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A NEW SPECIES OF *MAHONIA* FROM
THE OLIGOCENE RUBY FLORA OF
SOUTHWESTERN MONTANA

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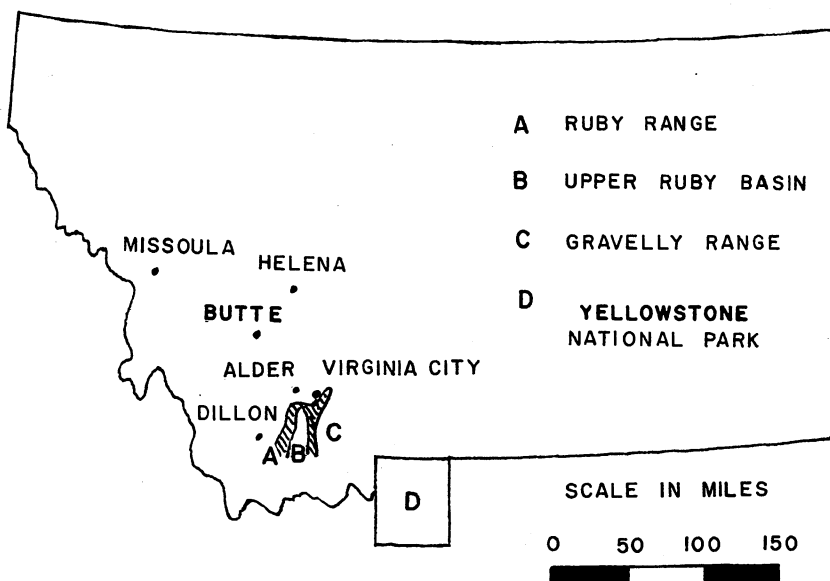
INTRODUCTION

A NEW species of *Mahonia*, *M. lobodonta*, from the Oligocene of the upper Ruby Basin, Madison County, southwestern Montana, is described here. It was discovered in the fossiliferous shales exposed in dry washes and on bench surfaces along the eastern Ruby Range (T. 7 S., R. 5 W.). The fossil-bearing strata comprise three facies, each with a distinct florule. The one in which the new species occurred, the paper shales, is the most productive.

The Ruby Flora, first known in 1947 and recently described by Becker (in press) is closely related to the Florissant flora of central Colorado (MacGinitie, 1953). In the Rockies of Oligocene time there were several large botanical provinces; the Ruby and Florissant floras belonged to one of them. Situated in an intermontane basin between the pre-Cambrian, Ruby and Gravelly ranges, about 60 miles west of Yellowstone National Park (see Map 1), the Tertiary shales containing the Ruby flora rest presumably on the pre-Cambrian and are partly overlain by the Madison Valley formation (upper Miocene or lower Pliocene) equivalent (Dorr and Wheeler, 1948). The strata consist of three lithofacies, all of which abound in plant remains. They are: (1) a fine paper shale which yields the bulk of the fossils; (2) a blocky, conchoidally fracturing shale known for an abundance of *Metasequoia*, *Alnus*, and *Cercidiphyllum*; and (3) a distinct deposit of highly fossiliferous, light gray to white silt, which occurs about 2 miles south of the paper-shale sites. The flora from these beds is probably of Green River age. Insects were found only in the paper shales.

All fossils obtained from the paper-shale facies were collected at 9 sites, within an area of about 4 square miles west of the Passamari guide meridian in secs. 15, 16, 22, and 23, T. 7 S., R. 5 W. Because of the lithological identity and proximity of the sites, they comprise the source

INDEX MAP OF MONTANA



MAP 1. Index map of Montana showing the Ruby Basin locality.

of the Ruby flora. At one of the sites, No. 7 (sec. 22) in a slightly sandy phase 300 feet west of paper shale site No. 4 in the dry wash, a distinctly trifoliate leaf of *Mahonia* was found. Even though the leaflets are incomplete, sufficient remains to permit reconstruction of the leaf (Fig. 1) and to recognize it as representing a new species. Hitherto, because of the generally brittle nature of the matrix and the fragmentary condition of most specimens, material from this site has not been included in this flora.

The *Mahonia lobodonta* specimen (UMMP 39566) was collected by the author in 1957 in the course of field work under a grant from the Geological Society of America.

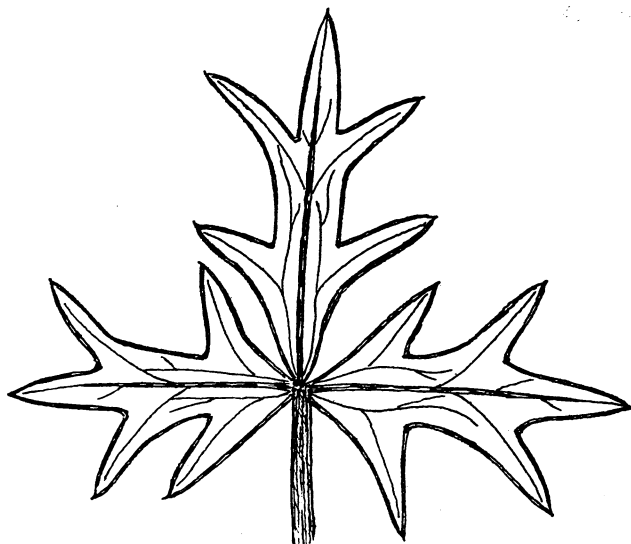


FIG. I. Reconstruction of leaf of *Mahonia lobodonta* Becker, sp. nov.

SYSTEMATIC DESCRIPTION

Family Berberidaceae

Genus *Mahonia* Nuttall

***Mahonia lobodonta* Becker, sp. nov.**

(Pl. I)

Description—Leaf 3-pinnate, 4 cm. long, 8 cm. wide; petiole $1\frac{1}{2}$ cm. long (incomplete), 1 mm. wide with 5 minute, longitudinal striations or grooves; leaflets elongate, inaequilateral, deeply dentate, 4 cm. in length, $2\frac{1}{2}$ cm. in total width, sessile, terminal to petiole; lobed teeth 5, prominent, 2 pairs of teeth opposite, central tooth apical; lobed teeth entire, 10 to 13 mm. long, 3 to 5 mm. wide at base, tapering sharply to an (presumably) acute or spinose tip; lamina 7 to 9 mm. wide above basal lobes, 4 to 5 mm. above second pair in the middle of the leaflet; sinuses slightly rounded to angular, mostly 80° , but ranging from 60° to 100° ; base broadly cuneate in lateral leaflets which are perpendicular to petiole, narrowly cuneate in central leaflet; midrib strong, curved, flanked by prominent, upward-curving primaries from which abaxial secondaries enter the basal teeth; pair of strong secondaries arising in the middle of the blade at 40° to 50° angle, entering second pair of teeth; primaries and secondaries branching irregularly, forming a coarse, longitudinal mesh; tertiary venation obscure; structure curled; margin thickened; texture coriaceous.

Remarks—Of the Tertiary western species of *Mahonia*, only *M. simplex* (Newberry) Arnold displays possible relationship to *M. lobodonta*. Of a leaf and several leaflets of *M. simplex* figured by Arnold (1936), a single leaflet (Pl. I, Fig. 1) approaches the Ruby specimen in size and shape, but it differs in having a wider blade, shorter and narrower teeth, incipient lobes, and in the pattern of venation. The Ruby specimen, with its extremely narrow blades and deep sinuses, possesses the longest lobed teeth on record for a fossil *Mahonia*. These foliar differences far outweigh the similarity between the two species. Chaney's (1927) figures of several leaflets (Pl. XIV, Fig. 11) of *M. simplex* emphasize the distinctions. All diagnostic details place *M. lobodonta* outside an expected range of intraspecific variation. Similarities, however, between the Oligocene Crooked River (Chaney, 1927) and Miocene Trout Creek (Arnold, 1936) specimens of *M. simplex* and the Ruby specimen undoubtedly suggest a relationship between the two species. All three may be regional forms derived from the same ancestral stock.

With three previously described species of *Mahonia* from the Ruby shales (Becker, in press), *M. marginata* (Lesquereux) Arnold, *M. obliqua* MacGinitie, and *M. subdenticulata* (Lesquereux) MacGinitie, *M. lobodonta*, as the fourth, emphasizes the diversity of this genus and the semidesert character of the Ruby flora.

Among the living forms, only *Mahonia trifoliata* Fedde, from the arid hills of Texas, southern California, and central Mexico, resembles *M. lobodonta*, and that in a general way, but it is smaller, lacks basal primaries, and has just one pair of lateral teeth. There are no living species of *Mahonia* in the Ruby Basin today.

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PLATE

EXPLANATION OF PLATE I

Mahonia lobodonta Becker, sp. nov. UMMP No. 39566. $\times 1\frac{1}{2}$.

PLATE I

