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## A New Occurrence of *Schwagerina princeps* in Sumatra.

By Y. OZAWA (Tokyo).

By the courtesy of Dr. A. TOBLER, of the Museum of Natural History of Basle, I had an opportunity to examine a large number of thin sections of *Fusulina* limestones collected by him during his expedition to Sumatra. Some of these sections were described by E. LANGE<sup>1</sup>), but most of them are untouched. I have re-examined the specimens described by LANGE. And a revision of his species belonging to the *Fusulinidae* will be published in the near future. Among the untouched specimens there are some interesting species which are not hitherto known from Sumatra. These are *Schwagerina princeps* EHRENB., *Neoschwagerina craticulifera* SCHWAGER and *Fusulina japonica* GÜMBEL<sup>2</sup>).

*Schwagerina princeps* is found in the *Productus* limestone of Telók Gedáng, laag d<sup>3</sup>) on the Merangin River underlying the plant bed of Soengi Garing<sup>3</sup>) containing a *Pecopteris* flora. Its occurrence there is very important because of inconsistency of opinion concerning the age of the *Productus* limestone and the plant bed.

The fossils in the *Productus* limestone were studied and described by O. E. MEYER<sup>4</sup>) who determined its age as Upper Permian (Neodyas) by an occurrence of *Productus sumatrensis*. Later, W. J.

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<sup>1</sup>) E. LANGE, Eine mittelpermische Fauna von Guguk Bulat (Padanger Oberland). Nr. 5 der „Beiträge zur Geologie und Paläontologie von Sumatra, herausgegeben von AUG. TOBLER, Basel“. Verh. v. h. Geol.-mijnbouwk. Genootschap voor Nederland en Koloniën. Geol. serie, deel 7, 1925.

<sup>2</sup>) The latter two species were obtained from other localities as *Schwagerina princeps*.

<sup>3</sup>) Refer to A. TOBLER, Djambi-Verslag. Jaarboek v. h. Mijnwezen in Nederl. Oost-Indië, 48 Jaarg. 1919. (1922) p. 191, 306, 541 (Telók Gedáng), p. 193, 308, 541 (Soengi Garing); bijlage VI, speciaalkaart 3; bijlage VII, profil 4, and A. TOBLER, Unsere paläontologische Kenntnis von Sumatra. Eclogae geol. Helv., Vol. 18, 1923, p. 317.

<sup>4</sup>) O. E. MEYER, Brachiopoden des Perm und Untercarbon der Residentenschaft Djambi (Sumatra). Nr. 2 der „Beiträge zur Geologie und Paläontologie von Sumatra, herausgegeben von AUG. TOBLER, Basel“. Verh. v. h. Geol.-mijnbouwk. Genootschap voor Nederland en Koloniën. Geol. serie, deel 5, 1922.

JONGMANS and W. GOTHAN<sup>1)</sup> examined the plant fossils obtained from the bed overlying the *Productus* limestone and insisted that its age is the uppermost Carboniferous.

On account of an occurrence of *Schwagerina princeps* in the *Productus* limestone I cannot hold the opinion of MEYER, because *Schwagerina princeps* marks a definite horizon in the Permian-Carboniferous series in Asia and is generally considered as indicating the uppermost Carboniferous though some authors, such as E. HAUC and H. GERTH, consider it to be of Lower Permian age.

On the other hand, the rock succession of the Permian and Carboniferous formations in the Merangin district more or less resembles that in North China and Korea where it was surveyed in detail in several coal fields. Many important papers concerning the stratigraphy of coal bearing Permian-Carboniferous formation were published in China and Japan. The generalised succession<sup>2)</sup> of coal bearing formation in North China and Korea is as follows (arranged in the descending order):

3. Coal bearing complex containing abundant plant fossils which were studied by H. YABE and others and determined to be Rotliegendes.
2. A complex of sandstone, shale and limestone. The uppermost limestone generally contains *Schwagerina princeps* associated with *Fusulina* spp., which are decidedly older than *Neoschwagerina*.
1. The fire clay (weathered substance of Ordovician limestone).

Comparing the above succession with that of the coal bearing formation in the Merangin district of Sumatra, we are struck by the similarity of their general succession. The plant bed in Sumatra as determined by JONGMANS and GOTHAN is of the uppermost Carboniferous, therefore it is natural to correlate the *Productus* limestone of the Merangin district with the *Schwagerina princeps* limestone in North China and Korea. And then we can safely conclude that the Permian-Carboniferous succession in Sumatra is of the same type as that of North China and Korea.

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<sup>1)</sup> W. J. JONGMANS und W. GOTHAN, Beiträge zur Kenntnis der Flora des Obercarbons von Sumatra. Nr. 7 der „Beiträge zur Geologie und Paläontologie von Sumatra, herausgegeben von AUG. TOBLER, Basel“. Verh. v. Geol.-mijnbouwk. Genootschap voor Nederland en Koloniën. Geol. serie, deel 8, 1925.

<sup>2)</sup> Refer to Y. OZAWA's paper on "Some Carboniferous Fossils collected in Manchuria and Korea", Japanese Journal of Geology and Geography, vol. 5, no. 3, 1927.