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THE OTTAWA NATURALIST

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DOES THE TYPE OF PROTOPALÆASTER NARRAWAYI PRESENT AN ORAL OR ABORAL ASPECT.

(PLATES VIII-IX, FIGURE 1).

BY GEORGE H. HUDSON.

During my first study of this type, careful search was made for items of evidence for both sides of this question and these items were classified and recorded. The evidence was so long and so overwhelmingly in favor of an oral aspect that it was decided not to burden my paper [A]* with it. In the last paragraph, however, I mentioned three of the most important adverse items, anticipated criticism, and promised a defence of my position. Dr. Raymond uses these items, with others, in favor of an aboral aspect [B]. I propose here to weigh carefully his evidence and present some items which are decidedly against his view.

INFERO-MARGINALS.

I. The vertical radial outlines of the interradiol shown in [A] plate II, fig. 4, and in our present text figure 1; together with the transverse vertical outlines seen in [A] plate III, fig. 5; show a markedly convex surface without the slightest degree of summit flattening and such outlines prove conclusively that no interradiol supero-marginal ever developed in contact with the exposed surface of these plates.

II. On the oral margins of each of these plates there are three concavities—the central one the most pronounced. They suggest comparison with the hollows or depressions in the plates of Goniasteridae and Linckiidae into which the jaws of the pedicellariae rest when open. Dr. W. K. Fisher writes me that he believes "The impressions are intended to receive the epineural plates," and that they are, therefore, oral surface features.

*Papers to which reference is made are indicated by capital letters in brackets. A list of these is placed at end of this article.

III. The absence of granular ornamentation on the exposed faces of the arm marginals is about equal in transverse width to the area which would be covered with the opened epineurals. Dr. Raymond, [B] p. 106, lines 42-43, cites this peculiarity as evidence that supero-marginals must have rested over these. In [C] I have published stereograms of three different regions from the undoubted oral surface of *Palæaster niagarensis*, Hall, which show the same smooth surfaces, and Prof. Fisher writes me that naked areas on these plates "are especially numerous in the Goniasteridae, in the genera *Tosia*, *Goniaster*, *Pseudarchaster*, *Plinthaster*." The evidence here is at least no stronger for an aboral than an oral surface.

IV. Dr. Raymond, [B] p. 106, lines 38 and 42, calls the exposed surface of the marginals "truncated" and "flat." We have seen that this is far from being the condition of the inter-radials and in [A] plate II, figures 3 and 4, we may see that it does not accurately describe the arm marginals. The first of these has a fairly well rounded surface, while the second to the fifth possess well marked angles a little orad of the centre of the plates. That these plates were convex on transverse vertical section is also seen in figures 5 and 7 of this plate—note particularly the right-hand side of figure 7.

Photomicrographs made under gum possess a flat lighting that is sometimes very deceptive. My study of such, like the one used in figure 2 of the plate just referred to, led me also to call these plates flat and deny them re-entrant angles for the oral longitudinal muscles. If now we will examine in [A] plate III, fig. 4, the marginals numbered from 2 to 7, we shall see these plates in normal lighting and their appearance is very decidedly that of original free surfaces and against both Dr. Raymond's descriptive terms and his deduction therefrom—that these surfaces were produced by intimate contact with a series of supero-marginals. Many forms, both living and fossil, show a more decided oral flattening of these plates than that revealed in this figure.

V. In our present plate IX, fig. 1, the right hand marginals 5 and 6 are fairly well preserved and the fields of their common flexor clearly outlined both by form and also by the blackened remains of some of their muscle fibers. Such large bundles of flexors would occur only on arm surfaces.

Of the five items given by the marginals the third is of little value and is only included because it formed a part of Dr. Raymond's evidence against an "oral side up" decision. Item IV, when the real facts are given, is for such a decision, and items I, II and V are of a most positive and unequivocal character.

ADAMBULACRALS.

VI. The exposed flat faces of the first adambulacra (mouth plates) dip strongly inward. The true oral surfaces of these plates in *Palæaster parviusculus* have similar flat faces which also dip inward. See stereogram in [C] plate III.

VII. Prof. Fisher says of the angular ridge towards the furrow, which is shown by all the adambulacra, "This strongly suggests the attachment area of the 'furrow comb' of spines * * * * such a ridge is quite characteristic of many species. It is well seen in *Astropecten*, *Psilaster*, *Persephonaster*, etc."

VIII. Dr. Raymond says of these adambulacra [B] p. 105, lines 9-11, "And each plate was provided with a cup-like pit into which the proximal end of a covering plate fitted." He then says of the *Urasterella* which he figures, [B] 106, lines 1-2; plate VI, fig. 1; that its apparent "Covering pieces" (ambulacra) "are supported by small plates with a pit on top, just as in *Protopalæaster narrawayi*." Now, in the first place, ambulacra never have their adambulacral ends fitting into cup-like pits to form ball and socket joints. There is, however, a pit or depression between each pair of plates, and this is occupied by the ambulacro-adambulacral muscle. In the second place, the adambulacra now in question do not possess "cup-like pits," but they show angular, flat or slightly depressed muscle fields. In the third place, the proximal ends of the epineurals in *P. narrawayi* not only do not "fit" these muscle fields, but they are in every case placed alternately with them. This is the only evidence that Dr. Raymond deduces from the adambulacra, and it is too widely at variance with the facts to have been carefully considered. The alternate arrangement just specified is strong evidence against Dr. Raymond's interpretation.

On giving these adambulacra additional study by means of new stereograms, I am inclined to abandon my idea that the muscle fields in question were for attachment of epineural adductors. The muscle fibers, which remain attached to them, are small and more probably served to open the "furrow combs." In our plate IX, fig. 2, much heavier bundles of muscle fibers are to be seen next the marginals and between adambulacra—note particularly the remains of the bundle between the last two adambulacra on the left. In addition to the evidence given, [A] p. 46, lines 32-37, to show that the epineurals were arranged alternately with the adambulacra, I here present fig. 1 of plate IX. There maining ends of several epineurals are to be seen in place in the left-hand row of this figure, but probably crushed in a little by the force that displaced the epineural below. In figure 2 of this plate it will be seen that the median bosses

projecting inwardly from the last preserved marginals do not extend through to the aboral surfaces of the plates, but they served for attachment of the epineurals. We may still see that the 3rd and 4th marginals on the left each possessed two of these bosses though the corner ones have been nearly lost by weathering.

IX. Where adambulacra possess long vertical axes these are usually somewhat imbricated, the oral ends being tipped toward the mouth, never away from it. The broken ends of rays II to V all show this inclination. See stereogram in [C] ray V and our plate IX, figures 1 and 2. The angle of inclination is about 25°. The slight imbrication is an adaptation to secure greater flexibility in the arms and to help in thrusting the food content of the furrow toward the mouth. Such evidence cannot be lightly set aside.

EPINEURALS.

Although asserting that the "covering pieces" had their origins in the pits of the *oppositely* placed adambulacra, Dr. Raymond calls them "alternating plates" (p. 105, line 6). A study of their distal ends is of interest. The younger pieces, plate VIII, fig. 2, meet, though very irregularly, by their end faces. The furrow here is in a contracted condition, and this should have *opened* the end faces, were these ambulacra, and displayed the muscle fields of the transverse dorsal ambulacral muscles. Not the least trace of such muscles is anywhere to be seen.

The older epineurals, following the law of biogenesis, are less like primitive covering pieces and meet only by their inner edges, plate VIII, fig. 1. The fallen 8th, the covered 5th and the two shifted 3rds in this figure indicate that the meeting ends were free.

The varied imbrication of the *sides* of these pieces and the absence of traces of longitudinal muscles is also evidence against their being ambulacra.

The epineurals marked as first could by no possible means have had their distal ends bound to their opposite neighbors. To conceive these first members of a series as ambulacra is therefore wholly out of the question.

The evidence of plate IX, fig. 2, is that the epineurals were borne by the marginals. The latter plates have lost much of their original surface, but there is here and there a suggestion that they also bore large spines outside of the epineurals. For one instance note the structure of the raised central portion of the more perfectly preserved fifth marginal in plate IX, fig. 2. The only spine fragment preserved in the matrix, however, is in

interradius 1, but this when magnified about 20 diameters reveals a striated surface as if belonging to a sea-urchin.

VERTICAL SECTION.

XI. The last item of evidence to be here given from the oral skeleton is derived from the sequence and form of outline of the vertical section given in text figure 1.

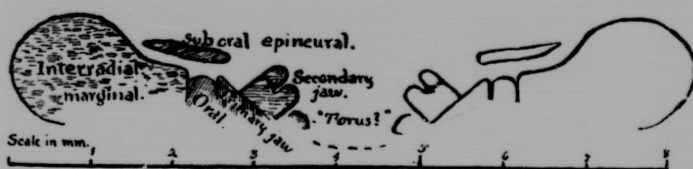


FIG. 1. Outlines from vertical section of *P. narrawayi* passing in through one interradius to center and out by one of the interradii next the opposite radius. Slight offsets have been made to include suboral epineurals and secondary jaws.

It is not a difficult matter to account for these plates, their form and position, if the outline is that of the true oral surface. If, however, this outline is of the aboral surface of the oral skeleton, we are face to face with an apparently insuperable difficulty. How are we to explain the presence of the deep concavity on the now aboral inner face of the marginal—the large paired plates which now become *supra-orals*—the beveled *interior* faces of the mouth plates—and the function of the “secondary jaws.” Are we to suppose that the circumgastric ring of ten *radially situated* pieces (our first epineurals) rested against or over the borders of the stomach and served for “internal massage” or for a compress to aid in the emptying of the stomach cavity? Was the ring of ten double-headed internal “crushers of the oesophagus” an essential adjunct of this new and wonderful mechanism? Those against an oral aspect must explain this apparently senseless arrangement of heretofore wholly unknown plates. Should further study establish their view we may properly expect that the biological story told by these plates will be one of intense interest.

THE ABORAL SKELETON.

The balance of Dr. Raymond's evidence is contained in the paragraph commencing on p. 106, line 44, of his criticism and is derived from the plates marked (x) and (y) in our plate VIII, fig. 1. I agree with him that for these “a place cannot be found in the structure of the specimen” (p. 106, lines 45-46). He

finds, however, that "they are not far from their original position" (p. 107, lines 18-19). That they were thrust to their present position after the burial of the specimen is made manifest, not only by the plates in the immediate vicinity, but plates now lost must have communicated this thrust to interradius 1, and there not only turned the secondary jaws, but displaced one of the mouth plates and the oral. Dr. Raymond's assertion that "if these were plates foreign to this specimen, they would not maintain their natural position in relation to each other, but would be separated," is evidently meant to indicate that the overriding movement was not of great magnitude. He must have frequently found forms buried serially over each other, without necessarily finding all the plates of the upper specimens "separated." An examination of our plate VIII, fig. 1, with a stereoscope leads me to doubt if (y) belongs to (x) any more than (z) does. I find plate (y) depressed; the meeting faces neither parallel nor of the same form; and if the plate really belonged to (x) shifted a little toward radius 1, though I should have expected the thrust to have made it slip in an opposite direction. The movement instead of *separating* these plates has thrust them together. Dr. Raymond asserts that (y) cannot be an adambulacral of another specimen (p. 107, lines 12-14) because it "is larger and of different shape." It has two diameters perpendicular to its sides of about 0.8 mm each, which is a little less than the transverse diameter of the adambulacral just back of the undisturbed mouth plate in radius II. Turn this adambulacral on its side and you will have a plate displaying an area greater than that now shown by (y). Plate (x) "is pointed at the wider end" (p. 107, line 6), but I cannot be positive that the faces on each side of the angle are either true sutural faces or that this is the original oral end of the plate. The smaller face seems to possess the granular ornamentation of the aboral end of a marginal and the lines of blackened organic fragments buried in the plate run parallel to the long face while in the stereograms (photographs) these lines are distinctly sub-parallel with the sides next the first arm marginals. If plate (y) belonged to the aboral skeleton it is sheltered enough to have retained some ornamentation, but it is as smooth as a sutural face of an adambulacral. As all other plates have been completely weathered away we must credit the remaining big plate with a serious loss of its original surface. I would not like to assert of this plate, which shows rotation on both its long and short axes in addition to great loss of surface, that it has the "same form" (p. 107, line 19-21) as an interradiial supero-marginal of *Palæaster matutina*, Hall.

XII. Mr. Narraway's very kind second loan of the type has enabled me to make a number of stereograms of it, and since returning the specimen to him, I have found three among them that offer more important evidence concerning the nature of the aboral skeleton than I had before noted. In plate VIII, fig. 1, the present floor of the oral cavity shows a number of very small ossicles having diameters of between 0.10 and 0.15 mm. These are most clearly seen around the inner margin of the "torus," in interradius 1. To the right of the whiter of these ossicles there are a number of darker molds or thinly covered ossicles having similar diameters and an alternate arrangement. The half tone process will hardly allow these to be seen, but in plate IX, fig. 2, thin, angled plates with a diameter of 0.2 mm should be visible on the dark background of the upper part of the figure. A transverse row of three of these will be found just above the last adambulacral and marginal at the right. There is also one quite clearly revealed two centimeters (measured on the stereogram) above the right-hand marginal and on a line with its inner face. These plates are very regularly arranged and each has a small central projection about 0.03 mm in diameter. Twenty-five or more of these plates can be recognized in the photographs from which this figure is produced. There is a median row of slightly larger plates, and on each side of this at least five other rows arranged in regular alternation. A number of the same plates may also be seen near the end of ray IV. As *P. narrawayi* can hardly have had its oral skeleton sandwiched between two aboral skeletons, I think this case does not need further argument.

Dr. Raymond in his criticism has kindly sought to share a responsibility for my errors and to make Mr. Narraway assist him in this, by frequently using the pronouns "we" and "our" to represent an offending trio who persisted in their error even though (p. 105, line 24) "it must be confessed, all dissented from our view." This use of these pronouns is misleading. Dr. Raymond had a manuscript copy of my paper before its publication and duplicates of some of my photomicrographs. My experience with "paleontologists and students of recent echinoderms" was not as he unwittingly represents it. On p. 106, lines 28-32, he states: "The chief reason that Narraway, Hudson and myself had for thinking that *Protopalæaster narrawayi* was exposed from the actinal side was that the covering pieces did not look like ambulacral plates, * * * *". Here again I believe the statement would have gained in accuracy had the first two names been omitted. It must be evident at least that Dr. Raymond did not know my reasons. To Mr. Narraway is due the credit of recognizing the true character of the "covering pieces." Aside from agreeing with him in this,

my study of his specimen was wholly my own, and neither he nor Dr. Raymond are in any manner responsible for errors in my paper.

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- B. On the nature of the so-called "Covering plates," in *Protopalæaster narrawayi*. By Percy E. Raymond. OTTAWA NATURALIST, Vol. XXVI, p. 105-108, Plate VI (December, 1912).
- C. The use of the Stereogram in Paleobiology. By George H. Hudson. New York State Museum Bulletin, 164, p. 103 to 130, plates I-XIII; Annual Report of the Director of the Science Division for 1912.

EXCURSIONS.

BILLINGS' BRIDGE, Sept. 20, 1913.—A most delightful fall excursion of the Club was held near Billings' Bridge on the above date. About 25 members were in attendance. The chief object of the excursion was to study the aquatic plants which grow in such profusion near the Islands, a short distance from Bank Street. A sufficient number of boats had been arranged for, and under the guidance of Miss F. Fyles, Assistant Botanist of the Experimental Farm, observations were made and collections gathered of many of the water plants of the vicinity.

In midsummer the beauty of our Canadian water gardens is so apparent as to attract the attention of even the unobservant: masses of waxen arrowheads, gayly bright-blue pickerel weed and water lilies, yellow, pink and white, bladderworts, or yellow sunbonnets and water arums all in flower at once. But, in the autumn, when the flowers have shed their bright petals, the interest is in the fruiting heads of the reeds and rushes and in the less conspicuous submerged plants; of the latter class, the water-weed (*Elodea canadensis*), which becomes a great pest in shallow canals, almost completely filling the passage with its dense growth. Belonging to the same family is the ribbon grass

(*Vallisneria spiralis*). This plant, which might better be called water ribbon, as it does not belong to the grass family, was still blooming. Some of the white pollen of the staminate flowers was seen on the surface of the water floating to meet the pistillate flowers, which had arisen with sudden growth to receive it. Several species of the pondweed were found, one of the most abundant being the clasping-leaved pondweed (*Potamogeton perfoliatus*), and entangled with these was the mud plantain (*Heteranthera dubia*), which earlier in the season raises its pale yellow flowers just above the water; and in the same company, the hornwort (*Ceratophyllum demersum*) and water milfoil (*Myriophyllum* sp.). These two last-named plants somewhat resemble one another in general appearance, but on closer examination we find a readily remembered distinction in the feather-like leaves of the latter. Closer to the shore, where the Cat-tails (*Typha latifolia*) and the Wild Rice (*Zizania* sp.) are always in evidence, were seen the artistic globular heads of the bur-reeds (*Sparganium eurycarpum* and *S. americanum* var. *androcladum*) with many members of the Sedge family, chiefly the club-rush (*Scirpus validus*), nut-grass (*Cyperus esculentus*), the dark green bulrush (*Scirpus atrovirens*), and the *Dulichium arundinaceum*. Floating among the stalks of these plants was the vivid green of the little duck-weed (*Lemna minor*), and the greater duck-weed (*Spirodela polyrhiza*) and the large lily pads. The different species of water lilies were distinguished, apart from the shape of the leaves, which is rather uncertain, by the seed vessels. The fruit of the yellow pond lily (*Nymphaea* sp.) remains above the water to ripen its seeds, while the pink and white water lilies (*Castalia* sp.) complete their maturity beneath the surface. On the edge of the shore, as a graceful background to the straight lines of the reeds and rushes, the trees were noticed to be festooned with the orange-berried bitter-sweet (*Celastrus scandens*) and the rich, blue, grape-like clusters of the Moonseed (*Menispermum canadense*) and bending over into the water, the long, red-leaved stems of the water-willow (*Decodon verticillatus*).

Several of the members proceeded direct to one of the islands to examine land plants and collect insects, and other zoological specimens. Unfortunately, however, the collections made were small. At 4.30 the whole party met on the Island and short addresses were given by several of the leaders. Miss Fyles spoke of many of the plants which are mentioned above, and answered questions regarding them.

Mr. H. McGillivray referred to the geological formation of the district, it being of the Utica rock formation. A specimen of

a fresh water shell of the genus *Unio*, collected on the Island, was discussed, and the statement made that a large number of specimens of rocks and shells secured in the Ottawa district had been collected during the summer. These he hoped to exhibit to members of the Club at a later date.

Mr. J. R. Dymond, of the Seed Branch, Department of Agriculture, discussed many of the plants which had been found growing on the Island. A number of species were shown and identified. None of these were of uncommon occurrence, but their names were asked for by some of the members present.

The common leopard frog, which frequents the damp places of the Island, was shown by Mr. Andrew Halkett, and remarks made upon its life-history. A tadpole of another species of frog was also shown, and explanations given as to how the gill apertures become closed as the frog assumes its lung-breathing function, and how the paired limbs develop. Specimens of land-mollusks, viz.: juveniles of a helicoid, snails with their shells of the genus *Succinea*, and two small shells of a gastropod, requiring determination, were exhibited.

Mr. F. W. L. Sladen, Assistant Entomologist for Apiculture at the Experimental Farm, showed some males of *Vespa diabolica* captured at raspberry flowers, in which the markings varied. He called attention to the neglected field of the study of wasps and wild bees, viz.: the superfamilies, *Vespoidea*, *Sphecoidea* and *Apoidea*. During the past season he had taken two or three thousand specimens of these in the Ottawa district, consisting of over 300 different species, not a few of which are probably new to science.

Mr. Arthur Gibson, First Vice-President of the Club, who had charge of the excursion, spoke in conclusion on certain insects which were noted, mentioning particularly the Burdock Gelechiid (*Metzneria lapella*), the larvæ of which are so useful in destroying the seeds of burdocks and which hibernate in the heads, and the galls of *Pontania pomum*, known as the Willow Apple Gall, which had been found abundantly on the leaves of *Salix discolor*. Freshly emerged specimens of the beautiful large dragon fly, *Anax junius*, were also shown.

EXPERIMENTAL FARM, September 27th, 1913.—Thirty members of the Club met at the end of the car line at 3 o'clock. A visit was first made to the memorial erected to the memory of the late Dr. James Fletcher, one of the founders of the Club. The party then, under the guidance of Mr. Arthur Gibson,

First Vice-President, and Mr. F. E. Buck, of the Horticultural Division, examined the climbing vines on certain of the Farm buildings, the remarkable collection of hedges, undoubtedly one of the best to be found anywhere, and afterwards many of the groups of trees and shrubs in the arboretum. The flowering plants were later visited and information given as to those most worthy of cultivation. The Insectary of the Division of Entomology was shown, and the method of studying the life-histories of destructive insects described.

BEAVER MEADOW.—The last of the fall excursions for 1913 was held on the afternoon of October 4th to the Beaver Meadow, near Hull. Since the previous excursion to Beaver Meadow, the lower end of this locality has changed considerably owing to its having been divided into building lots, on which already a fair sprinkling of homes have been established. The beautiful wood to the right of the stream, on entering the meadow, is a "thing of the past," but fortunately, as yet, from the naturalists' point of view, the upper end is unchanged, and it is sincerely hoped that this may be left as it is for very many years. The locality has always been a favourite haunt of the Club, and many happy hours have there been spent by its members.

After wandering about for nearly two hours, the party re-assembled and listened to brief remarks by leaders present. Mr. Andrew Halkett spoke of batrachians which had been collected, viz.: the Leopard Frog, the Wood Frog and the Common Toad. A fine specimen of the Garter Snake was shown and remarks made on snakes in general and their habits.

Mr. Arthur Gibson spoke on certain insects and showed specimens of the large Water-strider, which skates over the surface of the stream; the Hedge-hog Caterpillar, which was crawling about in search of a convenient place to hibernate; and the Lesser Migratory Locust, which this year has been very destructive near Ottawa in fields of barley, oats, potatoes and corn.

Mr. E. C. Wight showed specimens of Meadow Rue, Joe-Pie Weed, Butternuts, etc., confining his remarks chiefly to their medicinal properties. He also referred to several bad weeds, particularly the Blueweed, often called Blue Devil, which is so common in Ontario and the eastern provinces and which is much enquired about by farmers.

Mr. H. McGillivray exhibited specimens of rocks and shells which he had found in the district. A most interesting specimen was a nodule on which there was the impression of a petrified capelin, a specimen of fish which is yet extant.

THE JUBILEE MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

One of the most important gatherings of entomologists which has ever taken place in Canada was that which met at the Ontario Agricultural College, Guelph, on August 26th, 27th and 28th, 1913, to celebrate the Jubilee Meeting of the Entomological Society of Ontario. Among the distinguished entomologists from outside of Canada who were in attendance were: Professor J. H. and Mrs. Comstock, of Cornell University, Ithaca, N.Y.; Dr. E. P. Felt, Albany, N.Y.; Prof. T. J. Headlee, New Brunswick, N.J.; Prof. P. J. Parrott, Geneva, N.Y.; Dr. A. D. MacGillivray, Urbana, Ill.; Dr. R. Stewart MacDougall, Edinburgh, Scotland; Mr. Geoffrey Meade-Waldo, London, England; Prof. F. M. Webster, Washington, D.C., and Dr. W. M. Wheeler, Boston, Mass. The following entomologists from Canada were present: Rev. Prof. C. J. S. Bethune, Guelph, Ont.; Rev. Dr. T. W. Fyles, Ottawa; Mr. H. H. Lyman, Montreal; Prof. W. Lochhead, Macdonald College, Que.; Dr. C. Gordon Hewitt, Messrs. Arthur Gibson, F. W. L. Sladen, Ottawa; Dr. E. M. Walker, Dr. A. Cosens, Mr. J. B. Williams, Toronto; Prof. T. D. Jarvis, Messrs. L. Caesar, A. W. Baker, G. J. Spencer, Guelph; Prof. John Dearness, W. E. Saunders, London, Ont.; John D. Evans, Trenton, Ont.; F. J. A. Morris, Peterboro, Ont.; R. S. Hamilton, Galt, Ont.; R. C. Treherne, Agassiz, B.C.; J. D. Tothill, L. S. McLaine, Fredericton, N.B.; G. E. Sanders, Bridgetown, N.S.; C. E. Petch, Covey Hill, Que.; J. C. Chapais, St. Denis (En bas), Que.; W. A. Ross, Vineland Station, Ont.; H. F. Hudson, Strathroy, Ont.

In the afternoon of August 27th, President Creelman, of the Ontario Agricultural College, welcomed the entomologists to the College and in a bright, happy speech, spoke of the value of the practical side of the study of insects to the agriculturist and the community at large. Addresses to the Society on its having attained fifty years of service were presented by delegates, representing a large number of Universities, Colleges of Agriculture, Societies, etc., the world over. Greetings from the Ottawa Field-Naturalists' Club were presented by Mr. Arthur Gibson.

During the two days' session at Guelph important papers were presented by Rev. Dr. Fyles, Rev. Dr. Bethune, Dr. A. D. MacGillivray, Dr. A. Cosens, Dr. R. Stewart MacDougall, Prof. F. M. Webster and Mr. F. J. A. Morris.

On the evening of August 27th the delegates and members were entertained by Dr. and Mrs. Creelman, and on the following

evening Dr. W. M. Wheeler delivered a most delightful and instructive lecture on "Ants." This was illustrated by a collection of exceptionally good lantern slides. All of the papers, etc., presented at the meeting will be published in full in the Annual Report of the Society.

On August 29th the Society entertained the members and delegates to an excursion to the Grimsby district, where collections of insects were made and several orchards visited, which showed full well the value of spraying, etc., to control injurious insects.

Dr. C. Gordon Hewitt, Dominion Entomologist, Ottawa, was elected President of the Society for 1913-1914. The City of Toronto was decided as the place of the next meeting.

POPULARITY AND ROLE OF THE ROSE.*

By F. E. BUCK, Experimental Farm, Ottawa.

The popularity of the rose is rapidly increasing. To such an extent is this true that quantities of beautiful roses belonging to the Hybrid Tea class are now being planted in sections of country where up till recently it was thought impossible to grow with safety roses of this class at all. For instance, several rose lovers in Canada have recently planted large quantities, of the best varieties that it was possible to import, of these roses. With slight winter protection many of them are apparently quite adapted to conditions of climate as far north as Montreal and Ottawa.

In connection with the spread of this flower, it may be apropos to ask why it is that it has always held the premier position amongst flowers?

In the spread of culture and the aesthetic spirit throughout the world the role which the rose has played has been an important one, and in this paper it is the intention to briefly discuss that role.

The fact that somewhere during every hour of every day and night the sun is shining somewhere in that vast empire called British is often emphasized. Another fact equally significant to us perhaps in another way is that that same sun every day of the 365 of every year calls into fragrance and beauty somewhere in that same vast empire blossoms of one of the most perfect of flowers, the rose. Although this statement may perhaps sound exaggerated, it is nevertheless true. Roses

*—Paper presented at meeting of O.F.N.C., Dec. 10, 1912.

to-day are in bloom in some parts of the same country for about nine months out of every twelve of the year.

The wealth of bloom in some of the Rose Gardens of Europe is magnificent and the variety wonderful.

At the Central Experimental Farm, Ottawa, a new Rose Garden has been recently planted with the object of testing most of the best of these modern roses, for hardiness and suitability for Canadian conditions.

Is the popularity of the rose likely to go on increasing and to what cause or causes is its popularity to be ascribed? These are two questions similar to the one already asked and it is hoped that an answer will be at least suggested in what follows.

In the first place it may be mentioned that the esteem in which the rose is held is by no means of modern growth. The following account of the birth of the rose will show how the Ancients prized it:

"Of the birth of the rose, the queen of flowers, it is related in fable that Flora, having found the corpse of a favorite nymph, whose beauty of person was only surpassed by the purity of her heart and chastity of mind, resolved to raise a plant from the precious remains of this daughter of the Dryads, for which purpose she begged the assistance of Venus and the Graces, as well as all the deities that preside over gardens, to assist in the transformation of the nymph into a flower that was to be by them proclaimed queen of all the vegetable beauties. The ceremony was attended by all the Zephyrs, who cleared the atmosphere, in order that Apollo might bless the new created progeny with his beams. Bacchus supplied rivers of nectar to nourish it, and Vertumnus poured his choicest perfumes over the plant. When the metamorphosis was complete Pomona strewed her fruit over the young branches which were then crowned by Flora with a diadem that had been purposely prepared by the Celestials to distinguish this Empress of flowers."

This fable suggests the place which the wild or native roses held in the world of floriculture. The modern rose, with the co-operation of man, is a much more perfect creation than the rose alluded to in the foregoing, and through it nature has called into exercise the highest qualities of mankind. For this reason the rose has played and is still playing a role which is immensely potent in influencing the ethical history of the human race.

The role which each great man plays in life does not always influence the race for good. The role played by the Emperor Nero can scarcely be said to have influenced the world for good, and even that played by such as Napoleon is questionable. Indeed the role played by most men and women affects hardly

at all the destinies of the race; but the role played by the rose, if we may consider the good influences exerted by it, in this way, has always been beneficent or interesting, and to such an extent is this true that it is quite easy to divide this influence into various phases.

One of the very pleasing minor duties of the rose has been to hand on to us, as it were, a little series of biographical or historical notes on those personages who have had their names immortalized through association with the "queen of flowers." One instance will be sufficient perhaps to indicate what is meant. It may be best given in the form of a story of one of the most prized of the older roses; it is a dainty story of a notable rose from France. "When Niel, a brave French general, was returning from the scene of his victories in the war between France and Austria, he received from a peasant, who wished to honor the hero, a basket of beautiful pale yellow roses. One of the stems, which happened to have a root clinging to it, the general took to a florist in Paris, in whose care it remained until it became a thriving bush covered with blossoms. Niel then took the plant as a gift to the Empress Eugenie. She expressed great admiration for the exquisite flowers and on learning that the rose was nameless said significantly "Then I will name it. It shall be 'The Marechal Niel' and at the same moment she bestowed upon the astonished general the jeweled baton that betokened his promotion to the high office of Marechal of France."

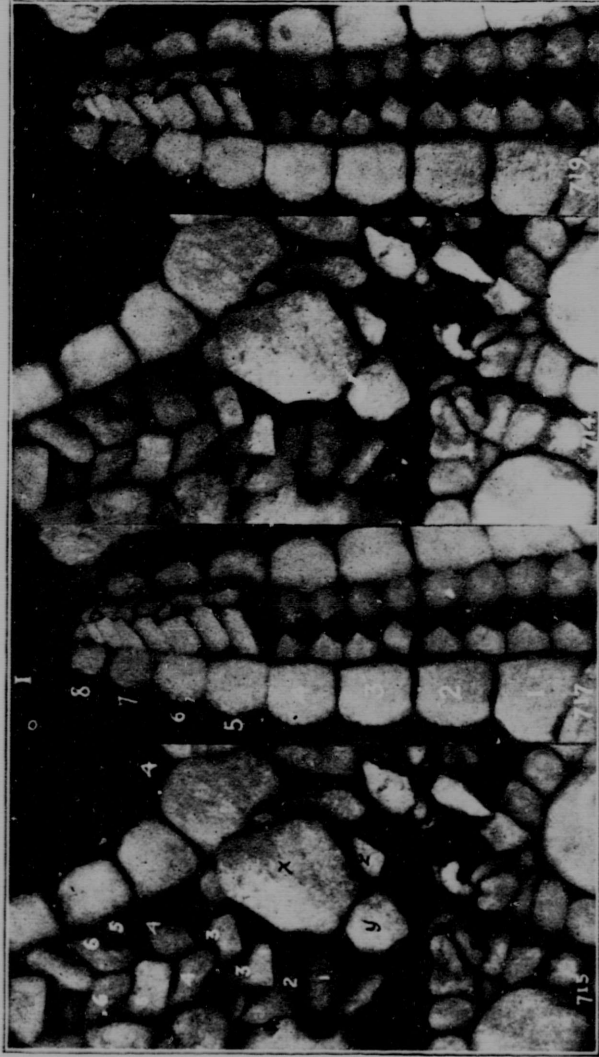
Lord Penzance, who has given us some beautiful brier roses, will be remembered as a great lawyer, but much as law may do to carry his name down the pages of history, his rose creations will do much more. William Allen Richardson is an unknown entity, but known in literature because his name became that of a rose, and Dorothy Perkins, Mrs. John Laing, and many others are names which will be household words for many years at least because their possessors loved the rose.

The only other minor role of the rose which we shall mention is one which is of greater interest to those interested in it from the botanical and historical standpoints than it is to the average grower. Botanists well know that the rose is native only to the temperate parts of this world; they also know that we have about nine species native to this country. The genus *Rosa* is not large, Gray mentions only fifteen species. Great Britain and Denmark claim about twenty species. The interesting part about these native species is that in working with them the hybridist found that they responded in a remarkable way to cross-fertilization. Until the year 1867 new roses other than the original species were few in number and mostly plants of chance. When, however, about that date a Mr. Bennett, in

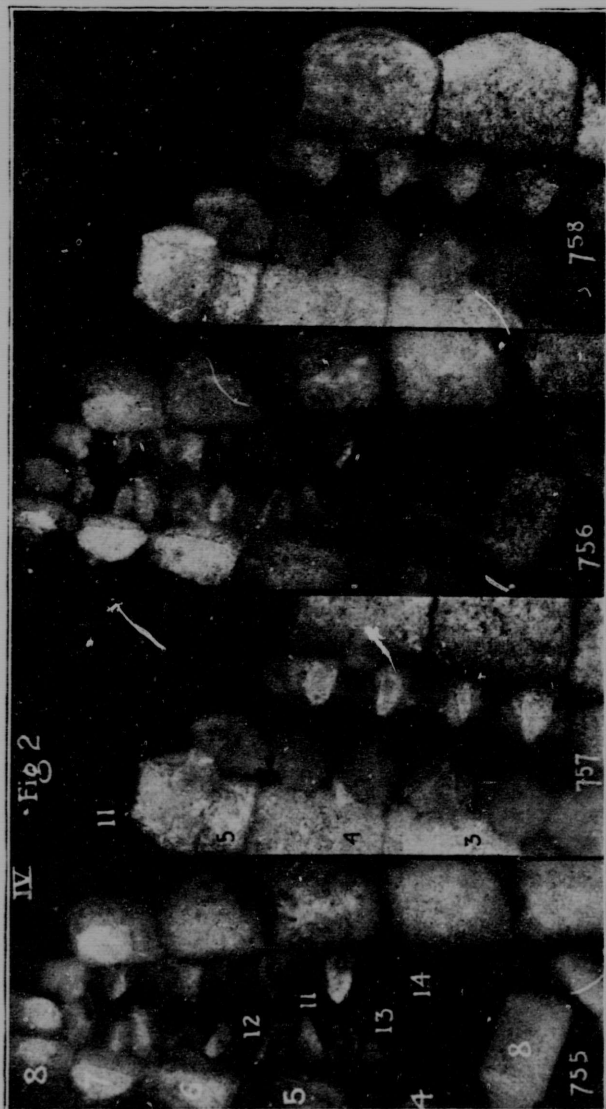
England, and other men in France, began some pioneer work in cross-fertilization of roses, a new era began in the world of floriculture, and the role which the rose has played in the efficient development and understanding of the art of plant improvement is only realized when we compare a modern plant catalogue, and especially a rose catalogue, with one printed less than fifty years ago, and then, few, we suppose, really grasp the meaning of the difference in such lists.

But let these few last words be for the consideration of the real role of the rose. One has said "What muse has been able or language sufficient, to do justice to a plant that has been denominated the Daughter of Heaven, the Glory of the Spring, and the Ornament of the Earth. . . . To paint this universal emblem of delicate splendor in its own hues, the pencil should be dipped in the tints of Aurora when arising amidst her aerial glory. Human art can neither colour nor describe so fair a flower. Venus herself finds a rival in the rose, whose beauty is composed of all that is exquisite and graceful." And it may be justly concluded that to possess such a flower and to grow it for its fragrance and beauty has been a potent desire which has led to the creation of many of those beautiful gardens not only around the "Stately Homes of England," but in ever increasing number on this continent also, and standing in one of these gardens and beholding the roses, or sitting in the doorway of one of the humblest cottages of the land, and scenting the fragrance of roses climbing around tiny windows, can any being revel in gross selfishness or remain unconscious to the fact that such flowers would win him to magnanimous conduct and invite him to be their messengers to carry fragrance and cheer to the sick and afflicted of mankind? And is there a man who can sell himself to pure utilitarianism when around him are examples of a type of beauty which has won multitudes of mankind to taste through the joys of the aesthetic life the real fulness of living? And surely none can be mere animal only in passions when forms so perfect in symmetry and shape appeal to him to witness their perfect modesty and grace?

The rose, Queen of Flowers, has a true role in this world, and that role no mortal may dare make light of. To take chief part in shaping the aesthetic taste in man, to encourage the love of the garden, the love of fragrance, of beauty of form, of exquisite color is a task of no mean order, and yet the modern rose is encouraging, more than ever before, a more clamorous appetite, a truer aesthetic thirst for these things, a true indication, surely, that her supremacy is secure and her role a beneficent one.



Details of *Protopalcaea narraivi*, Hudson, under gum and enlarged about 9.5 diameters. The numbers next lower margin are those of the original negatives. Examine with a stereoscope to study in relief.



Details of *Proropalcaea narraiayi*, Hudson, under gum and enlarged about 19.5 diameters. Numbers 13 and 14 are wrongly placed. The former is at the position of the tenth epineural.

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