XXXII. *Species novae Pleistocaeniae Marylandicae*
ab Arthur Hollick descriptae.

(Ex: Contr. New York Bot. Gard., no. 85, in: Maryland Geolog. Surv., 1906,
p. 217—237, pl. 67—75.)

1. *Hicoria pseudo-glabra* Hollick, l. c., p. 221, pl. LXXII, fig. 1, 16, 17 [fossil].

Terminal leaflet broadly obovate in outline, wedge-shaped at the base, finely serrate except near the base, short petioled; midrib thick; secondaries numerous, irregularly disposed, diverging from the midrib at obtuse but varying angles, mostly forking or branching once or twice near their extremities, the branches extending to the serrations; tertiary nervation fine and close. Lateral leaflets lanceolate (?) in outline, rounded and inequilateral at the base, entire below, serrate (?) above; secondaries irregularly disposed, sub-parallel, curving upward near the margin, the upper ones branching near their extremities.

These specimens are so contorted or imperfect that accurate description or comparison is impossible. They have much the appearance of many leaflets of the living *H. glabra* (Mill) Britton, in which the serrations are often obscure or entirely wanting below. The terminal leaflet may also be compared to *Aesculus simulata* Knowlton (Bull. U. S. Geol. Survey, no. 204, p. 78, pl. XV, figs. 1, 2) which is apparently a *Hicoria* rather than an *Aesculus*. The thick midrib, short petiole, entire, wedge-shaped base, and the irregular angle of divergence of the secondaries together with their branching extremities, are characteristics which are common to the Maryland specimen and to those figured by Knowlton. It is possible that Fig. 4, Plate LXX, may belong to the same species.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

2. *Populus Clarkiana* Hollick, l. c., p. 223, pl. LXX, fig. 6 [fossil].

Leaf deltoid in shape, slightly rounded at the center, rather abruptly acuminate above, cuneate or sub-cordate below, crenulate-dentate except near the base and apex; petiole about $\frac{3}{10}$ inch long; nervation 3-palmate; lateral primaries and principal secondaries spreading, sub-parallel, camptodrome; from the under sides of the lateral primaries and from the outer sides of the marginal loops of the secondaries a series of fine nerves and nervilles extend to the crenulations of the margin.

Named in honor of Professor W. B. Clark, under whose auspices the collection was made. There are no described or figured species with which this leaf may be satisfactorily compared, but it approaches very close to some of the forms of *P. deltoides* Marsh, especially var. *occidentalis* Rydb.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

3. *Populus pseudo-tremuloides* Hollick, l. c., p. 224, pl. LXX, fig. 5 [fossil].

Leaf orbicular or transversely elliptical in shape, tapering abruptly and about equally to the somewhat decurrent base and acuminate apex, about $1\frac{1}{10}$ inch in length and width; margin entire; petiole $\frac{1}{2}$ inch in length; nervation 3-palmate, camptodrome; lateral primaries arising from very near the base of the leaf at an angle of about 45 degrees with the midrib and curving gently upward, each with three secondaries on the lower side curving toward the margin; median secondaries fine, about two on each side of the midrib, extending upward at acute angles and curving at their extremities. This leaf is hardly to be distinguished from many entire-margined forms of the living *P. tremuloides* Michx. and is similar to *P. decipiens* Lesq. (Tert. Fl., p. 179, pl. XXIII, figs. 7—11), although in this species the lateral primaries are more upright.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

4. *Carpinus pseudo-carolinana* Hollick, l. c., p. 225, pl. LXXI, fig. 10 [fossil].

Leaf about $1\frac{1}{4}$ inch long by $\frac{1}{2}$ inch wide, oblong; abruptly acuminate at the apex, finely serrate; secondary nerves numerous, fine, sub-parallel, leaving the midrib at an acute angle and extending to the serrations of the margin. This leaf is almost identical with many smaller leaves of the living *C. caroliniana* Walt., which are frequently simply instead of doubly serrate. Numerous similar fossil forms have been described under *C. grandis* Ung. and *C. heerii* Etts., and Lesquereux has figured specimens under the former name from the western United States which approach the Maryland leaves very closely (Tert. Fl., pl. LXIV, figs. 8—10). They are described as doubly serrate, although the smaller specimens are figured as simply serrate, the same as the former. Practically the only difference between them is the abruptly acuminate apex of the latter, as compared with the more gradually tapering apex of the former.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

5. *Quercus glennii* Hollick, l. c., p. 226, pl. LXXII, fig. 3—5 [fossil].

Leaves oblong-lanceolate (?) in outline, tapering to the apex, rounded or narrowed (?) to the base; margin somewhat irregular or wavy, minutely denticulate; secondaries springing from the midrib at varying angles, curving upward, sub-camptodrome, with fine nervilles extending to the denticulations. These leaves are named in honor of Dr. L. C. Glenn, in whose company they were collected. They are very closely allied to the living *Q. wislizenii* Engelm.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

6. *Quercus pseudo-alba* Hollick, l. c., p. 227, pl. LXX, fig. 2; pl. LXXI, fig. 1—6 [fossil].

Leaves varying in size and outline, irregularly pinnatifid into obtusely pointed lobes, the lower ones entire and extended into a wedge-shaped base, the upper ones occasionally sub-lobed (?); sinuses rounded; secondary nervation irregular, consisting of a series of main nerves extending from the midrib at varying angles to the extremities of lobes, with forks extending to the extremities of the sub-lobes (?) and an intermediate finer series extending with the tertiary nerves and finally forming sub-marginal nerves extending along the margins of the lobes.

These leaves appear to be practically identical with many forms of the living *Q. alba* L. and they might also be compared with forms of *Q. macrocarpa* Michx. and *Q. lyrata* Walt., all of which vary greatly in size and shape. *Q. garryana* Dougl., *Q. utahensis* (A. D. C.) Rydb. and *Q. gunnisoni* (Torr.) Rydb. may also serve for comparison, but the imperfect condition of the Maryland specimens renders it impossible to determine accurately their nearest allies in the living flora, hence it has been thought best to merely indicate in the name adopted the general apparent relationship with the white oak group.

Sunderland Formation. Point of Rocks and near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

7. *Ulmus betuloides* Hollick, l. c., p. 228, pl. LXX, fig. 1 [fossil].

Leaf oblong-ovate (?) in outline, serrate; secondary nerves leaving the midrib almost at right angles, mostly forking or branching once or twice near the extremities, each division terminating in one of the marginal serrations; base and apex not known. This leaf by reason of the obtuse angle of divergence made by the secondaries with the midrib, appears to be distinct from any species with which it was compared. In some respects it resembles a *Betula* rather than an *Ulmus*, but it apparently was inequilateral or cuneate at the base, as indicated by the more rounded outline on the left side and the slightly curved midrib. With an apex such as that shown in Fig. 11, Plate V, the leaf would approach very closely to many forms of *U. americana* L.

Sunderland Formation. Point of Rocks, Calvert County. Maryland Geological Survey.

8. *Ulmus pseudo-racemosa* Hollick, l. c., p. 228, pl. LXXI, fig. 11—13 [fossil].

Leaves varying in size, averaging about 2 inches in length by 1 inch in width, oval to somewhat obovate in outline, inequilateral, sharply and more or less doubly serrate; apex rather abruptly acuminate; base cuneate or cuneate-cordate; petiole short; nervation simply pinnate, craspedodrome, the secondaries numerous, flexuous, varying in their angles of divergence from the midrib and mostly once to several times forked, especially towards their extremities, the branches of the forks terminating in the minor dentitions of the margin.

It is almost impossible to separate these leaves from those of the

living *U. americana* L., and *U. racemosa* Thomas, and it is quite possible that they are identical with one or the other of these species. They may be more or less satisfactorily compared with several fossil forms, such as *U. affinis* Lesq. (Mem. Mus. Comp. Zool. Harvard College, vol. VI, no. 2, p. 16, pl. IV, figs. 4, 5) which, however, is described as long petioled; *U. pseudo-americana* Lesq. (Cret. and Tert. Fl., p. 249, pl. LIV, fig. 10) which differs principally in its larger size and in the strict, parallel character of its nervation; *U. tenuinervis* Lesq. (Ann. Rept. U. S. Geol. and Geog. Surv. Terr., 1873 [1874], p. 412; Tert. Fl., p. 188, pl. XXVI, figs. 1—3) which is more elongated; and also with *U. fisheri* Heer, *U. plurinervia* Ung. and *U. bronni* Ung., all of which species differ from each other no more than the leaves of *U. racemosa* or *U. americana* on a single branch often differ between themselves. The apparent relationship is indicated in the specific name adopted, instead of referring the fossil, without question to the living species.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

9. *Celtis pseudo-crassifolia* Hollick, l. c., p. 230, pl. LXXI, fig. 9 [fossil].

Leaf about $1\frac{1}{2}$ inch long by $\frac{3}{4}$ inch wide, inequilateral (?) sparingly dentate below, entire above and tapering irregularly to the apex; secondary nervation camptodrome, consisting of a pair springing from the base and three or more above, which bend abruptly near the midrib and extend upward almost parallel with it; tertiary nervation approximately at right angles between the secondaries and between the secondaries and the midrib, curving upward from the outside of the basal secondaries, where they connect close to the margin, with fine sub-divisions extending to the dentitions.

It is unfortunate that only this fragmentary specimen was obtained upon which to base a description. It is apparently closely related to several living species, such as *C. crassifolia* Lam., *C. mississippiensis* Bosc., *C. georgiana* Small, and *C. occidentalis* L., in all of which the leaves may vary considerably in size, shape, and degree of dentition and with any one of which it could be compared more satisfactorily than with any described fossil species. This apparent relationship is therefore indicated in the specific name adopted.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

10. *Sapindus marylandicus* Hollick, l. c., p. 234, pl. LXXII, fig. 11—14 [fossil].

Leaves inequilateral, curved, entire, very unequal below and tapering to the base at each side; greatest convexity on the broader side at about $\frac{1}{3}$ the distance from the base and on the narrower side at about the same distance from the apex; secondary nervation irregularly disposed at varying angles of divergence from the midrib, curving and anastomosing near the margin or irregularly connected by oblique or curved tertiaries.

This species is somewhat suggestive of *S. oregonianus* Knowlton (Bull.

U. S. Geol. Survey, no. 204, p. 79, pl. XV, fig. 3) and to *S. obtusifolius* Lesq. (Ann. Rept. U. S. Geol. and Geog. Surv. Terr., 1873, p. 419, Tert. Fl., pl. XLIX, figs. 8—11; Cret. and Tert. Fl., pl. XLVIII, figs. 5—7) but differs in the more tapering base. It is possible that all specimens might not exhibit this characteristic to the same extent, in which case the similarity with *S. oregonianus* would be very close.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

11. *Bumelia pseudo-lanuginosa* Hollick, l. c., p. 236, pl. LXXI, fig. 18, 19 [fossil].

Leaves spatulate or oblong-spatulate in shape, entire, narrowed to an acute or wedge-shaped base; apex not known; midrib well defined; secondary nervation obscure and fine.

These leaves bear a very close resemblance to several of those of living species of *Bumelia*, especially *B. lanuginosa* Pers. and *B. monticola* Buckl., from either of which could be selected specimens which would match them exactly in outline, but the absence of definite nervation renders accurate comparison impossible.

Sunderland Formation. Near the headwaters of Island Creek, Calvert County. Maryland Geological Survey.

XXXIII. Zur Kenntnis der Phanerogamenflora der Grenzgebiete zwischen Bolivia und Argentinien. III.

Von Rob. E. Fries.

(Auszug aus: Arkiv för Botanik, Bd. 6 (1906), no. 216 pp.)

II. Malvales.

8. *Bombax argentinum* R. E. Fries, l. c., p. 3 (Taf. I, Fig. 1—5).

Arbor 8—10 m alta, trunco laevi et spinis destituto, viridi, usque ad 0,5 m crasso, medio non vel paullulum incrassato; ramulis novellis circ. 1 cm crassis, fulvis, cicatricibus foliorum delapsorum dense instructis. Foliis septenatis (?); foliolis rigide membranaceis, integerrimis, sessilibus vel petiolis brevissimis (ad 1 mm longis) suffultis, obovatis vel late obovatis, basim versus sensim cuneatis, apice rotundatis et acumine obtuso usque ad 1 cm longo, vulgo tamen breviori instructis, vetustioribus supra glaberrimis et subtus pilis stellatis cinereo-flavescentibus adpressis parce, in nervis densius vestitis; costa supra valde impressa subtusque prominente, nervis lateralibus utrinque 12—15, [sicut venis] supra planis et subtus valde prominentibus, marginem versus inter se arcuatim conjunctis; laminis maximis reportatis 17 cm longis, 9 cm latis, minimis