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Observations on the *Terataspis grandis*, Hall, the largest known trilobite.

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ON THE  
TERATASPIS GRANDIS, Hall,  
THE LARGEST KNOWN TRILOBITE.

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# OBSERVATIONS ON THE TERATASPIS GRANDIS, Hall, The Largest Known Trilobite.

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By J. M. CLARKE.

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Communicated to the State Geologist December, 1890.

Trilobites of great size have been reported from various formations. With rare exceptions, however, these relics are but fragments of the test, leaving to the imagination the restoration of the original proportions of the animal, and without an earnest mental effort one is apt to leave the contemplation of the large fragment with no adequate conception of the imposing lineaments of its owner. Indications of these gigantic forms occur in all the grand faunas of the Palæozoic, with the exception of the Carboniferous where diminution in numbers was accompanied by diminution in size, or, in other words, by the prevalence of genera in which great size was never attained.

Almost with the earliest known appearance of the Trilobites the genus PARADOXIDES attained magnificent proportions. *Paradoxides Harlani*, the well-known species of the Braintree argillites, must have grown to a length of 18 inches. ANGELIN has figured an entire specimen of *P. Tessini* 12 inches in length, and BARRANDE a fragment of an individual of *P. imperialis* which must have had about the same size. Mr. G. F. MATTHEW has described a nearly entire individual of an immense *P. regina* from the St. John beds, 15 inches long and 12 inches across the base of the cephalon, and it is claimed, with undoubted accuracy, that this is the largest undismembered specimen of a trilobite found in any country.

In the second faunas great Asaphids were not uncommon. As early as 1839 Dr. JOHN LOCKE described in the report of the Geological Survey of Ohio, a portion of an immense pygidium to which he gave the name *Isotelus maximus*. In 1843 Dr. LOCKE figured an entire individual of what he considered the same species, changing the name, however, to *Isotelus megistus*. This specimen measured nine and three-quarters inches in length. The figure was accompanied by outlines of two large pygidia, the greater of which was that referred to in 1839, which, the author says, coincided "with the end of an ellipse 22 inches

long and 12 inches broad." This is an evidently much compressed fragment, measuring seven inches in its greatest transverse diameter, and assuming this as the greatest diameter of the pygidium and restoring the length from the proportions of the animal as there given, the original length of its owner would have been about 13 inches. The plate is incomplete on its anterior portion, and it is probable that the error in this estimate due to the exaggeration of size from compression of the shield, is compensated by the loss of diameter from imperfect retention. This great pygidium, with other large fragments of the same species, were used as a basis for a well-known restoration in plaster to be found in some of the older museums of this country. ANGELIN has given a restoration of *Megalaspis heros* 14 inches in length and BRÖGGER estimated the original length of *Megalaspis acuticauda* to be fully 16 inches. BARRANDE figured an entire *Asaphus nobilis* from Etage D which measures  $10\frac{1}{2}$  inches.

Not until the introduction of the genera DALMANITES, HOMALONOTUS and LICHAS do we meet with the most gigantic proportions attained by these crustaceans, and then only after these genera have become well established. Perhaps none of their representatives in the lower Silurian faunas were of commanding size; in the upper Silurian large but not extravagant proportions were sometimes attained. *Lichas Boltoni* of the Niagara fauna, is a magnificent species, one of the largest of its race and remarkable for the frequency with which its parts are found together, an extremely uncommon occurrence in this thin-shelled group. The *Lichas pustulosus* of the Lower Helderberg shaly limestone was a great species attaining a length of 10 inches or more. *Homalonotus delphinocephalus* of the Niagara fauna grew to large size but does not appear to have attained the length of its successor in the Lower Helderberg, *H. Vanuxemi*, which, according to the restoration from a very large fragment given in the Palæontology of New York, Volume VII (plate V B) grew to a length of at least  $11\frac{1}{2}$  inches. SALTER has mentioned (Palæontographical Society, vol. xvii, p. 109) a large fragment of *Homalonotus rudis* which he estimates may have been a foot in length. In later faunas are found traces of this genus of still greater size. Dr. BEUSHAUSEN has figured a pygidium of *H. gigas* from the Spiriferen-sandstein of the Hartz, the possessor of which must have been upward of one foot in length. Unquestionably the largest individual of HOMALONOTUS known is that of *H. major*, from the Oriskany sandstone, figured in the Palæontology of New York, Volume VII (plate V A), a large fragment representing the greater part of the thorax and the pygidium, and according to the restoration there given the original length of the animal must have



been well nigh 15 inches. The later and common Hamilton species, *H. DeKayi*, attained no extravagant size though frequently large, e. g. the enrolled individual figured on plate IV (*op. cit.*), the largest entire specimen reported, which is about 9 inches in length; some large fragments indicate that the animal was sometimes as long as 11 inches.

The size attained by some of the Devonian species of DALMANITES and their immediate predecessors was marvelous. The pygidium of *D. micrurus* figured in the Palæontology of New York, Volume III, page 359 (there given as *D. pleuroptyx*), indicates an individual at least 11 inches in length, and there is reason to believe that the Lower Helderberg species, *D. nasutus* and *D. tridens*, attained a size fully as great. Most remarkable however is the great pygidium of *D. myrmecophorus* of the Corniferous limestone, figured upon plate XV of Volume VII (*op. cit.*), which from the restoration there given, made from careful comparative measurements, would imply an individual 16 inches long.

An interesting feature of the early Devonian trilobitic faunas is the reappearance of CALYMENE in the Schoharie grit and Corniferous limestone, a fact which has been duplicated by the recent description by Dr. OEHLERT of a large species (*C. reperta*), from the lower Devonian of Saint Malo in Angers. The American Devonian species, *C. platys*, is not only the latest but the largest known representative of the genus, and for a group which at its maximum development in species and individuals in the Silurian, rarely attained considerable dimensions, the proportions reached by *C. platys* are especially noteworthy. The entire individuals on plate 1 of Volume VII of the Palæontology show this, and the restoration accompanying a very large pygidium on plate xxv, if accurately drawn, indicates that a length of upward of eight inches was sometimes attained by the species.

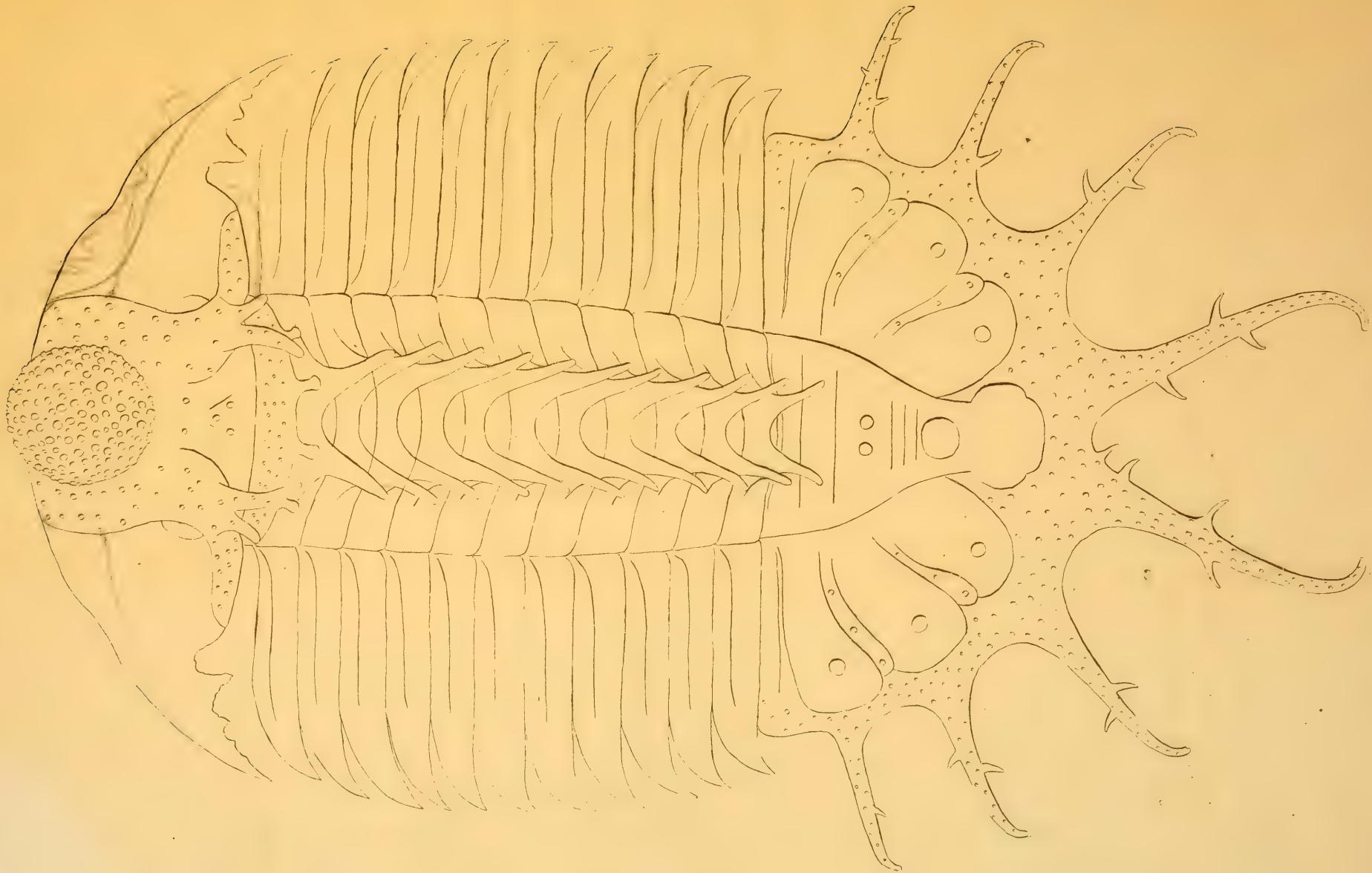
No larger or more extravagantly ornamented trilobite than the *Terataspis grandis*, Hall, is known. This giant of its race has left fragments of its test in the Schoharie grit of eastern New York, and in the commingled Schoharie and Corniferous faunas of the Province of Ontario. A very complete illustration and discussion of its different parts, are given in Volume VII of the Palæontology (p. 73, pls. xvii, xviii, xix), and from these one readily obtains an idea of the structure of the cephalon, thorax and abdomen, the free cheeks alone being there unrepresented. There is, however, a very large free cheek in a fragment of Schoharie grit in the collection of the American Museum of Natural History, which in all probability belongs to this species.

At the time of the preparation of this volume of the Palæontology of New York, the original specimen of Mr BILLINGS' species *Lichas superbis*, was made accessible for study by the kindness of the Director of the Geological and Natural History Survey of Canada. This specimen is a portion of the cephalon and a pygidium of *Terataspis grandis*, lying in juxtaposition on the same block, there being no doubt of their having belonged to the same animal. From this specimen it was possible to establish the relative proportions of cephalon and pygidium in this species, and from the data furnished by all the material under study, with careful comparative measurements of entire specimens of LICHAS in the collections of the State Museum, and of figures of such specimens as have been given by ANGELIN, BARRANDE and SCHMIDT, the accompanying reproduction of the original size of the animal has been drawn, its base being the largest and most complete cephalon figured in the work cited (pl. xvii, fig. 1; xviii, figs. 1, 2).

This restoration gives to the proprietor of this cephalon a length of nearly 20 inches. The figure does not however do full justice to the proportions of the animal. In the cephalon which has served as a base for the restoration the great ovoid central lobe of the glabella has a length of  $2\frac{1}{4}$  inches. Mr. BILLINGS speaks of a specimen of *Lichas superbis* in which the length of this lobe was fully 3 inches. If the increase in size of this part was accompanied by the same relative increase in the size of the entire animal (and there is no good reason for assuming the contrary), such a fragment would represent an individual fully 24 inches in length, a size unsurpassed and unequalled by any other known trilobite.

With his extravagant armor of defense and aggression, *Terataspis grandis* must have been easy lord of his invertebrate domain and no very palatable morsel for the heavily plated fishes of his day.

In the genera PHACOPS and PROETUS great size was never attained. The earlier forms of both of these genera were of inconspicuous proportions and their maximum size was attained in the middle Devonian. An entire *Phacops rana* is figured in the Palæontology of New York, Volume VII, which has a length of 4 inches, and cephala in the Museum collection indicate an original length of 5 inches, perhaps the greatest size which has been observed in this genus. PROETUS has a still smaller habit, that is, its maximum size is never so great, and, probably, the largest example of the genus recorded is represented by a cephalon of *Proetus macrocephalus* from the Hamilton group, which belonged to an individual fully  $3\frac{3}{4}$  inches in length.









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