109. Some Permian Fossils from Southern Kitakami. II

Two Brachiopod Species

(With 7 text-figures)

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In the Permian faunas of southern Kitakami, brachiopods are by far the most abundant, as stated in the foregoing article. Up to present many forms have been described, but no less may have to be added to make the list exhaustive. In this note two genera, *Orbiculoidea* and *Geyerella*, are dealt with. As far as is known at present, they belong to a rarity in the Permian of not only the southern Kitakami but whole of the country.

Genus *Orbiculoidea* D'Orbigny 1874.

Orbiculoidea sp. indet.

Figs. 1a, 1b.

The material of this genus in Araki's collection is a ventral valve attached to a piece of sandy shale, exposing the inner surface. It is rather large, and is slightly oblong in outline, measuring about 30mm lengthwise and about 25 mm crosswise. It looks flat, but not even: on the external surface, it is suggested, it should appear slightly convex behind the low apex, and slightly concave in front. From the center a narrow tube, the passage of peduncle, extends straightly toward margin. Bounding on both sides of the tube are muscle scars in a pair, together forming a lozenge shape. Around the center are fine concentric ribs and somewhat broader interspaces. About 25 ribs are counted: they become somewhat closer on approaching margin.

Although the material is such an incomplete specimen, the writer considers it worthwhile to place it on record, because this perhaps is the first find of the genus in the Japanese Paleozoic. The specimen is quite large as stated above: perhaps *Orbiculoidea*? sp. of Licharew from the Kolyma region may be a singular comparative in this respect.²⁾ The oblong outline may not possibly be much different from the original, as is suggested by the fact that the pedicle tube and the muscle scars conform in the direction of extension with the longer diameter of the valve itself.

Many species are known of the genus, widely ranging stratigraphically and geographically, and it seems there are some which the Japanese species resembles more or less. However, the material in hand is not competent to allow a correlation.

Locality and Horizon:—Wayama, Omote-Matsukawa, Kesennuma city: sandy shale of the lower Kanôkura series, found in association with numerous specimens of other brachiopods including *Neospirifer fasciger*.

Genus *Geyerella* Schellwien 1900.

The brachiopods of the Orthotetacea³⁾ have long been a subject of interest of paleontologists since more than a century ago when the genus *Orthotetes* was introduced by Fischer de Waldheim.⁴⁾ Discussions seem to have been concentrated on the inner structure of shells as taxonomic basis. *Geyerella* was created by Schellwien in 1900⁵⁾ as a new type with a particular inner structure. It was thoroughly diagnosed by the author. The important physiognomic features of the genus was concisely stated by C. Diener as follows:—“Schloßrand kurz und gegen die Seitenränder abgerundet. Stielklappe mit sehr hoher Area. Die beiden Septen derselben vereinigen sich in der Mitte der Schale zu einem Medianseptum. Oberfläche bald glatt, bald kräftig gefaltet”.⁶⁾ Concerning the surface sculpture of the valves Schellwien remarks that the finely striated shell is plicated in adult individuals, while plication is sometimes obscure in juvenile specimens.⁷⁾ This means that the genus *Geyerella* is to be defined plicate. Licharew in a paper of 1930 very elaborately discussed the differences in the inner structures of the allied but different forms of sub-family Orthotetinae Waagen.⁸⁾ He pointed out that, as far as the inner structures of the pedicle valves are laid stress upon as basis of classification, three main types can be recognized. Namely, (i) the type either with faint delthyrial supporting-plates or without them; (ii) the type with those plates reaching the floor of the valve; and (III) the type with the plates fused to form a median septum. *Orthotetes* (Girty) and *Geyerella* belong to the last type; a spondylium is formed in either of them.

On the other hand, Licharew proposed to abandon the generic name *Orthotetes*, because the type material has been lost: meanwhile what Girty redefined as *Orthotetes* is one of the two types of *Derbya*. In place of *Orthotetes* Licharew recommended *Ombonia* Caneva¹⁰⁾ of which the type is *O. canevei* Merla.¹¹⁾ Sokolskia, however, seems to have considered *Ombonia* to differ from *Orthotetes*.¹²⁾ Licharew took up *Ombonia* again in 1932. He considered “the genus *Ombonia* in that compass, which is adopted by Girty for *Orthotetes*, who introduces into it *Geyerella* which the author regards as only a more or less well defined section or sub-genus.”¹³⁾ Of the four species of *Ombonia* from northern Caucasus, the one with plicated valves is designated *Ombonia (Geyerella) tschernyschewi*: the others without

Fig. 1. *Orbiculoidea* sp. indet. 1a: nat. size, 1b: $\times 2$.

Figs. 2-3. *Geyerella arakii* sp. nov., Holotype and Paratype. $\times 2$. a: dorsal view, b: ventral view, 3c: natural external mold—the impression of 3b.

(Kumagai photo.)

plicae are described as *Ombonia* s. s.

If the plication and non-plication are to be considered as indicative of some uncertain features, as, for instance, stages of growth—the writer does not mean to disregard this notion—and consequently, if *Ombonia* (1906) and *Geyerella* (1900) are sub-generic to each other, then it is the latter that should represent the genus. Then, *Geyerella* is in two types, the plicate and the non-plicate.

Be that as it may, the Japanese species here under consideration belongs to the first of the two types. It is named *Geyerella arakii*, to remember the enthusiastic hunter of fossils in Kesennuma city, Mr. Hideo Araki of the city library.

Geyerella arakii sp. nov.

Figs. 2a, b; 3a, b, c.

Conch rather small, biconvex, very inequivalve. Pedicle valve very high, more than 30 mm, brachial valve about $1/3$ as high. Area more than 20 mm in height. Hinge-line is about 11 mm, and greatest breadth of shells, a little in front of hinge, is about 12.5 mm. Area

is almost on the same plane as that of commissure of valves, and is nearly plane or very slightly concave. Width of delthyrium and deltidium is, at base, about 1/3-1/4 of that of area. Delthyrial supporting-plates are long, and extend as far as to hinge: converge toward bottom of valve to fuse and form a median septum—Licharew's biseptum. Valves are plicate, with two or three plicae on either side of the median fold and groove: interspaces equally wide. Fine striation is not preserved in the steinkern specimens, though they may possibly be not lacking.

Remarks:— As the holotype specimen (Fig. 2) on which the foregoing description is chiefly based has the tip of beak torn off in collecting, the pedicle valve must be several millimeters higher. Another specimen, a paratype (Fig. 3), is somewhat larger than the holotype. Both the specimens are crushed more or less, obliquely in the direction nearly perpendicular to the antero-posterior extension of the shell. Thus, the delthyrial supporting-plates are pressed closely together behind the area, before merging into the septum, as is recognized on the breaches of beaks. All these three plates are, that is, the spondylium is, characteristically very long as stated above. That the plicae are very few and more or less flexuous is shown in Fig. 3b. Fig. 3c is an external mold into which Fig. 3a was found fitted.

Geyerella arakii is, to the writer's knowledge, the third species of the genus recorded from the Japanese Permian. A fragmentary specimen which the writer reported in 1932 as *Geyerella* sp. *indet.* occurred in the *Fusulina*-limestone of central Japan.¹⁴⁾ It is closely allied to *G. americana* Girty from the Guadalupean fauna of Texas.¹⁵⁾ Recently, Minato and Nakamura reported the occurrence of *Geyerella*? sp. *indet.* in the same region as *G. arakii*. The material is only a fragment of a shell, of which all that can be observed are several acute plicae and the radial striae covering the whole shell surface. It is considered to resemble *G. tschernyschewi* var. *lateareata* Licharew.¹⁷⁾ There is no doubt, however, that it is different from *G. arakii*.

Locality and Horizon:— Anabuchi, Omote-Matsukawa: sandy shale of the lower Kanôkura series. Araki has communicated to the writer that it occurred in another near-by locality, Shigeji-iri.

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