

ART. XXXIII.—*Additions to the Pleistocene Flora of Alabama*; by EDWARD W. BERRY.*

A BRIEF contribution to the Pleistocene flora of Alabama was made by the writer in 1907† in which twelve species were described from the Pleistocene clays and peat outcropping along the Chattahoochee River near Abercrombe Landing in Russell County, a few miles below Columbus, Georgia. During the past field season the writer, in company with Dr. L. W. Stevenson, was engaged in studying the Mesozoic sections along the principal rivers of Alabama for the U. S. Geological Survey. In the course of this work Pleistocene plants were discovered at a number of scattered localities which it seems desirable to place on record at the present time. The localities will first be briefly described, after which the forms identified will be enumerated.

The present contribution extends the range of the ten species previously recorded from the Alabama Pleistocene and records the occurrence there of sixteen additional forms, bringing the total flora up to twenty-eight species. Among these the following existing species have not heretofore been found as fossils: *Pinus taeda* Linné, *Arundinaria macrosperma* Michx., *Hicoria villosa* (Sarg.) Ashe, *Populus deltoides* Marsh, *Phoradendron flavescens* (Pursh) Nutt., *Acer saccharinum* Linné, *Acer rubrum* Linné, and *Osmunda spectabilis* Willd. In addition the range of several species in the Pleistocene is seen to be quite different from their present range: for one thing the Fall-line which marks such an important line of demarcation in the distribution of our existing flora seems to have largely lost its significance at the time when the glaciers crowded our eastern Pleistocene flora southward and a large part of the coastal plain was submerged. However, any general conclusions may well be postponed until the completion of the writer's studies of the eastern Pleistocene floras.

Locality No. 1.—This locality is on the right bank of the Warrior River, about 356 miles above Mobile and about 200 yards above the mouth of Big Creek. The following section at this point is typical of much of the Pleistocene seen along the Alabama rivers, lacking only the gravel bed at the base of the section which is probably present at this point beneath water level:

Section.

| | |
|--|---------|
| 1. Brownish, massive, sandy clay | 30 feet |
| 2. Brownish, laminated, iron-stained, sandy clay | 6 " |
| 3. Dark, bluish gray, thickly-laminated, sandy clay with leaf impressions | 8 " |

* Published by permission of the Director of the U. S. Geological Survey.

† Berry, Amer. Nat., vol. xli, pp. 679-697, pl. 1, 2, 1907.

The following species were identified from this outcrop: *Arundinaria macrosperma*, *Betula nigra*, *Quercus nigra*, *Phoradendron flavescens*, *Liriodendron tulipifera*, *Platanus occidentalis* and *Acer saccharinum*.

In the absence of topographic maps it is impossible to identify the various systems of Pleistocene terrace deposits which cross the state approximately parallel with the coast and which extend inland up the present rivers, passing insensibly from marine to estuarine, and finally to fluvial conditions of deposition. The present outcrop is believed to form a part of the Northport terrace, which at Tuscaloosa is about 70 feet above low-water mark in the Warrior River and about 140 feet above sea level.

Locality No. 2.—This outcrop is on the right bank of the Warrior River about 342 miles above Mobile, and shows the following section:

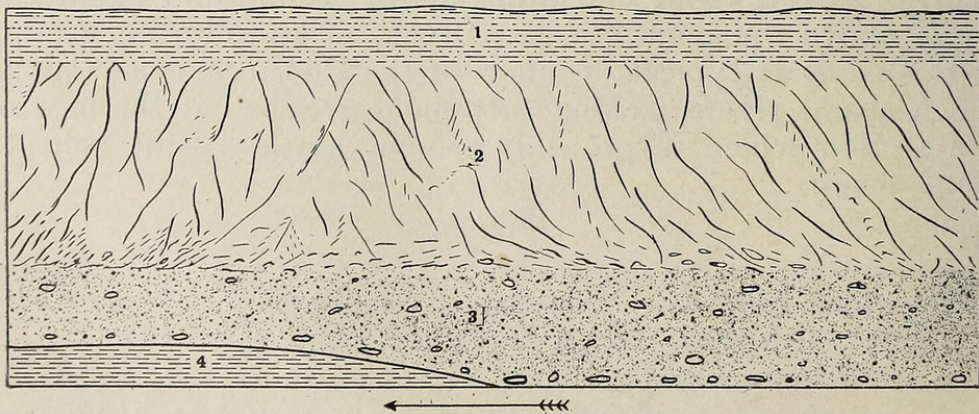
Section.

- | | |
|--|---------|
| 1. Yellow, massive, compact sandy clay, bedded and ferruginous below | 20 feet |
| 2. Light drab, yellowish and brownish sandy clay with pockets, thin seams and laminae of fine micaceous sand and numerous thin iron crusts, becoming more sandy toward the base where a few pebbles of quartz and coal are found | 7 " |
| 3. Dark drab clay interbedded with yellowish sand and carrying much comminuted vegetable matter and leaf impressions toward the base | 3 " |
| 4. Concealed | 8 " |

The following species were identified from this outcrop: *Pinus echinata*, *Taxodium distichum*, and *Quercus phellos*.

Locality No. 3.—This outcrop is on the right bank of the Warrior River near Fosters Landing, about 328½ miles above Mobile. The following diagrammatical section (fig. 1) well illustrates the character of the materials at this point:

FIG. 1.



Diagrammatical Section of the Pleistocene at Locality No. 3.

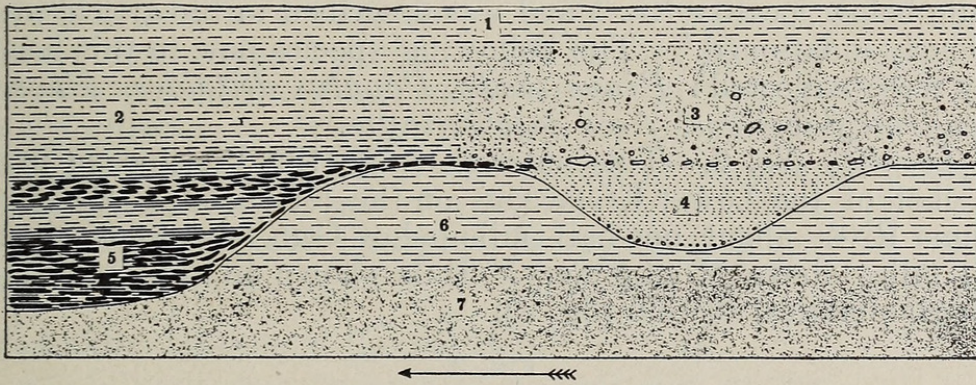
Section.

- | | | |
|--|-------|--------|
| 1. Sandy clay | about | 5 feet |
| 2. Similar materials concealed by landslips | " | 15 " |
| 3. Sand with much gravel containing some pebbles of coal and rather angular bowlders of Paleozoic rocks up to 2 feet in diameter | | 7-10 " |
| 4. Massive, dark gray, finely micaceous, plastic clay with leaf impressions and overlain by a thin iron crust | | 0-3 " |

The following species were identified from this outcrop: *Betula nigra*, *Populus deltoides*, *Liriodendron tulipifera*, *Platanus occidentalis*, and *Acer rubrum*.

Locality No. 4.—This outcrop is on the right bank of the Warrior River at Steeles Bluff, 311½ miles above Mobile, and is well illustrated by the following diagrammatical section (fig. 2).

FIG. 2.



Diagrammatical Section of the Cretaceous and Pleistocene at Locality No. 4.

Section.

Pleistocene.

- | | | |
|---|-------|---------|
| 1. Sandy clay | about | 5 feet |
| 2. Light colored massive clay and sand with lignitic layers in both the clay and the sand, grading laterally, i. e. up the river, into the next (No. 3) | " | 12 " |
| 3. Coarse yellowish sand with gravel and pebbles toward the base, lignitic at the base toward the lower end | | |
| 4. Yellowish micaceous stratified sand with scattered small pebbles | " | 10 " |
| 5. Sandy argillaceous peat with fruits, seeds, and leaf impressions | | 10-12 " |

Upper Cretaceous (Tuscaloosa formation).

- | | | |
|---|--|--------|
| 6. Blotched purplish, massive, somewhat sandy clay with iron crusts, much eroded | | 0-12 " |
| 7. Light gray, finely arkosic, slightly micaceous sand, argillaceous and compact in places | | 4-8 " |

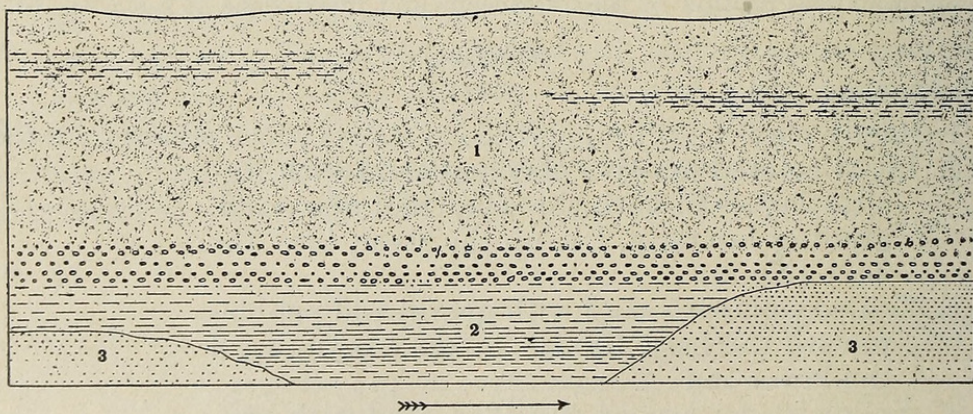
The following species were identified from this outcrop: *Osmunda spectabilis*, *Pinus taeda*, *Arundinaria macrosperma*, *Betula nigra*, *Fagus americana*, *Quercus nigra*, *Quercus prinus*, *Quercus phellos*, *Carpinus caroliniana*, *Ostrya virginiana*, *Ulmus alata*, *Hicoria villosa*, *Juglans nigra*, *Populus deltoides*, *Liquidambar styraciflua*, *Nyssa biflora*, *Vaccinium corymbosum*, *Xolisma ligustrina*.

Locality No. 5.—This locality is on the left bank of the Chattahoochee River and therefore in the state of Georgia. It is about one mile above the Abercrombe Landing exposure and is represented by three unimportant species found in pieces of Pleistocene clay along the river cove and not in place. The species are *Arundinaria macrosperma*, *Betula nigra*, and *Carpinus caroliniana*, all of which occur in the Alabama Pleistocene.

Locality No. 6.—This outcrop is on the right bank of the Chattahoochee River near Abercrombe Landing, about one mile below locality No. 5 and was described in the article previously mentioned.* The following species new to this locality were collected: *Pinus taeda*, *Populus deltoides*, *Phoradendron flavescens*, *Acer sacchaninum*.

Locality No. 7.—This outcrop shows the Pleistocene in a pocket of the Lower Cretaceous on the left bank of the Alabama River about one-half mile below Gun Island and about 12 miles above Montgomery. It is shown in the following diagrammatical section (fig. 3):

FIG. 3.



Diagrammatical Section of the Cretaceous and Pleistocene at Locality No. 7.

Section.

Pleistocene.

- | | | |
|--|-------|---------|
| 1. Light yellowish, somewhat argillaceous sand, with gravel base | about | 20 feet |
| 2. Buff sandy clay with leaf impressions | " | 6 " |

* Berry, loc. cit., 1907.

Lower Cretaceous (Cape Fear Formation).

3. Compact, somewhat arkosic and micaceous sand,
much eroded 0-5 feet

The following species were identified from this outcrop: *Fagus americana*, *Quercus nigra*, *Platanus occidentalis*, and *Vaccinium arboreum*.

There follows a briefly annotated enumeration of the species collected in systematic order, with citations of the fossil records of the various forms.

OSMUNDA SPECTABILIS WILLD.

The royal fern frequents swamps and openings and borders of wet woods. It ranges from Canada to Mexico and probably into South America, but is often confused with the old world *Osmunda regalis* Linné. In the existing Alabama flora it is common throughout the State. None of the existing species of *Osmunda*, which are six or eight in number, have heretofore been found fossil, although Hollick records* masses of rootlets attached to rhizomes in the swamp deposits of the Talbot formation in Maryland, which are almost certainly referable to *Osmunda*. The present record is based upon a single specimen showing a part of a pinnule and exhibiting the characteristic venation and marginal characters of this species found at locality No. 4.

TAXODIUM DISTICHUM (Linné) Rich.

Holmes. Journ. Elisha Mitchell Soc. for 1884-85, p. 92, 1885.

Berry, Torreya, vol. vi, p. 89, 1906. Jour. Geol., vol. xv, p. 339, 1907.

Hollick, Md. Geol. Surv., Pli. and Pleist., pp. 218, 237, pl. 68, 1906.

The cypress was probably one of the commonest forest trees of the Pleistocene from New Jersey southward, at least it is the one most frequently met with, having been recorded from New Jersey, Delaware, Maryland, Virginia, and North Carolina. The more northerly occurrences probably represent inter and post glacial warm periods. The recent collections show no trace of this species except at locality No. 2, where impressions of the detached leaves of this species are common in the clays

PINUS TAEDA Linné.

In the existing flora the Loblolly pine extends from Delaware and Maryland to Florida and Texas. In the northern part of its range it is confined to the coastal plain but farther south it spreads over the Piedmont Plateau and into the mountain region. In the Pleistocene it apparently extended farther north than at the present time since seeds which are

* Hollick, Md. Geol. Surv., Pli. and Pleist., p. 214, pl. 67, fig. 3, 1906.

believed to belong to this species have been collected by the writer from the Pleistocene of New Jersey.

The present record is based on cones and cone-scales from locality No. 4 and seeds from locality No. 6. The cones are frequent at the former locality but much water worn; some of the scales, however, preserve the characteristic markings of the species.

PINUS ECHINATA Mill.

Hollick, Md. Geol. Surv., Pli. and Pleist., p. 217, pl. 67, fig. 1, 1906.

This is a species found on sandy soils from New York to northern Florida and west to northeastern Texas, reaching its greatest development in the Mississippi Valley. Cones have been recorded in the Pleistocene as common in the Talbot formation of Maryland and the present record is based upon seeds which are common in the clay at locality No. 2.

ARUNDINARIA MACROSPERMA Michx.

In the recent flora this species forms those remarkable plant associations known as "canabrakes" in the bottom lands along the larger streams from southern Virginia to Florida and Louisiana and extending up the Mississippi Valley to Missouri and Kentucky. It has not previously been recorded in the fossil state but was evidently common in Alabama during Pleistocene time since characteristic fragments of the leaves have been collected from localities No. 1, 4, and 5.

JUGLANS NIGRA Linné.

Berry, *Torreya*, vol. ix, p. 98, fig. 6, 1909.

In the recent flora this species is found in rich soil from Canada to Minnesota and south to Florida and Texas. In Alabama according to Mohr it is found scattered in rich bottom lands from the Tennessee Valley to the Coast Pine belt, spreading southward along the banks of the larger rivers. As a fossil it was recently recorded by the writer from the Talbot formation in Maryland, the remains consisting of the characteristic nuts. The Alabama occurrence is based upon a single nut from locality No. 4.

HICORIA VILLOSA (Sargent) Ashe.

This species, differentiated from the common *Hicoria glabra* by Sargent, is an inhabitant of the Carolinian zone ranging from Delaware to Georgia and Alabama. In the latter state it is said to be one of the commonest hickories in the upland and mountainous parts of the state, extending southward to the Coast Pine belt. It has not been previously found fossil, the present record being based upon several husks and three

nuts from locality No. 4. The latter are identical with the more globular nuts of the recent tree resembling somewhat in appearance the nuts of *Hicoria minima* but with much thicker shells.

POPULUS DELTOIDES Marsh.

In the existing flora this species ranges from Canada and New England westward to Colorado and southward to Florida and Texas. In Alabama and throughout the Coastal Plain it is most frequent in the bottoms and alluvial river swamps.

The genus extends back to the late Lower Cretaceous and a large number of extinct species have been described. The present species has not heretofore been found fossil, but both *Populus balsamifera* Linné and *grandidentata* Michx. are present in the Canadian inter-glacial deposits and Hollick has recorded three species from the Pleistocene of Maryland. From the European Pleistocene the following still existing species are known: *Populus alba* Linné, *canescens* Sm., *nigra* Linné, and *tremula* Linné.

The present record is based on the characteristic leaves which are abundant at locality No. 3 and less common at localities No. 4 and No. 6.

BETULA NIGRA Linné.

Knowlton, Amer. Geol., vol. xviii, p. 371, 1896.

Berry, Journ. Geol., vol. xv, p. 341, 1907. Amer. Nat., vol. xli, p. 692, pl. 2, figs. 2-4, 1907. Ibid., vol. xliii, p. 435, 1909.

This species is common along streams and in bottoms with an existing range from Canada to Florida and Texas, and is common throughout Alabama. It was a common species in the Pleistocene, at least it was frequently preserved, and has been recorded by the writer from several localities in North Carolina and Virginia as well as from near Abercrombe Landing on the Chattahoochee River in Alabama. Knowlton has described it from the Pleistocene river terraces near Morgantown, West Virginia.

The present record is based on leaves from localities No. 1, 3, 4, and 5, they being especially abundant in the peat at locality No. 4.

FAGUS AMERICANA Sweet.

Hollick, Md. Geol. Surv., Pli. and Pleist., p. 226, 1906.

Berry, Torrey, vol. vi, p. 88, 1906. Journ. Geol., vol. xv, p. 341, 1907. Amer. Nat., vol. xli, p. 692, pl. 2, fig. 7, 1907. Ibid., vol. xliii, p. 435, 1909.

Fagus ferruginea Michx., Lesq., this Journal, vol. xxvii, p. 363, 1859. Geol. Tenn., p. 427, pl. 7 (K), fig. 11, 1869.

Fagus ferruginea Ait., Knowlton, Amer. Geol., vol. xviii, p. 371, 1896. Mercer, Journ. Phila. Acad. (11), vol. ii, pp. 277, 281, fig. 8 (15), 1899.

This common mesophile forest tree of the Alleghenian, Carolinian, and Louisianian zones which is common throughout Alabama is of frequent occurrence in the Pleistocene from Maryland southward and it has been recorded from a large number of localities, the buried swamp deposits usually furnishing remains of nuts or burrs, while the leaves are generally confined to the clays.

This species was recorded from near Abercrombe Landing in 1907 and additional occurrences are locality No. 4 (leaves, nuts, and burrs) and locality No. 7 (leaves).

QUERCUS PHELLOS Linné.

Berry, Journ. Geol., vol. xv, p. 342, 1907. Amer. Nat., vol. xli, p. 694, pl. 1, fig. 1, 1907.

This common mesophile tree of the Carolinian and Louisianian zones ranges from New York to Florida and Texas. It is common in northern Alabama, but becomes rare south of the central part of the state. It is a common fossil in the North Carolina Pleistocene and at Abercrombe Landing on the Chattahoochee River in Alabama.

The present occurrences are at locality No. 2 (leaves) and locality No. 4 (leaves, cupules and acorns).

QUERCUS NIGRA Linné.

Berry, Journ. Geol., vol. xv, p. 342, 1907. Amer. Nat., vol. xli, p. 693, pl. 1, figs. 3, 4, 1907.

In the existing flora this is a widespread species of the Carolinian and Louisianian zones extending northward to Delaware, Tennessee, and Missouri and common all over Alabama in low rich woods and swamps. As a fossil it has been recorded from the Pleistocene of North Carolina and eastern Alabama.

The present records are locality No. 1 (leaves), locality No. 4 (leaves and acorns, common) and locality No. 7 (leaves). One specimen from locality No. 4, while too imperfect for certainty, suggests its reference to *Quercus virginiana* Mill., a species previously recorded by the writer from Abercrombe Landing on the Chattahoochee River in Alabama.

QUERCUS PRINUS Linné.

Berry, Journ. Geol., vol. xv, p. 342, 1907. Amer. Nat., vol. xli, p. 693, pl. 1, fig. 2, 1907.

This is an upland tree of the Alleghanian and Carolinian zones, of rare occurrence in the southern Coastal Plain,* and

*This species has not been found in the Coastal Plain of Alabama, although Hilgard reported it years ago from Tippah County, Mississippi. In Georgia, according to R. M. Harper, it does not even approach the Fall-line, while in North Carolina it is confined to the Piedmont and mountains, according to Pichot and Ashe. Farther northward, however, it is found in the Coastal Plain from Long Island to Virginia, occurring in this province of New Jersey outside of the pine barrens and common on the upper eastern shore of Maryland and in Delaware.

since it is easy to confuse the leaves of this species with those of *Quercus michauxii*, a common tree of Coastal Plain bottoms, doubt has been expressed regarding the identifications cited above. However, it is believed that the fruit of *Quercus prinus* is sufficiently distinct for certainty, and when it is remembered that at some time during the Pleistocene practically the whole Coastal Plain was submerged by the sea and that there was a massing of species in the emerged portion of the southern Piedmont area, which served as a center of radiation for inter- and post-glacial dispersion,* the propriety of finding the species in the Pleistocene sediments is unquestionable.

The present record is based upon an acorn and leaf fragment from locality No. 4.

CARPINUS CAROLINIANA Walt.

Berry, Journ. Geol., vol. xv, p. 340, 1907. Amer. Nat., vol. xli, p. 692, pl. 1, figs. 8, 9, 1907.

This is a wide ranging species of low rich woods occurring from Canada to Florida and Texas. It is common in suitable situations over the greater part of Alabama and appears to have been frequent in the later Pleistocene of America, previous Pleistocene occurrences being along the Neuse River in the North Carolina Coastal Plain and from near Abercrombe Landing on the Chattahoochee River in Alabama.

The new records are localities No. 4 and No. 5, this species being especially common at the former of these.

OSTRYA VIRGINIANA (Mill.) Willd.

Hollick, Bull. Torrey Club, vol. xix, p. 332, 1892.

Penhallow, Amer. Nat., vol. xli, p. 447, 1907.

In the recent flora this species ranges from Canada to Florida and Texas, ordinarily in dry soil and on hillsides. It is said by Mohr to occur principally on calcareous soils in Alabama, where it ranges from the Tennessee Valley to the upper division of the coast pine belt, its southern limit corresponding roughly to the northern limit of the Cuban pine. In the fossil state it is recorded by Hollick from the late Miocene or Pliocene of Bridgeton, New Jersey, and by Penhallow from the interglacial deposits of the Don valley in Canada. Material indistinguishable from the modern species has been described by Nathorst from the post-Miocene of Japan under the varietal name *fossilis*. Finally the material from Wytheville, Virginia, said to be of Pleistocene age, which was identified by Lesquereux† as *Ostrya Walkeri* Heer, an early

* See the various papers by C. C. Adams on this subject.

† Lesq., Proc. U. S. Natl. Mus., vol. x, p. 38, 1887.

Tertiary arctic species, is probably identical or closely allied with the present species.

The present occurrence consists of leaves which are infrequent at locality No. 4.

ULMUS ALATA Michx.

Lesq., this Journal, vol. xxvii, p. 365, 1859.

Berry, Journ. Geol., vol. xv, p. 343, 1907. Amer. Nat., vol. xli, p. 694, pl. 1, figs. 6, 7, 1907.

This species is a common element in the recent flora of Alabama in low woods particularly along stream banks. It ranges northward to Virginia, Illinois and Kansas and southward to Florida and Texas. As a fossil it was recorded from the Pleistocene near Columbus, Kentucky, by Lesquereux, and from the Neuse River in North Carolina and Abercrombe Landing on the Chattahoochee River in Alabama by the writer (loc. cit.). Two species of *Ulmus* occur in the Pleistocene of Maryland, *Ulmus racemosa* is recorded from the Pleistocene near Morgantown, West Virginia, and both the latter and *Ulmus americana* occur in the interglacial beds of the Don valley in Canada.

The present record is based upon infrequent leaves from locality No. 4.

PHORADENDRON FLAVESCENS (Pursh) Nutt.

A species, in the modern flora, of the Carolinian and Louisianian zones ranging northward as far as New Jersey and common throughout Alabama. It has not previously been recorded as a fossil, although certain European Upper Pliocene remains have been described as *Viscophyllum*. However, it is not at all certain that these are not related to the genus *Pistia* rather than to *Viscum*.

The present record is based on the characteristic leaves of the modern species found at localities No. 1 (common) and No. 6 (1 specimen).

LIRIODENDRON TULIPIFERA Linné.

Berry, Amer. Nat., vol. xli, p. 695, 1907. Torrey, vol. ix, p. 71, fig. 1, 1909.

This common mesophile forest type of the Alleghanian, Carolinian, and Louisianian zones finds its present southern limit in Alabama at about latitude 31°. Previous fossil records are based on fruits from Abercrombe Landing on the Chattahoochee River in Alabama and upon abundant leaves from the Wicomico formation near Weldon, North Carolina.

The present record is based upon leaf fragments from locality No. 1 and upon a leaf and a carpel from locality No. 3.

PLATANUS OCCIDENTALIS Linné.

- Knowlton, Amer. Geol., vol. xviii, p. 371, 1896.
Penhallow, Trans. Roy., Soc. Can. (II), vol. ii, sec. 4, pp. 68, 72, 1897.
Amer. Nat., vol. xli, p. 448, 1907.
Mercer, Journ. Phila. Acad. (II), vol. ii, p. 277, 1899.
Berry, Journ. Geol., vol. xv, p. 344, 1907. Amer. Nat., vol. xli, p. 695,
pl. 2, fig. 5, 1907.
Platanus aceroides Göpp., Hollick, Md. Geol. Surv., Pli. and Pleist., p.
231, pls. 73, 74, 1906.

This modern inhabitant of low woods and banks from Canada to Florida and Texas is frequent in the bottom lands of central Alabama but not common elsewhere in the state. As a fossil it is of frequent occurrence in Pleistocene deposits from those of the Don Valley in Canada to Alabama.

The present record is based upon characteristic leaves which occur in considerable abundance at localities No. 1, No. 3, and No. 7.

LIQUIDAMBAR STYRACIFLUA Linné.

- Hollick, Bull. Torrey Club, vol. xix, p. 331, 1892.
Knowlton, Amer. Geol., vol. xviii, p. 371, 1896.
Berry, Journ. Geol., vol. xv, p. 343, 1907.

This species ranges from New England to Florida and westward to Texas and Mexico in the recent flora and is found throughout Alabama, more especially in the rich bottoms and swamp borders of the Coastal Plain. It has previously been recorded from the Pleistocene of North Carolina and West Virginia. The present record is based upon leaf fragments and upon two somewhat macerated and flattened but characteristic fruits from locality No. 4.

ACER RUBRUM Linné.

A species of swamps and low ground ranging from Canada to Florida and Texas in the existing flora and common throughout Alabama, not previously known as a fossil. The present record is based upon leaf fragments from locality No. 3.

ACER SACCHARINUM Linné.

This species in the existing flora ranges from Canada to Florida and westward to the Great Plains. It extends from northern Alabama southward along the larger streams. It has not been previously recorded from the Pleistocene, the form described by Penhallow under this name from the Canadian Pleistocene being referable to *Acer saccharum* Marsh.

The present record is based on characteristic samaras from locality No. 1 and No. 6.



Berry, Edward Wilber. 1910. "Additions to the Pleistocene flora of Alabama." *The American journal of science* 29(173), 387–398.

View This Item Online: <https://www.biodiversitylibrary.org/item/124454>

Permalink: <https://www.biodiversitylibrary.org/partpdf/247304>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: NOT_IN_COPYRIGHT

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.