32. **Two New Late Upper Permian Trilobites from Central Iran**

By Teiichi Kobayashi, M. J. A., and Takashi Hamada

University of Tokyo

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A small lot of trilobites were collected by Ishii, Murata and Nakamura from the top part of the Permian sequence in the Abadeh region, Central Iran during the geological survey, 1975, which was undertaken by an Iranian-Japanese joint party for the study on the Permo-Triassic boundary. Because these trilobites were found to be quite new to science, *Iranaspion sagittalis*, gen. et sp. nov. and *Acropyge lanceolata*, sp. nov. are proposed for them. While the latter bears a post-axial ridge through the mucronate part of the pygidium, the former possesses a sagittal incision on the main lobe and two nodes on the posterior lateral lobe on the glabella and a median slit on the terminal two axial rings on the pygidium. Remarkably enough, all of them show their phylogenetic specialization in the final phase of the trilobite evolution.

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**Genus Iranaspion, nov.**

*Diagnosis:*—Isopygous Ditomopyginae having a sagittal incision in posterior of main lobe, trisected preoccipital lobe and binodose basal lobe on glabella and a median slit on terminal two axial rings on pygidium.

*Type-species:*—*Iranaspion sagittalis*, sp. nov.

*Remarks:*—As described in the monotypic species, the genus is allied to *Pseudophillipsia* and *Ditomopyge* in one or another character. In the glabellar outline and obsolete anterior lateral lobes it agrees better with *Ditomopyge*. The pygidium of *Ditomopyge* is, however, less segmented. In this respect this pygidium is nearer to that of *Pseudophillipsia*, but the axial lobe is not trapezoidal in cross section. The most distinctive of this genus are the sagittal incision of the main lobe and the binodose basal lobe of the glabella in the cephalon and

*) His present address is the Himeji Kogyo University, Hyogo Prefecture.
the median slit of the axial lobe in the pygidium, all of which reveal the phylogerontic specialization. The sagittal furrow in different pattern seen in *Crotalocephalina* (*Geracephalina*) is another example of the final specialization which occurred in the Cheiruridae (Kobayashi and Hamada 1977).

*Iranaspidion sagittalis*, sp. nov.

Figs. 1a, b～4a～c.

Description:—Cephalon parabolic, strongly convex, arching toward its centre and provided with long genal spines. Glabella slowly expanding forward and rounded along frontal marginal furrow; main glabellar lobe large, subquadrate, cut by a short sagittal furrow in posterior; its lateral furrows and lobes obsolete; preoccipital lobe trisected by diagonal furrows into a broad median part and long binodose lateral parts; preoccipital furrows confluent in the middle part; their posterior branches diagonal and meet with arcuate occipital furrow; occipital ring beaded in a double row; axial furrow profound and almost straight. Eyes semicircular, large, prominent, set close to glabella; fixed cheek narrow; lateral and posterior borders fairly broad; marginal furrow deep. Facial sutures running forward from eyes along axial furrows but bent inward on anterior border; behind eyes they extend longitudinally, but soon become diagonally on borders and cutting cheek margins at median points.

Thorax composed of 9 segments; axial ring slightly narrower than pleura, strongly convex; pleurae flat in inner part and slanting in outer part.

Pygidium parabolic, as long as broad, well inflated, but marginal border flat and depressed. Axial lobe long, conical, rounded at terminus, composed of 23 rings or so which are separated by deep furrows; each ring ornamented by a row of tubercles, trisected by furrows into a median part and paired lateral parts; first axial ring and articulating half-ring non-trisected and non-tuberculate. Pleural lobe consists of gently sloping inner part and convex outer part of which the latter is arching down to lateral border; the lobe divided by deep pleural furrows into 12 pleural ribs beside anterior band which is broadened laterally and faceted; pleural ribs ornamented with tubercles, 9 in anterior, but reduced in number posteriorly; twelfth rib indicated simply by a short elevation. Lateral border flat, smooth, slightly broadened posteriorly. First pleural rib running into lateral border; posterior border just behind axial lobe a little bent up; this elevation bisected by a shallow median depression. Beyond this elevation a very short, low and vertical ridge is seen on the bottom of the terminal slit.
Figs. 1–4. *Iranaspis* *sagittalis*, sp. nov. 1a, b: Dorsal and lateral views of the paratype specimen. ×2.6. 2: Another paratype cranidium. ×2.5. 3a–c: The enrolled holotype specimen. ×2.6. 4a–c: A complete pygidium showing dorsal (a) and lateral (b) and posterior oblique (c) views. ×3.2, (c) ×6.7.

Fig. 5. *Acropyge lanceolata*, sp. nov. a, b: Dorsal and lateral views of the holotype pygidium. ×3.2.
Observation:—Three complete shields among eight specimens are all enrolled in the asaphid type. The cephalon is more convex than the pygidium. Therefore no hypostoma is visible. Judging from the size and position the binodose posterior lateral lobe of the glabella must be the preoccipital lateral lobe or the so-called basal lobe, instead of two posterior lateral lobes united. The genal spine is extending back as the fifth thoracic segment. The axis of the pygidium is most convex at about one-third from the anterior margin. Its cross section is not trapezoidal.

Comparison:—The present pygidium looks very similar to those of *Pseudophillipsia lipara* Goldring, 1957 and *Pseudophillipsia paffenholzi* (Weber, 1944) in outline and particularly to the latter in the possession of tuberculation.

Goldring (1957) called attention to the terminal median septum in the axial lobe of the pygidium which he found by rubbing down the specimens of *Pseudophillipsia lipara* Goldring, 1957 from the Uralian or Artinskian of Oman, Arabia. Then he noted that the septa are probably present in *Pseudophillipsia sumatrensis* Roemer, 1880 (Kazanian, Sumatra), *Pseudophillipsia ?* sp. indet. no. 3 by Tumansky, 1935 (Middle Permian, Crimea), *Pseudophillipsia elegans* Gemm. var. ? Weber, 1944 (Upper Permian, Caucasus), *Pseudophillipsia elegans* var. caucasica Weber, 1944 (ditto). Insofar as can be seen in the illustrations of these Permian trilobites, their peculiar structures belong possibly to the same kind as the median slit. Neither the slit nor the septum is as yet known in other trilobites than the Permian ones of *Iranaspidion* and *Pseudophillipsia*.

Occurrence:—Ishii and others distinguished three parts in the Unit I bed at the southwestern extremity of the Kuh-e-hambast range, Central Iran (Taraz 1971), namely, the *Eopolydiexodina-Verbeekina* faunule in the lower part, *Neoschwagerina craticuli* fauna, *N. margaritae* and others in the middle and minute *Chusenella* and *Schwagerina* in the upper part. At the fossil locality (between L 6a-66) the trilobites were contained in the higher horizon of the last part together with abundant brachiopods in 10 meters' thickness of pink coloured tuff interbedded with limestone. While most brachiopods belong to the Gnishik fauna of Transcaucusus, the *Chusenella-Schwagerina* fauna shows that the upper part of the Unit I bed is nearly coeval with the *Lepidolina asiatica* zone in Southeast Asia (Ishii 1966; Ishii, Kato and Nakamura 1969). Therefore the trilobites must be upper Guadalupian in age.

Genus *Acropyge* Qian, 1977

*Acropyge lanceolata*, sp. nov.

Figs. 5a, b.
Description:—Pygidium elongate trigonal whose lateral margin is long, broadly arcuate, but becoming straight or even concave near post-axial ridge and at length meeting its fellow in forming an acute angle. Axial lobe narrow, a fourth as wide as pygidium, a little longer than two-thirds the pygidium, roof-shaped, regularly tapering back and terminating at rounded tip at a short distance inside the marginal border; crest line of axial lobe highest at one-third of pygidium from anterior; post-axial ridge narrow, extending from the tip as far as the posterior end; axial lobe composed of more than 20 rings 17 of which are in its three-fourths; ring furrow weak; axial furrow strong. Pleural lobe broad, nearly horizontal on inner side, very slowly arching down on outer side, divided into 14 ribs 13 of which each consists of a broad anterior slope and subvertical posterior slope along deep pleural furrow, but the most posterior pair of ribs are united into a prominent post-axial ridge; the ridge, however, much lower than the axial lobe. Lateral border smooth, nearly flat, narrow, but regularly broadened posteriorly; marginal furrow absent; lateral margins forming an angle of 80 degrees at junction.

Comparison:—This species agrees with Acropye multisegmenta Qian, 1977 in mucronate pygidium, narrow multisegmented axial lobe and in the number of pleural ribs so closely that they are considered congeneric. The axial rings are, however, not trisected in this species. It has such a distinct post-axial ridge on the mucronate part, but no mention is given about the ridge in Qian's description, nor his illustration shows any trace of such a ridge. On the contrary, the axial lobe appears to reach the inner margin of the marginal border in his pygidium.

In the fusion of the last pair of pleural ribs in this pygidium the post-axial ridge may be comparable to the simple median rib in the Scutelluidae.

Occurrence:—Same as the preceding, namely, Unit A, Julfa, Iran: Murata coll.

References
Kobayashi, T., and Hamada, T. (1977): Devonian trilobites of Japan in com-
comparison with Asian, Pacific and other faunas. Ibid., 20, 202, pls. 1–13.