ON THE CUTICLES OF TERTIARY GINKGOITES LEAVES FROM KUZI, IWATE PREFECTURE

By

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With 1 Plate and 3 Text-figures

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MATERIAL

In a collection of fossil plants from the Tertiary rocks of Kuzi district made by Mr. Y. SASA of our Department, there are several *Ginkgoites* leaves, the preservation of which attracted the writer's attention. The carbonized leaf-substances of the *Ginkgoites* leaves are easily split off from the matrix, while other leaves on the same slab of rocks are unsatisfactorily preserved. Several fine cuticular preparations were obtained by treating the material in Schultz's solution following alkali.

The rock which contained these *Ginkgoites* leaves is a light-greenish medium grained sandstone of the Ube coal-mine and belong to the Minato Group of Mr. SASA[1] which he attributed to the Oligocene; it contains the following in addition to the *Ginkgoites* leaves:

Sphenopteris sp.
Sequoia Langsdorfii BRONGN.
Glyptostrobus europaeus HR.
Thuites sp.
Populus arctica HR.
Nordenskiöldia sp.

(1) Y. SASA: Geology of the Kuzi District, Iwate Pref., Japan. Journ. Geol. Soc. Tôkyô, Vol. XXXIX, 1932.

The Minato Group itself is considerably rich in fossil plants and yields besides the above, the following species at several localities other than the Ube coal-mine:

Adiantites sp.
Osmundites sp.
Equisetites sp.
Taxites Olriki HR.
Taxodium distichum miocenum HR.
Salix sp.
Populus Zaddachi HR.
P. Richardsoni HR.
Quercus sp.
Crataegus antiqua HR.

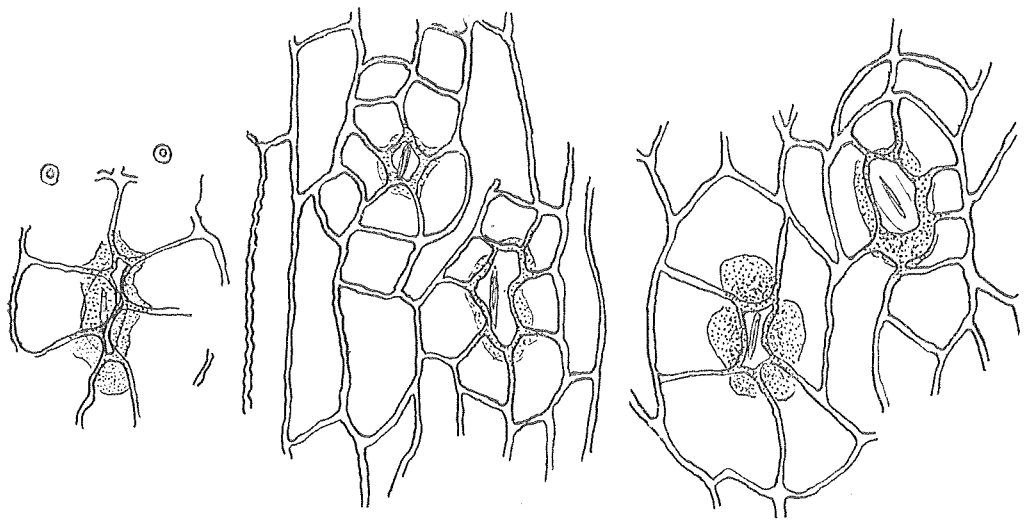
DESCRIPTION

Leaf: Petiolate, the petiole being more than 3 cm. long; the lamina fan shaped, 4 cm. high, 6 cm. broad, with somewhat wavy or nearly entire outer margin; veins numerous, divergent, forking frequently; two lateral marginal veins are not very prominent.

Cuticle: Both the upper and the lower cuticles are nearly of the same thickness, or the lower is a little thicker than the other. The upper cuticle shows elongated rectangular or elongated fusiform cells but those on the veins are more elongated. The median papilla is entirely absent. The cell-walls always strongly sinuous. The stomata are present at marginal region. The lower cuticle shows similar cells to those of the upper, but they are a little smaller in size and the cell-walls are less distinctly marked; at least those of the stomatal region seem to be almost straight. Occasional cells between the veins possess prominent hollow papillae. The stomata are distributed between the veins; they are surrounded by 5–7 subsidiary cells forming a circular group, strongly thickened in their inner sides and arching over the stomatal opening. The guard-cells are somewhat sunken and seldom seen distinctly; they are thinly cuticularized except along the margin of the narrow median slit. The slit does not have constant orientation; its length is about 15 μ.

DISCUSSION AND COMPARISON

Many *Ginkgoites* leaves similar in size and form to the present specimens have been figured and described from Cretaceous and Tertiary rocks of the world. They have been called under the name *Ginkgo adiantoides* (UNGER)[1] or sometimes under the name of the living species of *Ginkgo*. The specimens of *G. adiantoides* hitherto described are, so far as the external characters of leaves are concerned, indeed little distinct from those of the living species. The



A. B. C.

Ginkgoites cfr. *adiantoides* (UNGER).

A. A stoma from the lower cuticle; *h*, hollow papillae. ×400.
B. Stomata from the cuticle of petiole. ×400.
C. Stomata from the upper cuticle close to the margin of lamina. ×400.

present specimens also can not be distinguished from the above named fossil and the living species in their leaf-form and venation.

Neither in the case of UNGER's type-specimen[2] nor in the case of leaves described under the name *G. adiantoides* is anything said of the cuticle. Therefore, the comparison of the present specimens

(1) K. SHAPARENKO: *Ginkgo adiantoides* (UNGER) HEER; Contemporary and Fossil Remains. Phil. Journ. Sci., Vol. 57, No. 1, 1935, p. 1.

(2) F. UNGER: Synopsis Plantarum Fossilium, 1845, p. 211.

with *G. adiantoides* by the cuticle is impossible, though in their leaf-form the two are indistinguishable.

The living species, *Ginkgo biloba* L., is distinguishable from the present fossil by their cuticle, the upper cuticle of the former being entirely without stomata and the cell-walls less sinuous.

The writer proposes provisionally to call the present specimens *Ginkgoites* cfr. *adiantoides* (UNGER).

Plate XIII (I)

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Ginkgoites cf*c*. *adiantoides* (UNGER)

Figs. 1–2. Leaves with carbonized leaf substance. × 1. (Reg. No. 7930).

Fig. 3. Lower cuticle. × 60.

Fig. 4. Upper cuticle. × 60.

Fig. 5. Upper (right) and Lower (left) cuticles, both with stomata. Median dark portion shows the margin of the lamina. × 60.

Fig. 6. Cuticle of petiole, with stomata. × 60.

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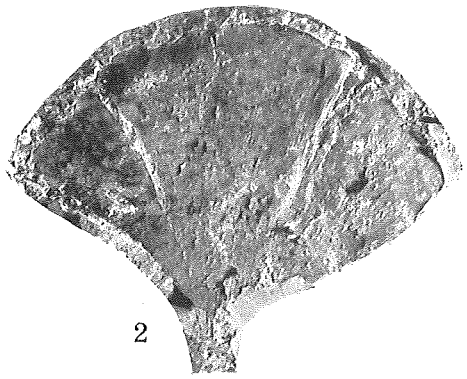

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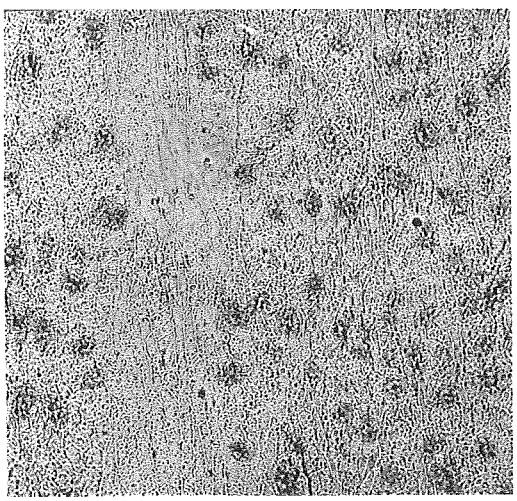

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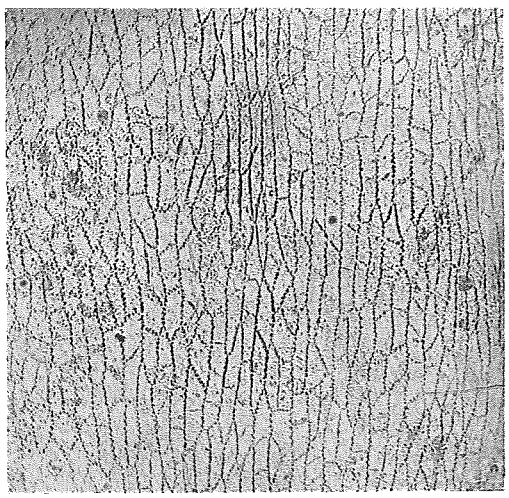

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S. Ôishi: Cuticles of Tertiary Ginkgoites Leaves.