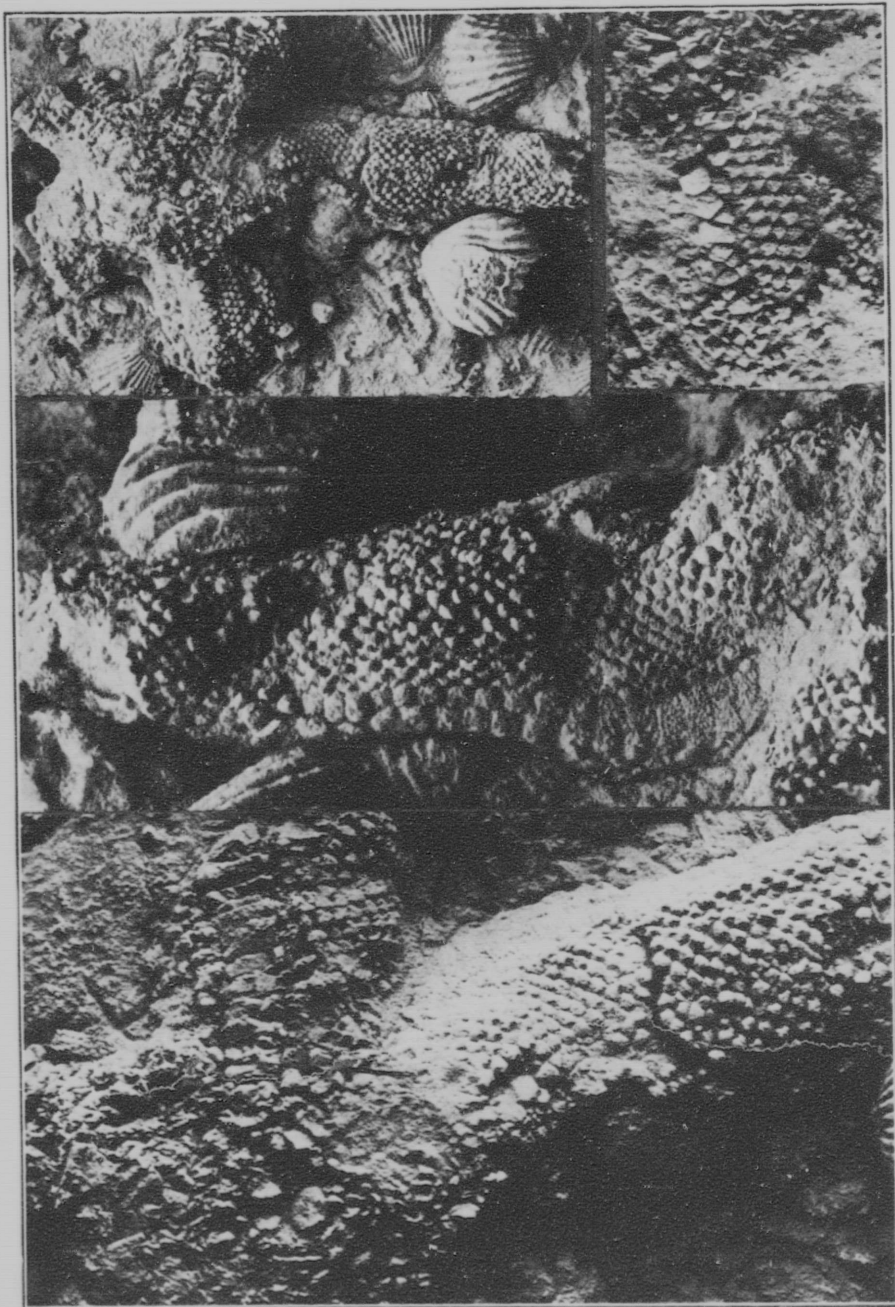
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PALÆASTER ? WILSONI, RAYMOND

THE OTTAWA NATURALIST

VOL. XXVI.

OCTOBER, 1912

No. 7

ON TWO NEW PALEOZOIC STARFISH (ONE OF THEM FOUND NEAR OTTAWA), AND A NEW CRINOID.

BY PERCY E. RAYMOND.

PALÆASTER? WILSONI, SP. NOV. Plate V.

The remarkable starfish found by J. E. Narraway, Esq., at City View, near Ottawa, and described by Professor Hudson in the May and July numbers of THE OTTAWA NATURALIST as *Protopalæaster narrawayi*, naturally excited interest in City View as a collecting place. Specimens like Mr. Narraway's, which can be described as *order, family, genus and species nov.* are of infrequent occurrence, but such a discovery shows that the possibilities of even so old a collecting place as Ottawa are by no means exhausted.

In searching for another specimen similar to the one found by Mr. Narraway, Miss A. E. Wilson was fortunate enough to find a pretty starfish of a type hitherto quite unknown in strata so old as the Black River. The specimen is exposed from the abactinal side, and preserves the greater part of one arm, the disk, and the stumps of the other four arms. The diameter of the specimen, when complete, must have been about 75 mm. (3 inches), and the diameter of the disk is 20 mm. This is large for a starfish from the lower Ordovician. The arms are quite convex, with a gentle taper, reminding one somewhat of the common recent starfish, *Asterias vulgaris*, and as in that species, the arms were probably somewhat flexible. The greater part of the abactinal side of the disk and arms is covered with small convex, over-lapping, V-shaped plates, which are arranged with the point of the V directed toward the margins. Along the crest of each arm there is a single row of larger plates. These plates are quite large and hexagonal in outline near the disk, but become smaller, triangular, and alternate in position further out on the arm. (See upper right-hand figure on the plate). There are two rows of marginals, these plates being larger and flatter than the other plates, and covered with minute tubercles, which may be spine-bases. (See the middle figure on the plate). Close to the disk, the supra-marginals and mar-

ginals seem to be of the same size, both rectangular, and the plates of the supra-marginal row directly over those of the marginal series. Further out on the arms, the plates are pentagonal, those of the two rows alternating in position, and dove-tailing, and the supra-marginals are smaller than the marginals. One of the marginals, about half-way out on the arm, is 1.25 mm. high and of about the same breadth. The smaller triangular plates which cover the greater part of the arm average about .5 to .6 mm. in height. On one of the arms (the one directed downward in the upper left-hand figure on the plate), the small triangular plates seem to be arranged in rows parallel to the axis of the arm, but the plates on the longer arm seem to be more irregular, although a general arrangement in rows can be seen. On this arm there are a number of very small plates scattered about, especially on the top of the arm, thus adding to the irregularity. The triangular shape of these plates gives the arm a neat pattern, the plates making diagonal rows backward and forward from the row of large plates along the top of the arm. The madreporite, which is nearly circular in outline, and 2 mm. in diameter, is in position, but slightly tipped down at the inner side, in an interradius, and not far from the centre of the abactinal side of the disk. The surface is probably worn, for it appears perfectly smooth.

In the fragment of the arm which is directed upward in the upper left-hand figure and in the lowest figure on the plate, the small plates are broken away, disclosing the ambulacral plates. These plates, which are long and rather thick, seem to be alternate in position. Two of the plates, well shown in the lower figure, and indicated by an arrow, seem to be pierced by pores near their proximate ends, two pores piercing each plate vertically. Near the outer end of the more perfect arm there is a space where a few of the small triangular plates are missing, and here also the ambulacral plates can be seen from the upper side. Each plate has a narrow keel on that side. (See the middle figure on the plate, between the two brachiopods). Other details of the plates of the actinal side are unknown.

This species seems to be most nearly related to *Palæaster magnificus* Miller,* to which species my attention has been called by Professor Schuchert, who has most kindly loaned me photographs of the type. *Palæaster? magnificus* is a large starfish (6 inches in diameter), found in the Waynesville division of the Richmond formation in Ohio. Like *Palæaster? wilsoni*, it has two rows of large marginals and a row of large plates

*Jour. Cincinnati Society Nat. Hist., vol. 7, p. 16, pl. 4, figs. 3, 3a, 1884.

along the top of each arm, while the greater part of the surface is covered with small convex triangular plates. Miller found the plates to be spine-bearing, a point which can not be definitely decided in the present species. From the photograph it appears that there are spaces between the small triangular plates on the abactinal surface in *Palæaster? magnificus*, while in *P.? wilsoni* these plates actually overlap each other.

There is a superficial resemblance between *Palæaster? wilsoni* and *Urasterella pulchella* (Billings), but the latter species does not have the double row of marginal plates, nor the large plates along the top of the arm. The arms are also much more slender in Billings' species.

Of course the reference of this species to *Palæaster* is purely a convention, as it has nothing in common with the type of the genus. The generic position of these starfishes will be discussed in the monograph by Professor Schuchert, which it is expected, will appear at an early date.

Locality and formation. The holotype was found by Miss A. E. Wilson in a fence near the large quarry in the Lowville formation at City View, a short distance south-west of Ottawa. While the Lowville is the only formation which is exposed at this particular spot, the starfish seems to have been derived from the Black River, which outcrops only a short distance away. The matrix contains, beside the starfish, *Rhynchotrema inaequivalve* (shown in the photograph), *Orthis tricenaria*, and *Rafinesquina alternata*. The species is dedicated to its discoverer, whose private collection contains the type.

GENUS MARIACRINUS HALL.

MARIACRINUS? INSUETUS, SP. NOV.

Mariacrinus sp. Raymond, 1907. American Journal of Science, Fourth Series, Vol. XXIII, p. 118.

Two fragmentary calices of crinoids from the Three Forks Shale at Logan, Montana, are of importance, as they are the only crinoids thus far known from the Devonian of the Rocky Mountains. These fragments were sent to Mr. Frank Springer for identification, and he reported that they probably belonged to the genus *Mariacrinus*.

One fragment (Figure 1) retains the base of a calyx and fragments of four radials. All sutures are obliterated, but the ornamentation makes possible the determination of the probable outline of the plates. From such parts as remain, the radials seem to have been in contact. The position of the two notches in the margin of the area of stem attachment suggest that there are four basals, though there may be only three, two large and one small. The ornamentation consists of raised lines

which connect the centres of the plates, forming a series of triangles.



Figure 1 x 2.



Figure 2 x 2.

The other specimen is a part of the dorsal cup, lacking the basal portion. Figure 2 shows this fragment, the ray lacking the distichial being the anterior radius. The rays show a strong longitudinal ridge crossing the first costal and bifurcating near the centre of the second, sending a branch onto each of the distichials. This species appears to agree with *Mariacrinus warreni* from the Niagara in having only two distichials, and no palmers in the calyx. In fact, none of the rays show more than one cycle of distichials, but there were probably two when the specimen was complete.

The interradiial areas are not depressed as in most species of this genus, a section through the calyx at the second cycle of interbrachials being almost circular in outline. There is, however, a slight depression in the interdistichial spaces. The first interbrachial is large, the next two slightly smaller. The three plates of the third series and the four of the fourth are not regularly hexagonal, but laterally compressed. The posterior interradius is very badly preserved, but there appear to be five interbrachials in the third row. As shown in the figure the plates are ornamented with raised lines connecting the centres of the plates.

Locality.—The specimens were found by the writer in the limestone of the Three Forks Shale at Logan, Montana, associated with the fossils of the brachiopod facies of the *Clymenia americana* fauna. The types are in the Carnegie Museum, Pittsburgh, Penna.

GENUS SCHÖENASTER MEEK AND WORTHEN.
SCHÖENASTER? MONTANUS SP. NOV.

Animal small, about an inch in diameter. Rays short, slender, extending about one-half their length beyond the disk. Disk large, pentagonal, the margin slightly concave between the rays. The five proximal plates of the adambulacreal series function as orals, while on the arms beyond the disk the adam-

bulacreals become marginals. The adambulacreal plates are rather small, oval, placed with the long axis diagonal to the axis of the arm. On the most perfect arm there are 16 of these plates on each side of the groove, not counting the proximal and distal plates.

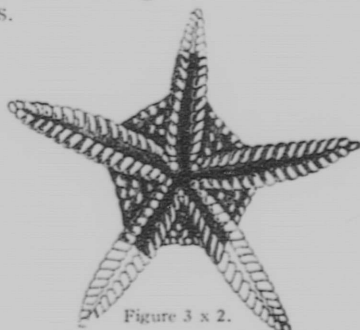


Figure 3 x 2.

The ambulacreal ossicles are small, arranged alternately. On this specimen they are mostly displaced. The plates on the disk between the rays are few and small. The marginals are small, rounded, and do not appear to bear spines, but this appearance may be due to poor preservation.

Locality.—This species is described from a single specimen collected by the writer in the Madison Limestone at Spring Canon in the Ruby Mountains, near Alder, Montana. The type is in the Carnegie Museum, Pittsburgh, Penna.

EXPLANATION OF PLATE.

1. Upper left-hand figure. *Palæaster? wilsoni* Raymond. All that is preserved of the specimen. The brachiopods are *Rhynchotrema inaequivalve*. One-half larger than natural size.

2. Upper right-hand figure. An enlargement of the ray which extends downward to Fig. 1, to show the character of the large plates along the top of the arm. X 3.

3. Central figure. The most perfect arm, viewed from the side. Notice the two rows of large marginals, the overlapping triangular plates above them near the middle of the arm, and the flatter and more nearly square plates to the right, nearer the disk. X 3.

4. Lower figure. An enlargement of part of the specimen, to show the ambulacral plates in the ray pointing upward, the madreporite, and the small, irregular plates along the top of the arm. The arrow points to the two ambulacrals which are pierced by vertical pores. X 3.

All the photographs were made at the Geological Survey of Canada, and are published by permission of the Director.

CONSTITUTION OF THE OTTAWA FIELD-
NATURALISTS' CLUB.

ARTICLES OF THE CONSTITUTION.

- I. Name.
- II. Objects or Aims.
- III. Membership.
- IV. Annual Fees.
- V. Officers.
- VI. The Council.
- VII. Auditors.
- VIII. Meetings.
- IX. Order of Business at the Annual Meeting.
- X. Elections.
- XI. Term of Office.
- XII. Vacancies.
- XIII. Quorum.
- XIV. Duties of Council.
- XV. Duties of President.
- XVI. Duties of Vice-President.
- XVII. Duties of Secretary.
- XVIII. Duties of Treasurer.
- XIX. The Ottawa District.
- XX. The Ottawa Naturalist.
- XXI. Amendments.

ARTICLE I. NAME.

This club shall be known as "THE OTTAWA FIELD-NATURALISTS' CLUB."

ARTICLE II. OBJECTS.

The objects of this Club shall be: To foster an acquaintance with and a love for nature; to study especially the natural history of the Ottawa District; to encourage investigation and to publish the results of original research in all departments of natural history; to arrange for out-of-door excursions during the summer months; to provide free lecture courses during the winter months; and in a general way to render assistance to students or others interested in Nature Study.

ARTICLE III. MEMBERSHIP.

(a) ACTIVE. Any one interested in Natural History may upon application be elected by Council as an active member of the Club. Payment of the annual fee shall be a necessary condition of the continuance of membership.

(b) CORRESPONDING. Any eminent naturalist not resi-

dent in the Ottawa District, who is desirous of promoting the objects of the Club, may be elected by the Council as a Corresponding Member.

(c) HONORARY. Any prominent person resident of the Ottawa District, who shall to a marked degree assist towards the successful working of the Club, may be elected by the Council as an Honorary Member. There shall not be at any one time more than five such Honorary Members.

The Council shall also have power to elect a Patron after his consent has been obtained. The Patron shall be considered one of the Honorary Members.

(d) No Membership fee shall be expected from Corresponding or Honorary Members.

ARTICLE IV. ANNUAL FEE.

The annual membership fee shall be one dollar, payable in advance immediately after the Annual Meeting. No member in arrears shall be entitled to any of the privileges of the Club.

ARTICLE V. OFFICERS.

The officers of the Club shall be a President, a First and a Second Vice-President, a Secretary, a Treasurer, an Editor and a Librarian.

By decision of the Club or of the Council, two officers may, if necessary, be filled by one person for one year.

ARTICLE VI. THE COUNCIL.

The Council shall consist of not less than fifteen members, namely, the officers and at least eight other active members of the Club. Upon retirement of any President of the Club from office, he shall, if still resident in the Ottawa District, continue a member of the Council for the ensuing Club year.

ARTICLE VII. AUDITORS.

The Auditors shall be elected by open vote at the Annual Meeting. They shall examine the Treasurer's accounts and certify as to its correctness.

ARTICLE VIII. MEETINGS.

(a) The Annual Meeting of the Club shall be held on the third Tuesday of March, the anniversary of the inauguration of the Club in 1879.

(b) Special Meetings of the Club may be called by the Council or shall be called by the Secretary on the request of ten active members. At this meeting no business other than that for which the meeting was called shall be transacted except by unanimous decision of those present.

(c) All questions submitted for discussion at the meetings of the Club shall be in harmony with the expressed objects of the Club. The mover of a resolution shall be allowed ten minutes to speak in presenting his motion. Five minutes shall be allowed each of the subsequent speakers, and to the mover in closing the discussion.

ARTICLE IX.

ORDER OF BUSINESS AT THE ANNUAL MEETING.

1. Reading the minutes of the previous Annual Meeting and of any special meetings held during the year.
2. Business arising out of the minutes.
3. Communications.
4. Report of the Council.
5. Report of the Treasurer.
6. Reports of Special Committees.
7. Election of members of the Council.
8. Election of Auditors.
9. Notices of motion.
10. New Business.
11. Suggestions for the good of the Club.

ARTICLE X. ELECTIONS.

The President, the two Vice-Presidents, the Secretary, the Treasurer, and the eight non-official members of Council, shall be elected by ballot at the Annual Meeting.

The Council as so constituted (including the past-President, if any), shall at the earliest possible date, select and appoint the Editor and the Librarian either from among its own number or from the members of the Club at large.

If after these appointments the members of Council shall still be found to number fewer than fifteen, as prescribed in Art. VI., Council shall similarly select and appoint one or more additional members to complete such full quota.

None but active members of the Club shall be eligible for any of the above elections or appointments.

ARTICLE XI. TERM OF OFFICE.

The officers, the other members of the Council, the auditors and the associate editors shall hold office during the year following the Annual Meeting, or till their successors are appointed.

ARTICLE XII. VACANCIES.

The Council shall have power to accept any resignations and to appoint any active member of the Club to fill any vacancy occurring during the Club year.

ARTICLE XIII. QUORUM.

Twenty members shall constitute a quorum at the Annual Meeting or any other business meeting of the Club, and five members shall constitute a quorum of the Council.

ARTICLE XIV. DUTIES OF THE COUNCIL.

The Council shall, as business may require, meet from time to time at the call of the President or of any two other of its members; it shall manage all matters affecting the welfare of the Club; it shall have full control of the funds of the Club, and it shall present at the Annual Meeting a report upon the year's work.

ARTICLE XV. DUTIES OF THE PRESIDENT.

The President shall preside at all lectures, excursions and other meetings of the Club. He shall be chairman at the meetings of the Council. He shall conduct all business of the Club in accordance with its Constitution and By-laws. He shall be, ex-officio, a member of all committees of the Council and of the Club.

ARTICLE XVI. DUTIES OF VICE-PRESIDENTS.

In the absence of the President, or at his request, a Vice-President shall, in order of rank, preside.

ARTICLE XVII. DUTIES OF THE SECRETARY.

The Secretary shall keep a true record of the proceedings of the Club and of the Council, and shall conduct their correspondence. He shall give previous notice to each member of the Council of its various meetings. He shall be responsible for all newspaper notices of all lectures and excursions. He shall be the custodian of the Constitution and By-laws and the records of the Club. He shall prepare reports of the meetings of the Council for THE OTTAWA NATURALIST. He shall be compiler of the Annual Report of the Council and shall read it at the Annual Meeting of the Club.

ARTICLE XVIII. DUTIES OF THE TREASURER.

The Treasurer shall be charged with the collection and custody of the moneys of the Club and shall keep a systematic account thereof which shall at any time be open to the inspection of the Council or of the Auditors. He shall submit at each Annual Meeting a statement showing the financial standing of the Club. He shall make disbursements only when authorized by the By-laws or by decision of the Council. He shall be, ex-officio, a member of the Excursions Committee.

ARTICLE XIX. THE OTTAWA DISTRICT.

The Ottawa District shall be the area included within a radius of thirty miles from the City of Ottawa.

ARTICLE XX. THE OTTAWA NATURALIST.

THE OTTAWA NATURALIST is the organ of the Club. It shall, if possible, be issued before the tenth day of each month, and a copy be sent to every member of the Club. The Editor shall be elected by the Council, nominations being made by ballot. The Associate Editors shall also be appointed by the Council, but each division (department) of the Club shall have the privilege of nominating one or more persons. All contributions published in THE OTTAWA NATURALIST shall be in harmony with the objects of the Club, the decision of the Publications Committee on such matters being final.

ARTICLE XXI. AMENDMENTS.

An amendment to this Constitution may be passed at an Annual Meeting of the Club by a two-thirds vote of the members present; notice having been given at a previous Annual Meeting or to the Council at least two months previous to such Annual Meeting. Notification of a proposed amendment shall be published in THE OTTAWA NATURALIST in the month of February.

BY-LAWS.

1. Standing Committees.
2. Publications Committee.
3. Duties of Publications Committee.
4. Duties of the Librarian.
5. Duties of the Editor.
6. Duties of the Associate Editors.
7. Duties of the Excursions Committee.
8. Leaders at Excursions.
9. Duties of Lectures Committee.
10. Departments.
11. Order of Business at Meetings of Council.
12. Amendments.

NO. 1. STANDING COMMITTEES.

Three Standing Committees of at least five members each shall be appointed by the Council from among its members, viz.: a Publications Committee, an Excursions Committee, and a Lectures Committee. The names of the members of each committee shall be printed in order of their rank, on the cover of THE OTTAWA NATURALIST.

No. 2. PUBLICATIONS COMMITTEE.

The Publications Committee shall be composed of the Editor, the Librarian, and three other persons selected by the Council from among its members.

No. 3. DUTIES OF THE PUBLICATIONS COMMITTEE.

The Publications Committee shall have direct supervision over all publications issued or received by the Club and shall see that they are dealt with by the Librarian in accordance with By-law No. 4.

This Committee shall have power to decide what shall and what shall not be published in THE OTTAWA NATURALIST and shall see that the Editor performs his work in accordance with By-law No. 5.

The Chairman of this Committee shall submit to the Council a report which shall be embodied in the Annual Report of the Council. This report shall give an outline of the work accomplished by the Committee during the year, and shall also include the report of the Librarian provided for in By-law No. 4.

No. 4. DUTIES OF THE LIBRARIAN.

The Librarian, under the direction of the Publications Committee, shall have charge of all exchanges and volumes belonging to the Club. He shall keep a record of these and shall make such disposition of them as will render them easily accessible to the members of the Club. Towards the close of each Club year, and in time for embodiment in the annual report of the Publications Committee, he shall submit to said Committee a detailed statement of the publications received, the titles of the volumes bound during the year, the names of the volumes added to the Library of the Club, the number of copies of THE OTTAWA NATURALIST kept in reserve, and such other relevant information as he may consider of value and interest.

No. 5. DUTIES OF THE EDITOR.

The Editor shall be responsible for the preparation of THE OTTAWA NATURALIST, which he shall endeavor to issue before the tenth day of each month. He shall be an ex-officio member of the Publications Committee, whose executive officer he shall be and to whom he shall be responsible. He shall also be Chairman of the Editorial Committee, composed of the Editor and the Associate Editors.

No. 6. DUTIES OF THE ASSOCIATE EDITORS.

The Associate Editors shall co-operate with the Editor in his work of preparing THE OTTAWA NATURALIST. They shall

render advice and assistance to him when he finds it necessary to consult them. The Associate Editor of each division (department) shall be responsible to the Editor for a report of each meeting held by the Branch of which he is the representative.

NO. 7. DUTIES OF THE EXCURSIONS COMMITTEE.

The Excursions Committee shall from time to time make arrangements for field work, subject to the approval of the Council. It shall submit a signed report to the Council outlining the work done at the excursions during the past season. The chairman of this Committee shall be responsible for a report of each excursion for publication in *THE OTTAWA NATURALIST*.

NO. 8. LEADERS AT EXCURSIONS.

The Leaders at Excursions are persons appointed by the Council to lead parties interested in the various phases of natural history in connection with the regular excursions of the Club. The person whose name appears first as Leader in any department shall assume the responsibility of providing a Leader in his department at each excursion.

NO. 9. DUTIES OF THE LECTURES COMMITTEE.

The Lectures Committee shall prepare a lecture programme before November of each year and submit it for approval to the Council. Its members shall constitute a Reception Committee at the various lectures.

The Chairman of this Committee shall be the custodian of the programmes; he shall be responsible to the Editor for a report of each lecture; and he shall at the close of each year submit a signed report to the Council outlining the work accomplished under the supervision of this Committee. This report shall be embodied in the Annual Report of the Council.

NO. 10. DEPARTMENTS.

The Club recognizes the following departments of natural history: Archaeology, Botany, Entomology, Geology, Ornithology, Zoology.

Members may form groups for intensive study in the departments in which they are respectively interested.

Each department shall have the privilege of nominating one or more of its members as Associate Editors, such nominations being submitted to the Council of the Club.

NO. 11. ORDER OF BUSINESS AT MEETINGS OF COUNCIL.

1. Reading minutes of previous meeting.
2. Business arising out of minutes.

3. Communications.
4. New Members.
5. Reports of Committee.
6. New Business.

NO. 12. AMENDMENTS.

An amendment or an addition to these By-laws may be passed at any meeting of the Council, by a two-thirds vote of the whole Council, due notice embodying a copy of the proposed motion having been given at a previous meeting of the Council. Any such amendment or addition shall be published in the next issue of THE OTTAWA NATURALIST.

DONATIONS TO THE NATIONAL MUSEUM.

The Victoria Memorial Museum has received a gift from the Canadian Northern Pacific Railway of the skeleton of a youth found in September, 1911, tightly wedged in a crevice about 50 feet from the centre line of the Canadian Northern Pacific Railway's construction at Kamloops Lake. This skeleton was secured by Mr. W. H. Melanson, the Resident Engineer of the Railway at Savona, and in compliance with orders issued by Mr. T. G. Holt, Attorney for the road at Vancouver, at the instance of Hon. William MacKenzie, was forwarded to Vancouver, from where it was sent as a gift of the Canadian Northern to the people of Canada. This single shipment, of course, is of minor importance compared with *the precedent which it established for the deposition in the national museum of all information and specimens obtained in railroad construction throughout Canada.* The Dominion Archæologist made request to several of the leading railroads of the country to instruct their engineers to carefully preserve all specimens found, and of *still more importance to send in information* regarding all antiquities and objects of handiwork as well as human remains *as a gift to the nation.* It seems only right that these objects of scientific value *should be preserved for the benefit of all the people rather than allowed to become scattered and destroyed* as is so often the case when they are uncovered by the activities connected with development and industries throughout the country. Accession 12.

An ancient human skull has also recently been received at the Victoria Memorial Museum as a gift from MacKenzie, Mann & Co., Limited. This was sent in by Mr. G. T. Holt, the Attorney for the road at Vancouver in compliance with orders issued by Hon. William MacKenzie to the authorities of the road to present

to the nation all scientific information and specimens discovered by the employees of the company. The particular skull was found by Mr. A. W. Phillips, Resident Engineer, at Tranquille. Unfortunately the bones found with it were buried in the dump by the ignorant labourers, but effort is being made by the authorities of the railroad to have them uncovered for the national museum. The skeleton was turned out near Tranquille by the grading machine plough about 8 feet below the surface of the ground and was sent to Mr. H. L. Johnston, Division Engineer at Savona. The Dominion Archæologist of the Canadian Geological Survey has urged upon the authorities and engineers of this road as well as upon those of the other great railroads of Canada, the Indian agents, and the North West Mounted Police, the great necessity of *saving whatever is found for the use of all the people of Canada.* Accession 13.

BOOK NOTICES.

ELEMENTARY ENTOMOLOGY.—By E. Dwight Sanderson and C. F. Jackson, pp. VIII, + 372, 496 figs. Boston: Ginn & Co.; \$1.50.

The need for a good introductory book on Entomology has been felt by teachers and those who are called upon from time to time to recommend such a book to one who may be desirous of taking up the science. Packard and Comstock have each given us excellent text-books for the student, but a book was desired of a more elementary character to put into the hands of the beginner, and one which would serve as an introduction to these and such other standard works as Sharp, Kellogg and Howard have written. Only those who have had experience in teaching entomology will realize the difficulties to be encountered in writing such a book. The authors of the present work have succeeded where others with less experience of teaching and often of the subject have failed. In so doing they have placed under a debt of gratitude not only teachers of entomology but the increasing number of those who are desirous of beginning a study of this subject. As the authors admit, the economic side has been made the dominant note in the book. For numerous reasons we think that this was a wise course to take; nor has the value of the book to the general student been diminished by unduly emphasizing the economic aspect.

The book is divided into three parts. The first part treats of the structure and growth of insects. In the second part the different orders are considered seriatim in a most readable and interesting manner. The third part is extremely valuable as

it describes in very clear language the methods by which the elementary student may familiarize himself with and study the structure, life-history and classification of insects. An excellent key to the different orders is given; in the preparation of this key the authors have been fortunate in securing the helpful criticism of the leading authorities in the various orders, thereby rendering it increasingly valuable and accurate.

In a book of this nature there are naturally a number of points which, if space did not forbid, we might discuss. It is unfortunate that "oesophagus" should be mis-spelt throughout the book, and surely "axe" does not, even on the ground of simplified spelling, deserve to have the "e" chopped off (p. 337). The so-called "rasp-like" character and "rasping" function of the labial lobes of the house-fly and blow-fly (p. 18) are mistakes which have crept into entomological literature due to an incorrect interpretation of the nature of the pseudotracheæ resulting from lack of actual observation and careful examination. The statement that "no true gills, that is, gills carrying blood vessels, like those of fishes, are found in insects," whilst strictly true, might be misleading in view of the possession by larval Chironomids of respiratory filaments containing blood spaces and similar in function to the gill filaments of fishes. Among the minor mistakes we notice "*Corisidae*" (p. 108), "Torie" (p. 305) and the laying of Fig. 434 on its side. We are of the opinion that some mention of such important facts as parthenogenesis and the alternation of generations, etc., would have enhanced the biological side of the book.

The book is well illustrated with nearly five hundred figures which have been selected with considerable care from good sources, and we note with no regrets the absence of many old acquaintances which have been rightly allowed to enjoy their well-earned rest. To all, whether they be teachers or students or those merely desiring to learn something about insects, we recommend this book most heartily.

C. GORDON HEWITT.

THE FLIGHT OF BIRDS.—By F. W. Headley, M.B.O.U. With sixteen plates and many text-figures. Witherby & Co. 326 High Holborn, London; 163 pp. Price, 5s. net.

"The Flight of Birds" is the first book which has come to our notice dealing exclusively with the science of flight from an ornithological viewpoint. It is only within recent years that the subject has had much attention from naturalists, and this chiefly by European ornithologists. The subject seems not to have been studied to any extent in a systematic way on our own continent.

British naturalists, however, seem to have paid more attention to the study. W. P. Pycraft devotes a chapter to the subject in "The Story of Bird Life," and most of the prominent natural histories deal briefly with the machinery of flight. Mr. Headley seems to have given the subject careful study, and a large part of an earlier volume by him entitled "Structure and Life of Birds" was devoted to birds' flight. In the present volume the author has his subject well in hand and gives each phase a careful consideration. His theories in regard to the explanation of many phenomena in flight and of flight principles are logical and much observation has been supplied in their support.

A list of chapter headings will indicate the scope of the material dealt with. They are as follows: Chap. I, Gliding; II, Stability; III, Motive Power; IV, Starting; V, Steering; VI, Stopping and Alighting; VII, The Machinery of Flight; VIII, Varieties of Wing and of Flight; IX, Pace and Last; X, Wing and Flight, and XI, Some Accessories. Under each of these headings are many sub-headings and each phenomenon is discussed at some length and a plausible theory advanced in explanation.

There are sixteen plates, fourteen of which are from photographs, and twenty-seven other illustrations.

This book, because of the principles of flight set forth within its pages, should prove interesting to aviators as well as to ornithologists and we trust that it will receive the welcome at the hands of the public which it deserves.

E. W. CALVERT.

CAMROSE, ALBERTA, BIRD NOTES.

On the 13th of September, 1911, a Red-breasted Nuthatch spent over an hour in and around our yard in Camrose. This bird seems to be very rare in the prairie country, as this is only the second one I have seen in twenty years.

The Blue Jay seems to be more plentiful now than formerly. Previous to the last year or two, the only ones I noticed were on the river bottoms in the thick spruce. Twice in September last year I saw two different pairs in the willows on the level prairie many miles from any evergreens.

October 14th, 1911, saw a pair of Magpies about ten miles north of Lacombe. This is the furthest north I have observed this bird. They are not common by any means. I remember seeing one a number of years ago in mid-winter, east of Red Deer.

F. L. FARLEY.

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