12. Advance Reports on the Permian Trilobites of Japan. I^{*)}

Outline of the Permian Trilobite Fauna

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In Japan Permian trilobites were first discovered by Jimbo in 1888 in the southern Kitakami Mountains. Since then trilobite localities were increased and tentative identifications were done from time to time. Recently the authors carried out an extensive study on the collections from various localities. As the result fifteen species of nine genera were discriminated.

The oldest of them is *Neoproetus akagii*, sp. nov. from the lowest Permian Miharono limestone near Tojo, Hiroshima Prefecture. The next oldest may be *Neogriffithides imbricatus* Kobayashi and Hamada, 1980 from Mt. Ryozen in the Suzuka Range where *Pseudoschwagerina* occurs in the Ryozen limestone.

The third horizon is indicated by the Nabeyaman trilobites from the Yamasuge limestone at Kuzuu which yields *Pseudophillipsia kuzuensis*, sp. nov. Its age is about Artinskian. *Pseudophillipsia kiriensis*, sp. nov. from Kiri in the same district is considered the same age.

Pseudophillipsia intermedia Kobayashi and Hamada, 1980 from the *Parafusulina-Neoschwagerina* zone at Neo, Gifu Prefecture may be also Artinskian. These trilobites from the Inner Zone of Southwest Japan and North Kwanto are all contained in limestones, while the trilobites from the Kitakami and Abukuma Mountains in Northeast Japan are mostly in non-calcareous rocks.

In the Kesennuma-Iwaizaki district, Miyagi Prefecture the Middle Permian Kanokura Formation is rich in trilobites. In the Kesennuma area the formation, particularly its lower part called Kattizawa stage, is prolific of *Pseudophillipsia* and other trilobites, as listed below.

Cheiropyge (Suturikephalion) koizumii, subgen. et sp. nov.

Ditomopyge densigranulata, sp. nov.

Pseudophillipsia spatulata Kobayashi and Hamada, 1980

Pseudophillipsia sasakii, sp. nov.

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Pseudophillipsia simplex, sp. nov.

Pseudophillipsia binodosa, sp. nov.

At Iwaizaki adjacently to the south of Kesenuma, *Paladin iwaizakiensis*, sp. nov. was collected from the Iwaizaki stage, i.e. the upper division of the Kanokura formation whose age is late Middle Permian.

In the Abukuma Mountains *Nipponaspis takaizumii* Koizumi, 1972 and *Endops yanagisawai* (Endo and Matsumoto), 1962 were procured from the Takakura-yama formation, also Middle Permian in age.

Fossil list of Permian trilobites in Japan

Trilobites \ Locality	Kesenuma Iwaizaki	Takakura-yama	Kuzuu Kiriu	Neo Ryozen Miharano	Sakawa
<i>Cheiropyge</i> (<i>Suturikephalion</i>) <i>koizumii</i>	X				
<i>Nipponaspis takaizumii</i>		X			
<i>Paraphillipsia levigata</i>					X
<i>Neoproetus akagii</i>				X	
<i>Paladin iwaizakiensis</i>		X			
<i>Endops yanagisawai</i>		X			
<i>Neogriffithides imbricatus</i>				X	
<i>Ditomopyge densigranulata</i>	X				
<i>Pseudophillipsia spatulata</i>	X				
<i>Pseudophillipsia sasakii</i>	X				
<i>Pseudophillipsia simplex</i>	X				
<i>Pseudophillipsia binodosa</i>	X				
<i>Pseudophillipsia kiriuensis</i>			X		
<i>Pseudophillipsia kuzuuensis</i>			X		
<i>Pseudophillipsia intermedia</i>				X	

Finally, *Paraphillipsia levigata* Kobayashi and Hamada, 1980 was collected from the Shimoyama limestone in the Sakawa basin, Shikoku Island. The age of the limestone was first considered early ? Permian (Yabe and Sugiyama, 1934) but later, late Permian (Minato, 1955). It may be late Middle Permian in view of the extensive distribution of *Paraphillipsia* from Crimia to the Far East through South Asia.

In looking through these occurrences in the Permian System of Japan it is evident that trilobites were more thrived in the Middle

Permian than the Lower Permian and none is so far known from Upper Permian, unless the *Yabeina* zone is considered early Upper Permian. A few species of *Pseudophillipsia* was reported from the Akasaka limestone in the *Neoschwagerina*-*Yabeina* zones. However, they are not fully studied paleontologically yet (Tokai Kaseki Shumino-kai, 1974; Kinsho-zan Kaseki Kenkyu-kai, 1981).

(Kobayashi & Hamada, 1982)

Fig. 1. Localities of Permian trilobites in Japan. 1: Shimoyama, Sakawa basin, Kochi Pref. 2: Tsunemori, Yamaguchi Pref. 3: Miharano, Tojo, Hiroshima Pref. 4: Ohé, Kyoto Pref. 5: Mt. Ryozen, Shiga Pref., Suzuka Range, Eastern Kinki Region. 6: Akasaka, Gifu Pref. 7: Neo, Gifu Pref. 8: Kiriu, Tochigi Pref. 9: Kuzuu, Tochigi Pref. 10: Takakura-yama, Fukushima Pref. 11: Nemari, Maiya, Miyagi Pref. 12: Iwaizaki, Miyagi Pref. 13: Kobama, Naburi, Miyagi Pref. 14: Kesennuma, Miyagi Pref.

Among the nine genera of the trilobites *Pseudophillipsia* is best represented in the Japanese fauna by seven species. Not only this genus but also *Paraphillipsia*, *Neoproetus* and *Neogriffithides* are all Eurasiatic genera unknown from the North American realm. *Paladin* and *Ditomopyge* are two cosmopolitan genera and *Paladin iwaizakiensis* may be the latest survivor of the genus. *Cheiropyge* (*Suturikephalion*), *Nipponaspis* and *Endops* are all indigenous genera showing strong provinciality of the Japanese fauna within the Eurasiatic realm.

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