

## ON NEW MATERIAL OF LATE MIDDLE CAMBRIAN TRILOBITE FAUNA FROM KAIPING BASIN, EASTERN HOPEI

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### (Summary)

Some additional fossil trilobites were obtained by the members of the palaeontological Training Team under the auspices of Ministry of Geology from the valley of Weishan near Yehli, Kaiping Basin. The collections embrace one new subgenus, four new species and one new variety, besides *Damesella*, *Aojia*, *Lisania*, *Anomocarella*, *Poshania* and *Peronopsis*, which are characteristic of the Changhsia formation. Being immediately overlain by *Blackwelderia*-bearing beds<sup>1)</sup> (Kushan stage) the horizon under study is certainly ascribed to the Changhsia formation of the late Middle Cambrian. In this article the description of the following new forms is given:

*Lisaniella elongata* Chang, *Lisaniella suni* Kuo (sp. nov.), *Lisaniella suni* var. *sinica* Kuo (var. nov.), *Solenoparia* (*Kaipingella*) *sinica* Kuo (subgen. et sp. nov.), *Solenoparia* (*Kaipingella*) *elongata* Kuo (sp. nov.), *Szeaspis gangamus* Kuo (sp. nov.).

### DESCRIPTION OF SPECIES

#### Genus *Lisaniella* Chang, 1963

##### Genotype: *Lisaniella elongata* Chang, 1963

**Diagnosis:** Glabella rectangular, slightly tapering forward. Occipital ring broad in the middle; with a long occipital spine extending backward, or an occipital node. Fixed cheek slightly convex and narrow. Palpebral lobe long. Eye ridge well developed. Brim very narrow or absent. Anterior border gently convex. Thorax composed of ten segments.

Pygidium small, semicircular, with 3—4 faint rings; border well defined.

#### *Lisaniella elongata* Chang

(Pl. I, figs. 1—3)

**Description:** Glabella moderately convex, oblong, marked by three pairs of well defined glabellar furrows: first pair short extending obliquely upward; second and third pairs oblique backward. Occipital furrow deep. Occipital ring broad at the middle and with a long occipital spine and an occipital node. Fixed cheek convex, about one-third the width of the glabella measured across the palpebral lobes. Palpebral lobe relatively long and more curved outward; eye ridge convex, and slightly oblique. Brim narrow. Border flat or gently convex.

1) Described by the author in a separate paper.

Pygidium small, subsemicircular in outline. Axial lobe convex, elevated above the pleural lobes, conical, narrowing gradually backwards and composed of three rings. Pleural lobe with two pairs of furrows: anterior pair deep; posterior pair faint. Border broad and flat, marginal furrow well defined. Surface smooth.

**Horizon and Locality:** Middle Cambrian Changhsia formation of Weishan, Yehli, Kaiping, Hopeih.

***Lisaniella suni* Kuo (sp. nov.)**

(Pl. I, figs. 4—6)

**Description:** This species is represented by six cranidia and one complete shield.

Dorsal shield gently convex, elongately ovate. Thorax equal to the cephalon in length (or a little longer). Cranidium slightly convex, subquadrate or subtrapezoidal in outline. Glabella rectangular, slightly tapering forward, truncated in front, with three pairs of distinct glabellar furrows: first pair short, horizontally extending; second and third pairs long and oblique backward. Occipital furrow deep and straight. Occipital ring broader at the middle and with a long occipital spine which extends backwards. Dorsal furrow deep and subparallel. Fixed cheek relatively narrow, about  $\frac{1}{4}$  the width of the middle part of the glabella. Postero lateral limb short. Palpebral furrow deep; palpebral lobe medium sized, convex; eye ridge convex, well defined and slightly oblique. Brim narrow and slightly depressed. Border flat, broad and slightly reflected upward. Anterior course of facial suture short, divergent forwards from the palpebral lobes, then convergently running across the marginal furrow, and finally cutting the outer margin at a distance about one-third the length of the cranidial border; posterior course oblique backward.

Thorax composed of ten thoracic segments. Axial lobe slightly convex, tapering gradually backward. Dorsal furrow deep and broad, pleural furrow shallow and broad; pleural lobe gently convex with stout and short pleural ends.

Pygidium small, short, subsemicircular in outline; length of pygidium equal to about half the width. Axial lobe slightly convex, tapering gradually backward, with three axial rings, and rounded posterior end. Axial furrow and border furrow distinct. Border flat and relatively narrow.

**Comparison:** This new species differs from *L. elongata* in several respects, particularly in truncated front of the glabella. Frontal border wide, slightly convex and truncated in front. Anterior course of facial suture at first extending divergently from the palpebral lobe but then convergently and finally cutting the outer margin at a distance about one-third the length of the cranidial border. Occipital ring and fixed cheek narrow, palpebral lobe short.

**Horizon and Locality:** Same as the preceding.

***Lisaniella suni* var. *sinica* Kuo (var. nov.)**

(Pl. I, fig. 7)

**Description:** This new variety is represented by three cranidia, and one comparatively complete shield.

This species is closely related to *L. suni* in several respects, but it differs from the

latter in (1) the short and broad subrectangular glabella, (2) uniform width of the occipital ring, (3) very narrow brim and deep marginal furrow, (4) short and slightly inward converging anterior course of the facial suture.

**Horizon and Locality:** Same as the preceding.

**Genus *Solenoparia* Kobayashi, 1935**

**Subgenus *Kaipingella* Kuo (subgen. nov.)**

**Subgenotype: *Kaipingella sinica* Kuo (sp. nov.)**

**Diagnosis:** Cranidium subtrapezoidal. Glabella convex on all sides, but flat or concave at the centre, truncato-conical, and marked by two or three pairs of faint glabellar furrows. Dorsal furrow deep. Occipital ring medium in size, increasing in width toward the centre and with a minute median occipital node. Fixed cheek wide and flat, palpebral ridge well defined, palpebral lobe small. Brim narrow and very convex. Surface ornamented with fine granules and large pustules. Border convex and about equal in width to the brim.

Pygidium small, subsemicircular in outline; axial lobe slightly convex, tapering gradually backward, extending to the posterior margin and with 5–6 axial rings; pleural furrows and interpleural furrows distinct. Border relatively narrow. Surface marked by granulations.

**Remarks:** The new subgenus is similar to *Solenoparia* (s.s.), but it differs from the latter in its flat glabella, distinct marginal ridge surrounding the glabella, distinct occipital node and nearly horizontal eye ridges.

***Solenoparia* (*Kaipingella*) *sinica* Kuo (sp. nov.)**

(Pl. I, figs. 8–12)

**Description:** This species is represented by six cranidia and two pygidia.

Cranidium subtrapezoidal in outline. Glabella convex or flat, and surrounded by the marginal ridge. Glabella broad, slowly tapering anteriorly, truncated in front and marked by three pairs of faint glabellar furrows. Anterior pair very weak, slightly impressed at both sides of the glabella, second and third pairs long and oblique. Occipital furrow broad and deep; occipital ring medium in size, increasing in width toward the centre and marked with a minute median occipital node. Dorsal furrow deep at the sides and almost shallow or faint in front of glabella. Fixed cheek wide, flat or slightly convex, less than one half the width of the glabella. Posterior lateral limb strong, posterior border furrow shallow and broad. Palpebral lobe short, eye ridge prominent and almost horizontal. Brim narrow and convex, raising into a low boss in front of the glabella, with fine granules and large pustules. Border slightly convex, as broad as the brim, border uniform in breadth and slightly curved outwards. Marginal furrow broad and deep. Anterior course of facial sutures slightly convergent forward from the palpebral lobes, posterior course oblique backward.

Pygidium small, subsemicircular in outline; axial lobe slightly convex, tapering gradually backward, and with six faint rings; pleural lobe triangular, pleural furrow and interpleural furrow faint and very shallow. Border relatively narrow. Surface of both cranidium and pygidium crowded with numerous pustules of different sizes.

**Horizon and Locality:** Same as the preceding.

***Solenoparia (Kaipingella) elongata* Kuo (sp. nov.)**

(Pl. I, fig. 13)

**Description:** This species is represented by two well preserved cranidia.

The present form is closely allied to *S. (Kaipingella) sinica*, but it differs from the latter in the following: (1) posterior pair of glabellar furrows long, and deep, extending from the dorsal furrows. (2) Occipital ring broad and slightly arching backwards at the centre, posterior lateral limb narrow, long; postero-lateral furrows broad and deep. (3) Frontal margin straight, anterior border convex, abruptly narrowed forwards at both sides, about one-third the length of the frontal border; marginal furrow deep. (4) Anterior course of the facial suture running across the marginal furrow, and cutting the outer margin at a distance about one-third the length of the border.

**Horizon and Locality:** Same as the preceding.

**Genus *Szeaspis* Chang, 1959**

***Szeaspis gangamus* Kuo (sp. nov.)**

(Pl. I, figs. 14—14a)

**Description:** This species is represented by two well preserved cranidia and one mold of cranidium.

Glabella truncato-conical in shape, slowly tapering anteriorly, rounded in front and marked by three pairs of the glabellar furrows, of which the anterior pair are very narrow, long and well-defined. Occipital furrow straight at the middle, bending abruptly forwards at both sides. Palpebral lobes small. Brim very broad. Anterior border smooth without a small rear projection at the middle. Marginal furrow very shallow.

**Comparison:** The present species differs from *Szeaspis reticulatus* Chang in the above mentioned features.

**Horizon and Locality:** Same as the preceding.

## 图 版 说 明

本文内所描述的标本保存在地质部地质科学研究所

### 图 版 I

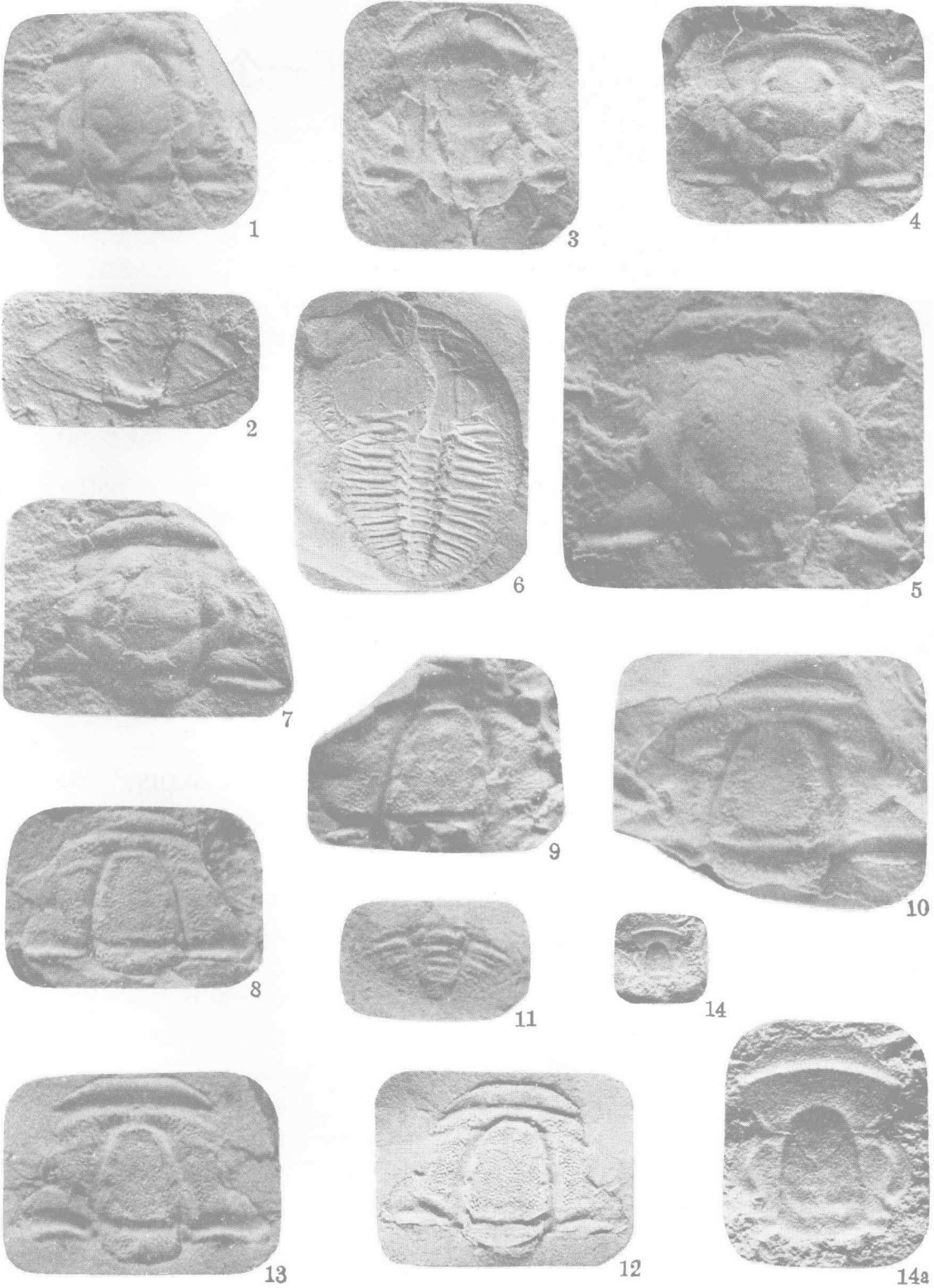
- 图 1—3. *Lisaniella elongata* Chang  
1. 头盖,  $\times 4$ , (193)。 2. 尾部,  $\times 5$ , (194)。  
3. 头盖,  $\times 4$ , (195)。
- 图 4—6. *Lisaniella suni* Kuo (新种)  
4. 头盖,  $\times 4$ , 正型标本(196)。 5. 头盖,  $\times 4$ , (197)  
6. 背壳,  $\times 3$ , (198)。
- 图 7. *Lisaniella suni* var. *sinica* Kuo (新变种)  
头盖,  $\times 4$ , 正型标本(199)
- 图 8—12. *Solenoparia* (*Kaipingella*) *sinica* Kuo (新亚属, 新种)  
8. 头盖,  $\times 4$ , 正型标本(200)。 9—10. 头盖,  $\times 4$ , (201, 202)  
11. 尾部,  $\times 4$ , (203)。 12. 头盖,  $\times 5$ , (204)
- 图 13. *Solenoparia* (*Kaipingella*) *elongata* Kuo (新种)  
头盖,  $\times 5$ , 正型标本(205)。
- 图 14. *Szeaspis gangamus* Kuo (新种)  
14. 头盖, 原大, 14a. 正型标本  $\times 3$ , (206)

### Explanation of Plate

The specimens described in this paper are kept in the Academy of Geological Sciences, Ministry of Geology, Peking.

### Plate I

- Figs. 1—3. *Lisaniella elongata* Chang  
1. Cranidium,  $\times 4$ , (193). 2. Pygidium,  $\times 5$ , (194)  
3. Cranidium,  $\times 4$ , (195)
- Figs. 4—6. *Lisaniella suni* Kuo (sp. nov.)  
4. Cranidium,  $\times 4$ , Holotype (196). 5. Cranidium,  $\times 4$ , (197)  
6. Counterpart,  $\times 3$ , (198)
- Fig. 7. *Lisaniella suni* var. *sinica* Kuo (var. nov.)  
Cranidium,  $\times 4$ , Holotype (199)
- Figs. 8—12. *Solenoparia* (*Kaipingella*) *sinica* Kuo (subgen. et sp. nov.)  
8. Cranidium,  $\times 4$ , Holotype (200)  
9—10. Cranidia.  $\times 4$ , (201, 202) 11. Pygidium,  $\times 4$ , (203). 12. Cranidium,  $\times 5$ , (204)
- Fig. 13. *Solenoparia* (*Kaipingella*) *elongata* Kuo (sp. nov.)  
Cranidium,  $\times 5$ , Holotype (205)
- Figs. 14. *Szeaspis gangamus* Kuo (sp. nov.)  
14. Cranidium, nature size, Holotype (206)  
14a. Cranidium,  $\times 3$



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