14. **Fossil Chelonian (?) Eggs from South Manchuria.**

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Figs. 1 a and b represent a specimen we acquired through the effort of Mr. Riuji Endō in our recent trip to South Manchuria and etiquetted “Found July, 1921, from a cutting (west side) of the South Manchuria railway line between the Station Chuan-tou (泉頭) and Station Shuan-miao-tzu (雙廟子).” It is spheroidal and extraordinary similar in appearance to *Heterastridium conglobatum* Reuss; its dimensions and volume are:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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<tr>
<td>Longitudinal diameter</td>
<td>82.5 mm.</td>
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<tr>
<td>Transverse diameter</td>
<td>76.0 mm.</td>
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<tr>
<td>Vertical diameter</td>
<td>63.0 mm.</td>
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<tr>
<td>Equatorial circumference</td>
<td>226.0 mm.</td>
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<tr>
<td>Thickness of shell</td>
<td>3.0 mm.</td>
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<tr>
<td>Volume</td>
<td>195.0 cc.</td>
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</tbody>
</table>

The specimen, partly polished on surface, has lost more than a half of the shell, before it is placed at our disposal; it is coloured reddish brown on surface, a fact which points to its preservation in a reddish brown sediment. Fractures show that its shell is two-layered, the outer layer being whitish and the inner one brownish in colour, and that its interior is an aggregate of coarse xenomorphic crystals of calcite, like a geode.

The specimen is traversed by a system of cracks, some of which are vertically striated on the surface of fracture. Certainly it was more spherical in its original state and later depressed; this deformation took place after the infilling of its interior by calcite. The surface of its internal mould is in a whole even, though minutely pitted all over; its external surface is apparently smooth, but there is faint trace of minute vermicular rugosity under the magnifier.

Several specimens quite similar to this in size, form and preservation, are kept in the collection of the Geological Institute of the South Manchuria Railway Company in Dairen; these were obtained from one kilometer southwest of the Station Chuan-tou in April, 1928. It is told that more than a score of the round bodies, all of the same size and form, were accidentally dug out from ca. 7.5 m. below the river bed of the Ta-tzu-ho (塔子河) in a work of laying the foundation of a new railway bridge. These were found there lying in a group in a compact reddish brown sandstone; by curiosity, many of them were hammered
and destroyed by workmen, while a few escaped the destruction and were confided to the care of the Geological Institute. A fragment of a specimen from this locality forwarded to us by Mr. H. Murakami, the Director, was thin sliced and microscopically examined (Fig. 2).

The shell is ca. 3 mm. thick and two-layered. The inner layer, the thinner of the two, consists of brown coloured lucid calcite prisms, measuring 0.2 mm. in the broadest part and radially disposed; the prisms are more or less fasciculated and the whole inner layer is thus divided into numerous mamillae, with the intervals filled with white calcite. The mamillae are fairly isolated and dark coloured on the tops, which all together constitute a plane limiting the inner surface of the shell. The outer layer shows a very fine radial and concentric structure, indicated by delicate dark striae; it resolves in crossed nicols into a large number of radially elongated calcite prisms. The latter are crowded and leave irregular lacunae at variable intervals, which are subsequently infiltrated with more transparent colourless calcite.

While all the specimens from the second locality, examined, are quite similar in size, form and preservation, with that from the first locality, one discovered by Messrs. J. Hata and K. Hario of the Geological Institute Dairen, at a little north of the Station Chang-tu (8 Ill) is somewhat smaller and oblong, being 77, 61 and 50 mm. in the longitudinal, transverse and vertical diameter respectively; otherwise there is no essential difference macroscopically recognisable between this and the other type. As this specimen is much fractured, the cited difference may possibly due to posthumous deformation; yet of course the other possibility is by no means excluded that the mother organisms of the eggs found from the first and second localities are specifically or also generically distinct.

The last mentioned specimen was found by the two geologists in situ in a cross-beded reddish brown sandstone, a member of the Chuan-tou Formation of Mr. Hata. We visited this place and also the second locality, kindly guided by him. At the second locality, the mother rock of the eggs is no more exposed just where they have been excavated, but all the outercrops of rocks near by belong no doubt to the Chuan-tou Formation. The same remark can also be applied to the first locality, although we are in this case informed only about the approximate point of excavation.

The name Chuan-tou Formation is newly proposed by Mr. Hata for the "reddish brown sandstone formation" in his early paper. 1) It

is a thick complex (more than 500 m. after him), mainly composed of sandstone, with occasional intercalation of conglomerate and shale; the prevailing colour of these rocks is reddish brown and there are rarely interbedded whitish sandy and clayey layers. These rocks are usually cross-bedded, in minor as well as grand scales. At the third locality of the eggs, a reddish brown sandstone of this complex contains more or less flattened, whitish clay marl galls.

The age of the Chuan-tou Formation is not yet settled; no fossils other than the eggs have yet been found in it. But it is at least certain that the complex is younger than the coal-bearing formation of the Sha-ho-tzu (砂河子) coal-field, as the former repose near Kao-tai-tzu, 2.4 km. southeast of Chuan-tou, unconformably upon liparite-tuff beds at the top of the latter. The Chuan-tou Formation has the average trend of N. 10° E., 10°–5° (or less) NNW. between Chang-tu and Chuan-tou, and farther north; only at Kao-tai-tzu (高臺子), its basal members show the dip as steep as 60°.

The plant remains accompanying coal-seams at Sha-ho-tzu indicate the Jurassic age of the coal-bearing formation; the Chuan-tou Formation therefore must be regarded as either Older Cretaceous or later in age. Near the third locality, a reddish brown sandstone is intruded by a basalt dyke.

Fossil reptilian and avian eggs, especially of Mesozoic age, are extremely rare, and in literature we consulted, there is no previous record of the remains more or less simulating the fossil eggs from South Manchuria. Most of the actual reptilian and avian eggs are either elliptical, oblong or oval in form; only some Chelonian eggs are spheroidal, and in this respect, our specimens approach Chelonian eggs more closely than the others.
Fig. 1 a, b. A fossil Chelonian (?) egg from the first locality, in two different views. Nat. size.

Fig. 2. Shell of another specimen from the second locality, in transverse section. ×25.