

CONTRIBUTIONS TO PALEONTOLOGY

# A MIOCENE FLORA FROM SHANTUNG PROVINCE, CHINA

PART I. INTRODUCTION AND SYSTEMATIC CONSIDERATIONS

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PART II. PHYSICAL CONDITIONS AND CORRELATION

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*P. serrulata* Heer, from the Oligocene of Sakhalin,<sup>1</sup> and also doubtfully recorded from Hokkaido, shows some resemblance in shape and margin, as does *P. scottii* Heer from the Eocene of Greenland<sup>2</sup> and Alaska.<sup>3</sup> None of the fossil cherries from temperate latitudes in Europe and North America have the slender shape of *P. miodavidiana*.

*Collection*—National Geological Survey of China, Holotype No. 9; Paratype No. 10.

*Rosa shanwangensis* new species

(Plate 24, figs. 2, 3, 4)

*Description*—Leaflets ovate, broadly cuneate to subcordate at the base, apex acuminate; length 2.1 to 3 cm., width 1.3 cm.; secondaries diverging at angles of about 30° except at the base where they are more spreading, running up rather straight to the margin where they curve up slightly, craspedodrome or with small branches to the teeth; tertiaries obscure, irregularly percurrent; margin coarsely and doubly serrate; texture firm.

Our material is limited to 2 leaflets, which are of somewhat different shape but which resemble each other in the low angle of divergence of the secondaries. It is impossible to indicate certainly the modern affinities of *R. shanwangensis*, but *R. rugosa* Thunberg, which is living in Shantung at the present time, has a corresponding range in the shape of its leaflets, and resembles our specimens in the low angle of divergence of the secondaries.<sup>4</sup> This modern species ranges eastward to Korea and Japan.

There are no closely related fossil species known, although the genus is well represented in the Tertiary of Eurasia and North America.

*Collection*—National Geological Survey of China, Holotype No. 12; Paratypes Nos. 11, 267.

*Spiræa mioblumei* new species

(Plate 24, figs. 5, 6)

*Description*—Leaf oval-obovate, narrowly rounded at the slightly unequal base, the apex broadly rounded; length 2.3 cm., width 1.4 cm.; petiole stout, 1 mm. long; nervation obscure, several secondaries diverging from the midrib at about 30°, curving up toward the apex; margin entire below, in the upper half irregularly and finely serrate; texture firm.

This little leaf closely resembles the leaves of the living *S. blumei* G. Don,<sup>5</sup> differing in the less pronounced serration, which may be in individual variation. Another still smaller leaf, shown as figure 6 on plate 24, may also represent this species, as it has the general form and nervation of juvenile leaves of *S. blumei*. This modern species is found from North and West to Southeast China. Almost equally close to our fossils is *S. betulifolia* Pallas of North China, of which the variety *æmiliana* Koidzumi occurs also in Japan.

A resemblance is shown to the fossil specimens by *S. tenuifolia* Engelhardt from the Oligocene of Bohemia.<sup>6</sup> Another fossil species, *S. andersoni* Heer from the Eocene of Alaska,<sup>7</sup> also shows similarity. *S. weaveri* Hollick from the same locality is larger but represents a leaf of the same type.<sup>8</sup>

*Collection*—National Geological Survey of China, Holotype No. 193; Paratype No. 194.

<sup>1</sup>Heer, Fl. Fos. Arc., vol. 5, p. 53, pl. 14, fig. 8.

<sup>2</sup>Heer, Fl. Fos. Arc., vol. 1, p. 126, pl. 8, fig. 7.

<sup>3</sup>Hollick, *op. cit.*, p. 126, pl. 70, fig. 4.

<sup>4</sup>See sheets Nos. 31835 and 06122 in the herbarium of Fan Memorial Institute of Biology.

<sup>5</sup>See sheet No. 542 in the herbarium of Fan Memorial Institute of Biology and sheet No. 6713 in the collection by H. H. Chung from Fukien, in the herbarium of the New York Botanical Garden.

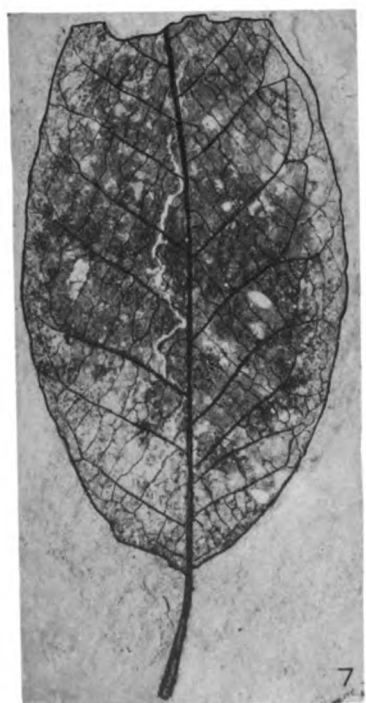
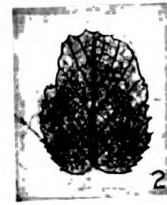
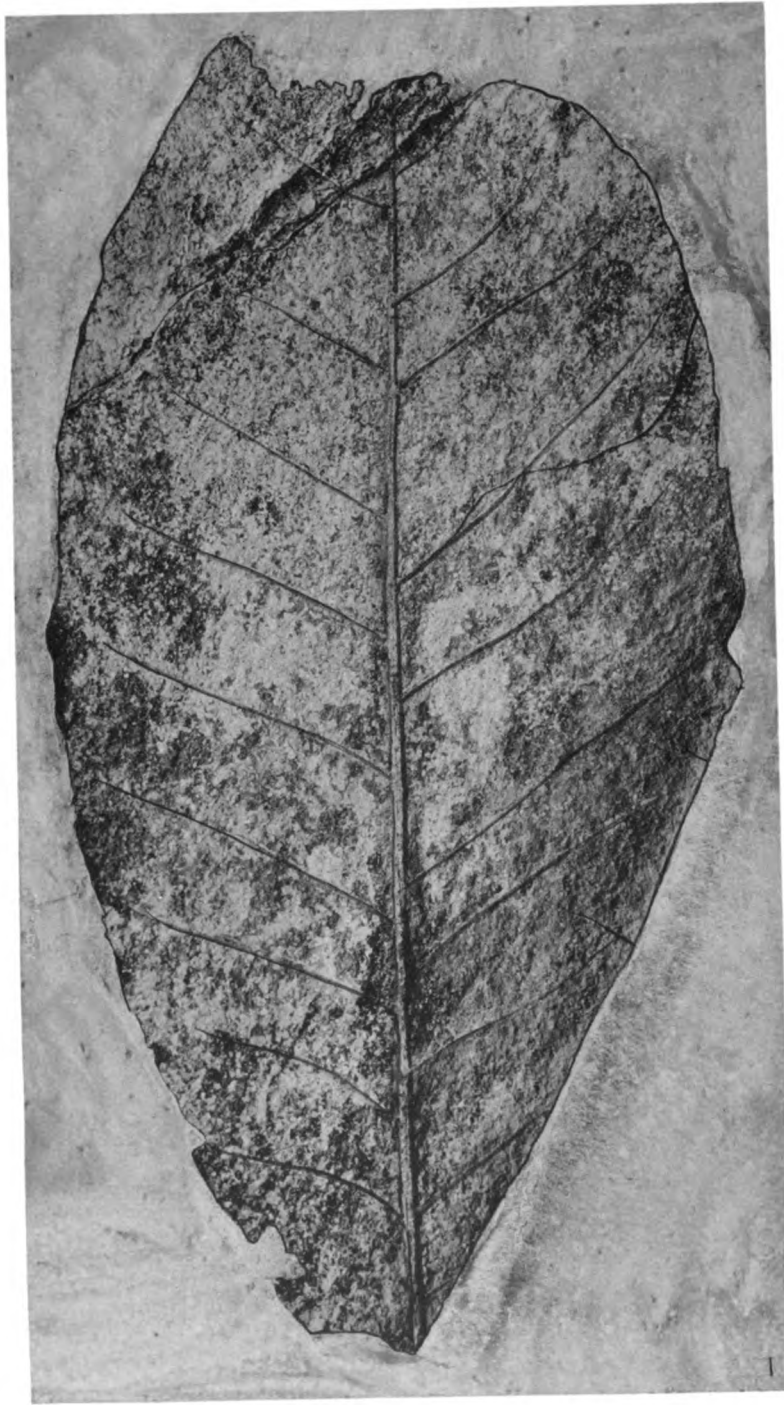
<sup>6</sup>Engelhardt, N. Act. K. Leop.-Carol. Deutsch. Akad. Naturforsch., 48:3, p. 369, pl. 24, fig. 14, 1855.

<sup>7</sup>Hollick, *op. cit.*, p. 124, 1936.

<sup>8</sup>*Ibid.*, pp. 124–125, pl. 70, fig. 7.

PLATE 24

- FIG. 1. *Eriobotrya miojaponica* Hu and Chaney. Nat. Geol. Surv. of China, Holotype No. 17.
- FIGS. 2, 3. *Rosa shanwangensis* Hu and Chaney. Nat. Geol. Surv. of China, Paratypes Nos. 11, 267.
- FIG. 4. *Rosa shanwangensis* Hu and Chaney. Nat. Geol. Surv. of China, Holotype No. 12.
- FIG. 5. *Spiræa mioblumei* Hu and Chaney. Nat. Geol. Surv. of China, Holotype No. 193.
- FIG. 6. *Spiræa mioblumei* Hu and Chaney. Nat. Geol. Surv. of China, Paratype No. 194.
- FIG. 7. *Prunus miobrachypoda* Hu and Chaney. Nat. Geol. Surv. of China, Paratype No. 8.



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