

ART. XIX.—*An Almost Complete Specimen of Strenuella strenua (Billings);* by H. W. SHIMER.

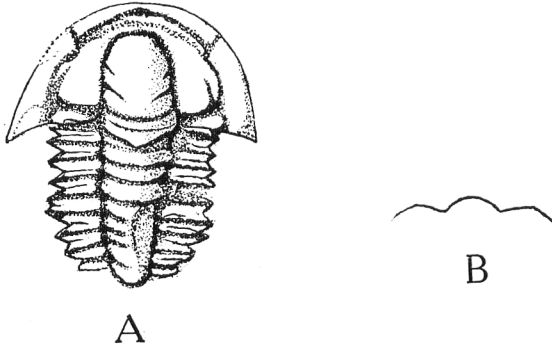
THE specimen of *Strenuella strenua*, here described, was found at Mill Cove, North Weymouth, Mass., in the Lower Cambrian slates. It is now in the collection of the Boston Society of Natural History, with catalog number 12978.

The cephalon is almost complete. The genal angles are prominent; the free cheeks thin, and the anterior fold (frontal rim), extending around the front of the cephalon between the free cheeks, is narrow, convex, and defined from the rest of the cephalon by a prominent, rounded furrow. The glabella is strongly arched, with two partial but well-marked furrows; it tapers forward very slightly and is abruptly rounded in front. The neck ring is prominent, with anterior furrow broad and deep, and the posterior shallow and narrow; this narrow furrow separates the neck ring from a strong, backward-pointing, triangular projection, which shows no evidence of a spine. The palpebral lobes are slightly curved and separated from the fixed cheeks by a rounded furrow which disappears anteriorly. What, with doubt, was taken for an eye, is a small, lozenge-shaped elevation bordering the free cheek but apparently attached to the palpebral lobe; this was seen only upon the left side. The fixed cheeks are convex but much less so than the glabella; they are not flattened on top.

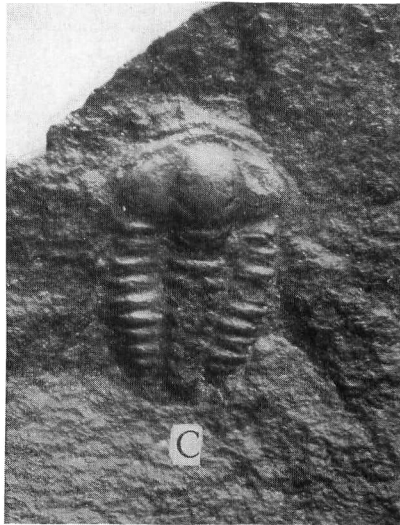
The axis of the thorax is quite convex, as are also the pleura. The latter rise gently from the axis for slightly more than half their length, when they bend down quite suddenly, thus giving to them a triangular convexity. This down-bending takes place just inside the point where the overlapping of the pleura cease. There is a broad rounded furrow running lengthwise through the middle of each pleural segment and terminating in the straight, outwardly-pointed, broadly spine-like tip. The anterior half of each segment as divided by this median furrow is narrower than the posterior. Nine segments are preserved on the specimen and judging from the shortening and narrowing of the pleural portions of the segments, there were very few if any more before the pygidium.

The peculiar pleural segments of this specimen naturally led at first to a comparison with *Ellipsocephalus*. The close similarity of these segments with those of *E. hoffi* Schlotheim, figured in Zittel's Textbook of Paleontology, is very evident; especially comparable is the broad groove in the middle of each outwardly-pointing segment. But this specimen differs from *Ellipsocephalus* in lacking the smooth glabella with its

obtusely angular front and the rather broad depressed area anterior to the glabella.



A. *Strenuella strenua* (Billings), a nearly complete specimen. $\times 2$.
B. Transverse section through the 5th pleural segment, to show the convexity of the axis and pleura, the latter being angular. $\times 2$.



C. Photograph of the specimen. $\times 2$.

Referring to the original generic description of *Strenuella* by Matthew* it is noted that it departs from *Agraulos* and resembles *Ellipsocephalus* in the marked elevation of the parts

*Trans. Roy. Soc. Canada, vol. iv, sec. 4, p. 154.

of the head shield, in the long eye-lobes, the depressed anterior limb of the cheeks and in the short and direct posterior extension of the facial suture. It is also noted that it resembles *Liostracus* in the prominent glabella with the depressed area behind the anterior margin of the head-shield. In all of these points, the specimen discussed here agrees with the generic description of *Strenuella*; it is apparently the first of the species *strenua* to be described possessing a thorax.

That this specimen does not belong to Walcott's varietal form of *S. strenua nasutus*, is indicated by the following measurements. This variety was founded on a specimen* which has "a broad extended frontal limb." These measurements used for comparison were taken from cuts. The relative widths of the cephalon, glabella, etc., are alike in the species and variety, hence the comparison is made on the length alone.

	From anterior edge of glabella to anterior neck furrow	Width of frontal limb ⁶	Proportion ⁷
<i>S. strenua</i> ¹	7	3	1 : .43
" " ²	7	2	1 : .29—
" " ³	10	2.75	1 : .27+
" " ⁴	5.5	2	1 : .36—
var. <i>nasutus</i> ⁵	5.5	3	1 : .55—

The measurements are in millimeters.

¹ Figure of the type specimen.—Billings, Geol. Surv. Can., Pal. fossils 2 ; 1, pp. 71, 72.

² Walcott, U. S. G. S. Ann. Rep. 10, pl. 97, fig. 1b. This is said by Walcott to be much like the type of the species.

³ Grabau, Occas. Papers, Bos. Soc. Nat. Hist., iv, pl. 34, fig. 7b.

⁴ The specimen here discussed.

⁵ Walcott, loc. cit., fig. 2. Type specimen.

⁶ Distance from the glabella to the anterior edge of the cephalon.

⁷ Letting length of glabella from its anterior edge to the anterior neck furrow = 1.

It thus appears that *S. strenua* has a frontal limb which in all the specimens examined, bears to the length of the glabella from its anterior edge to the anterior neck furrow, the relation of less than one-half to one; while that of the variety *nasutus* is more than one-half to one. The present specimen then agrees much more closely with the type of *S. strenua* than it does with the varietal form *nasutus*.

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* U. S. G. S. Ann. Rep., 10, 654, pl. 97, fig. 2, 2a-c.