Respects of the Author

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BARTRAM OAK,

Quercus Heterophylla, Michx.

BY

ISAAC C. MARTINDALE.

CAMDEN, N. J.:
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Prepared for the West New Jersey Surveyors' Association, and read at their annual meeting held at Camden 1st month 6th, 1880.

PROBABLY no other species of Oak has been more considered, and is still so little understood as the "Bartram Oak." A single tree on the bank of the Schuylkill, near Philadelphia, was all that was known for many years; but there are now several to be found, chiefly in the States of New Jersey, Pennsylvania and Delaware. As the descriptions and references in our Botanical works abound in interesting facts concerning this Oak, I have collected all these that have come under my observation, and arranged them somewhat in the order of their publication, that they may form a continuous history.

The first reference is in a letter from Peter Collinson, of London, to John Bartram, dated March 5th, 1750–1. "Pray "what is the reason I have no acorns from that particular "species of Oak that Doctor MITCHELL found in thy "meadow?" "*Memorials of John Bartram and Humphrey "Marshall,*" by William Darlington, page 183; published at Philadelphia, 1849. That they were sent to Collinson there can be little doubt, judging from the personal history of John Bartram, as it has come down to us, that he was conscientious in the ful-

filment of all his engagements; but if they were sent they seem to have failed to produce any succession, as no mention is made of this Oak in "HORTUS COLLINSONIANUS. *An Account of the "Plants cultivated by the late Peter Collinson,"* published by L. W. Dillwyn, in 1843. Although many other plants are enumerated, the seeds from which they grew, or the plants themselves, had been sent by Bartram.

In 1810–13 F. Andre Michaux published, at Paris, "*Histoire des Arbres Forestiers de l'Amerique Septentrionale,*" (A History of the Forest Trees of North America), and therein is found the first published description of this Oak, accompanied by a colored plate of the foliage and acorn, both natural size. An English translation of this splendid work by Augustus L. Hillhouse, of New Haven, was printed at Paris with French types in 1817-19, under the title of "THE NORTH AMERICAN SYLVA;" a second edition was afterwards produced at New Harmony, Indiana; and in 1850 J. Jay Smith, of Philadelphia, issued a third edition, still using the original copper plates for the figures. All that was known of the tree is summed up in these words on page 38 of vol. 1st, of this last edition.

BARTRAM OAK.

"QUERCUS HETEROPHYLLA. *Q. foliis longe petiolatis, ovato-"lanceolatis, integris vel inæqualiter dentatis; glande subglobosa."*

"Every botanist who has visited different regions of the "globe must have remarked certain species of vegetables which "are so little multiplied that they seem likely at no distant "period to disappear from the earth. To this class belongs "the Bartram Oak. Several English and American naturalists "who, like my father and myself, have spent years in exploring "the United States, and who have obligingly communicated to "us the result of their observations, have, like us, found no "traces of this species except a single stock in a field belong-"ing to Mr. Bartram, on the banks of the Schuylkill, 4 "miles from Philadelphia. This is a flourishing tree, 30 feet "in height and 8 inches in diameter, and seems formed to

"attain a much greater development. Its leaves are of an "elongated oval form, coarsely and irregularly toothed, smooth "above, and beneath of a dark green. The acorns are round, "of a middle size, and contained in shallow cups lightly "covered with scales."

"I was at first disposed to consider this tree as a variety of the "Laurel Oak, to which it bears the greatest affinity; but the "leaves of that species are never indented, and not a stock of "it exists within a hundred miles of Philadelphia."

"Several young plants, which I received from Mr. Bartram "himself, have been placed in our public gardens to insure the "preservation of the species."

F. A. Michaux as appears by his travels in America published in London after his return to France in 1803, visited the residence of William Hamilton (now Woodland Cemetery) near Philadelphia; and he therein speaks of seeing William Bartram. As he arrived in Philadelphia, from New York, about the 10th of June, 1802, and left Philadelphia, for Pittsburg on the 27th of the same month, we are thus able to fix near the time at which the tree was observed by its Botanical author.

In "*Flora Americæ Septentrionalis*," by Frederick Pursh, vol. 2d, page 627, published at London, 1814, the author says: "Q. "foliis longe petiolatis ovato-lanceolatis oblongisve integris "vel inæqualiter grandidentatis, cupula hemisphærica, glande "subglobosa. *Mich. Arb.* 2, *p.* 87. Icon. *Mich. l. c. t.* 16. "On the banks of the Delaware, Pennsylvania, May. *v. v.* "Of this singular species there is but one individual known, "which grows on the plantation of the Messrs. Bartrams near "Philadelphia. It probably is only a hybrid plant on that ac- "count, and cannot with propriety be considered a genuine "species: but the younger Michaux having given a good "figure of it, I insert it here on that account only."

Pursh was employed as gardener at the Hamilton Estate (now Woodland Cemetery) for many years, and consequently must have been familiar with the tree.

In the "*Genera of North American Plants*," by Thomas Nuttall, published in Philadelphia, 1818, volume 2d, page 214,

is noted "*heterophylla*, (Bartram's Oak). May not this be an "anomalous variety of *coccinea?*" As Nuttall was a resident of Philadelphia for many years, he too must have known the tree, and thus records his view of it at that time.

In the second edition of Muhlenberg's "*Catalogus Plantarum Americæ Septentrionalis*," published in Philadelphia, 1818, on page 91, is mentioned "Quercus heterophylla, (Burrier's oak); "various-leaved oak. Pens."

How the name "Burrier's oak" came to be applied does not appear, nor have I been able to ascertain.

W. P. C. Barton, in his "*Floræ Philadelphicæ*," published at Philadelphia, 1818, on page 167 of volume 2d, says: "Q. "leaves on long petiolates, ovate-lanceolate or oblong, entire "or unequally toothed with large dentures; cup hemisphærical; "acorn subglobose. *Mich. f. Burrier's Oak, Bartram's Oak,* "*Various-leaved Oak.* The only individual of this species "known; supposed to be a hybrid. On the banks of the Del- "aware at Kingsess."

The first edition of Michaux's "*Flora Boreali Americana*," was published at Paris in 1803, which was apparently before the tree was made known to the author, consequently is not therein mentioned. In 1820 a new edition was published, and although the Oak had been described many years before, had appeared in the works of Pursh, Nuttall and Barton, above referred to, in some unaccountable way it was omitted from this new edition also.

"*The* UNIVERSAL HERBAL, *containing an account of All the known Plants of the World*," by Thomas Green, published at Liverpool, England, in 1820, on page 442, of volume 2d, says: "Quercus Heterophylla. Leaves petiolated at considerable "length, ovate-lanceolate, oblong or entire, or unequally large- "toothed; acorn-cup hemispherical; gland subglobose. "Grows on the banks of the Delaware, Pennsylvania. Pursh "observes, that there is only one individual of this singular "species known, which grows on the plantation of the Messrs. "Bartrams, near Philadelphia. Michaux considers this tree to "be a distinct species; but Pursh is inclined to rank it among "the hybrid plants."

John Torrey published at New York, in 1826, "*A Compend-*
"*ium of the Flora of the Northern and Middle States.*" On page 357 of this work he says: "*Q. heterophylla:* leaves on "long petioles, ovate-lanceolate and oblong, entire, or coarsely "toothed; cup hemispherical; acorn subglobose. HAB. "River banks. A hybrid?"

In the "*Manual of Botany for North America,*" by Amos Eaton, fifth edition, (first edition 1818) published at Albany, 1829, I find, on page 354, "*Q. heterophylla*, Mx. (burrier's oak), "leaves long-petioled, lance-ovate or oblong, entire or un-"equally coarse-toothed: calyx hemispheric, acorn subglobose. "Pursh says there is but one individual of this species known "in the world, which is now growing on the Bartram planta-"tion near Philadelphia."

The same description and remarks occur in the eighth edition of this work, by Eaton and Wright, published at Troy, New York, in 1840.

In Robert Sweet's "*Catalogue of Plants Indigenous or Cultivated in the gardens of Great Britain,*" second edition, published at London in 1830, "Q. heterophylla, Ph." is mentioned on page 466, but the date of its introduction into England is not given.

Lewis C. Beck in "*Botany of the Northern and Middle States,*" published at Albany 1833, on page 328 says: "*Q. heterophylla* "*Mich.*; leaves on long petioles, ovate-lanceolate or oblong, "entire or coarsely toothed; cup hemispherical; acorn subglo-"bose. Hab. Banks of the Delaware, Penn. May. Accor-"ding to Pursh, there is only one individual of this species "known, which grows near Philadelphia. He suggests that it "may be a hybrid. It is figured and described by Michaux in "his Sylva Americana."

In 1842 the first volume of Nuttall's supplement to Michaux's North American Sylva was published in Philadelphia. On page 15 of this volume occurs the following interesting record:

"BARTRAM'S OAK, (*Quercus heterophylla*, MICH., Vol. 1, pl. "16.") It should be plate 18 instead of 16. "This curious "tree, which, in 1837, had attained the height of 50 feet, and a

"circumference of 3 feet 9 inches, was inadvertently cut "down, and with it the species, if such it was, appeared to be "annihilated; but Thomas G. Lea, Esq., of Cincinnati, in- "forms me 'that several years ago he discovered an Oak, "between two and three miles north of that city, the leaves "and fruit of which accord with Michaux's figure. The leaves "are sometimes larger than those represented; but with the 'same outline, irregularly and coarsely-toothed or sub-lobed, "and on longish petioles; the margin is very rarely entire. "The tree is about twenty-five feet high and in a vigorous state "of growth. Some scattering Oaks of other species are in its "immediate neighborhood. I think it is not a variety of *Q.* "*imbricaria*, many trees of which I have examined, but never "found them with leaves the least indented. The *Q. Phellos*' "[to which it might be allied] 'does not grow in the vicinity of "Cincinnati, nor, that I know of, in any part of Ohio. This "tree, therefore, cannot be a variety of that species.' Its near- "est affinity appears to me to be the *Quercus ambigua*, of "Michaux, Jr., from which it is principally distinguished by "the narrower and more simple divisions of its leaves."

On page 13* of the same work in regard to Q. Leana, the author further says: "Other specimens accompanied with "the ripe glands, have now convinced me that it is either a "distinct species or another strange hybrid; but as I am, by no "means satisfied of the existence of such spontaneous mixed "races among our Oaks, I have taken the liberty of giving it "as a species and dedicating it to its discoverer." Again on page 14* from Lea's notes "I saw two individuals of *Q.* "*phellos* in the Bartram Garden, which Colonel Carr assured "me were propagated from the seed of the original Bartram "Oak. Certainly our plant "(Q. Leana)" is very like Mi- "chaux's figure; but as that appears to be a hybrid of *Q.* "*phellos*, I think they must be considered distinct."

In the Catalogue of "*Indigenous and Exotic Plants cultivated in the Cambridge (England) Botanic Garden*," by P. N. Don, 13th edition, enlarged, published at London in 1845, the name is mentioned, but the date of introduction into England is left blank.

In 1852 Henry R. Noll published, at Lewisburg, Pa., "*The Flora of Pennsylvania;*" in which, on page 323 he says: "Q. "heterophylla, Mich. f., was founded on a single tree raised in "Bartram's Garden near Philadelphia, recently destroyed, "which was doubtless a hybrid. It is figured and described "by Michaux in his Sylva Americana."

In "*The American Handbook of Ornamental Trees,*" by Thomas Meehan, published in Philadelphia in 1853, I find, on page 198:

"Q. HETEROPHYLLA, *Pursh.* Leaves on rather long petioles, "ovate-lanceolate, oblong, entire, frequently with large irreg- "ular teeth.—Bartram oak."

"Partaking of the character of *Q. Phellos* and *Q. imbricaria*, "and supposed by many to be a hybrid between them. I can- "not subscribe to this opinion; firstly, because I cannot learn "that flowering plants of *Q. imbricaria* ever existed in Bartram, "and secondly, because seedlings of the phellos show no ten- "dency to vary, and seedlings of *Q. heterophylla* have more or "less the characters of the original. The tree from which "Pursh drew up his description, was privately destroyed by "some of Mr. Hamilton's gardeners (as I have been informed "by Colonel Carr) because it interfered with a view of the "Schuylkill from the Woodlands. A seedling from this tree at "Bartram is seventy feet high and six feet in circumference. "The leaves of this are considerably narrower than those of "another tree at Marshall's garden; making it appear, without "examination, like a willow oak. Marshall's specimen, on the "other hand, has its leaves much resembling those of a *Q. im-* "*bricaria, Michaux,* which is growing beside it with a trunk "seven feet three inches in circumference, and probably ninety "feet high. The leaves of this latter are broader and shorter "than either the Bartram or the willow oak."

On page 1894 of volume 3rd of "*Arboretum et Fruticetum Britannicum,*" by J. C. Loudon, second edition, published at London in 1854, that author says "Q. HETEROPHYLLA, *Michx.* "The various-leaved *or Bartram's* Oak. Leaves on long foot- "stalks, ovate-lanceolate or oblong, entire or unequally-toothed. "Cup hemispherical. Nut roundish. And tree 30 feet high. "It is a remarkable fact, that, notwithstanding the apparent dis-

"tinctness of this oak, only one specimen of it has been found "in a wild state, and that was discovered by Michaux, in a "field belonging to Mr. Bartram, on the banks of the Schuyl- "kill, 4 miles from Philadelphia. This was a flourishing tree "30 ft. high, with a trunk 12 inches in diameter. The "leaves are of an elongated oval form, coarsely and irregularly- "toothed, smooth above, and of a dark green beneath. The "acorns are round, of a middle size, and contained in shallow "cups, lightly covered with scales. It is said to have been in- "troduced, but we do not know where it is to be obtained."

On page 68 of a "*Catalogue of the Plants of Newcastle Co., Delaware*," published by Edward Tatnall in 1860, I find "Q. "heterophylla, *Mich.* (Bartram Oak.) Low woods; Townsend "Station. Rare. Detected by Thos. Meehan, June 18, 1860."

This is the first record I have seen of the finding of this oak out of Pennsylvania.

"*Note on the Bartram Oak* (*Quercus heterophylla*) by S. B. BUCKLEY," is the title of a paper published in the Proceedings of the Academy of Natural Sciences of Philadelphia, for 1861, on page 361. The author says "The Bartram Oak (Quercus het- "erophylla *Mx.*) has long been regarded by most American "Botanists as a hybrid. Accompanied by Dr. Procter, Editor "of the Journal of Pharmacy, I lately went to Mount Holly, near "Burlington, in New Jersey, to see an Oak with leaves of "varied forms, many of which correspond in shape with the "figure of the Bartram Oak in Michaux's Sylva. It is less "than one-fourth of a mile from the depot at Mount Holly, in "a thicket near several willow oaks (Quercus phellos), of "which it is plainly one. It has all the characteristics of body, "limbs and acorns, peculiar to the willow oak. Many of its "leaves also have the ordinary form of Quercus phellos. "Michaux, in his description of the Q. heterophylla, says "that several young plants of the Bartram Oak have been "placed in the public gardens to insure the preservation of the "species. One of these, which was grown from an acorn of "the original Bartram Oak, was planted in the Bartram Gar- "den. Col. Carr, who succeeded Bartram in the ownership "and possession of the garden, showed this tree to Mr.

"Meehan, of Germantown, who had charge of the garden dur-
"ing two years. With Mr. Meehan, a few days since, I visited
"this tree. It also is a Quercus phellos. It has very few
"lobed leaves, indeed there is scarcely one in fifty of them
"lobed."

"In Mr. Durand's herbarium are specimens of Quercus
"phellos with lobed leaves like the Bartram Oak, which he
"received from Columbia county in this State, where such
"forms of the willow oak are said to be quite common along
"the banks of the Susquehanna. The Bartram Oak is not a
"hybrid, but a mere form of Quercus phellos, which like
"most American oaks, varies greatly in the shape of its leaves."

"Since writing the above I have seen a specimen from the
"original Bartram Oak, which has both lobed and entire leaves,
"showing beyond question that it is a form of Q. phellos.
"This specimen is now in the general herbarium of the
"Academy of Natural Sciences at Philadelphia."

In 1862 the same Author published "NOTE No. 2," see Proceedings of Academy of Natural Sciences, page 100: "Since
"the first note was written, I have seen a young tree on the
"grounds of Joshua Hoopes at West Chester, near Philadelphia,
"which grew from an acorn obtained from a tree now living at
"Marshallton a few miles from West Chester. The Marshall
"tree is a seedling from the original Bartram Oak. The
"Bartrams wishing to continue the species, which was founded
"on a single tree, caused acorns from it to be planted in dif-
"ferent places, from which two living trees are now known;
"one at the Bartram garden, mentioned in a former paper, and
"the other in the old Marshall garden. The Hoopes Tree is
"about 15 feet high and 2—3 inches in diameter, and its leaves
"have a striking resemblance to Michaux's figure of the
"Bartram Oak. This may be caused in part from a tendency
"in many young oak trees to have lobed leaves, often quite
"different from those of mature trees of the same species. This
"is well known to many observers. Mr. T. Meehan, of Ger-
"mantown, has specimens similar to Q. heterophylla, from
"Townsend, in New Castle County, Delaware, collected from
"the young shoots growing around a stump, surrounded by

"living willow oaks, of which it had every appearance of having "been one."

"The following is an extract from a letter lately received "from Mr. Hoopes: "There is a Bartram Oak in the garden "at Marshallton, with foliage corresponding to the figure in Mi- "chaux, yielding acorns, which produce trees having foliage "true to the original."

"Dr. Darlington lately told me what amounts to the same as "that just quoted from Mr. Hoopes. Should these trees main- "tain their present distinctive characters, and continue to pro- "duce trees of the same sort, it will be an example of the "formation of a new species from a form of an old one; nor is "it by any means improbable that the Bartram Oak may "become distinct from its parent, the willow oak."

"It is believed by some botanists that new species have been "formed, and are now being made from varieties of old species; "but human life is so short that we cannot perceive the long "gradual changes necessary for this creative process. These "Bartram Oaks should be carefully preserved and propagated, "that future generations may see whether a good species of "Quercus heterophylla has been thus created."

"It is singular that acorns from the Original Bartram Oak "should yield trees of such different foliage as the one at the "old Bartram garden, and that at Marshallton. The oak in the "Bartram place shows a tendency to breed back to the original "stock of the willow oak, while the one at Marshallton seems "to keep most of the characters of its immediate parent, the "Bartram Oak. In confirmation of this I have just received the "following note from Mr. Meehan in reference to some Bartram "Oaks now being raised by Mr. Buist."

"Mr. Buist says his seedlings from the Bartram Oak all "approach the willow oak, but none quite like, all having "a few lobed leaves. His seed was gathered by himself from "the tree in the Bartram garden which I pointed out to you.

T. MEEHAN."

"These seedlings, as they acquire age, will probably be "much more like the willow oak than at present, young trees "often having foliage different from mature trees, as before "stated."

In the "*Manual of the Botany of Northern United States*," by Asa Gray, 4th revised edition published in 1863, I note from page 406. "Q. HETEROPHYLLA Michx.(BARTRAM OAK) re-discov- "ered in Delaware, &c.,—apparently a hybrid between Q. "Phellos and Q. tinctoria?"

In Wood's "*Class Book of Botany*," edition of 1863, page 645, the Author says "Q. HETEROPHYLLA, MX. BARTRAM'S OAK. "*Lvs.* on long petioles, coriaceous, oblong or oblong-ovate, "round or subcordate at base, *margin with a few shallow tooth-* "*like lobes, or often only wavy*, lobes setaceous-acuminate; "acorn subglobous, in a hemispherical cup; scales of the cup "oblong-ovate, obtuse.—Ohio to Ill., rare. Lvs. exceedingly "variable, 4 to 6 inches by 1½ to 2 inches, smooth and shining "above, tomentous along the veins beneath, generally broad and "abrupt at base. Fruit 9 lines in diameter (Q. Leana Nutt.? "Clark). Our specimens well agree to Michaux's figure and "character."

In a little pamphlet entitled "*An Account of the Bartram Garden, published in* "THE HORTICULTURIST" in 1850, Revised and corrected by the Author, and now printed for the Central Fair in aid of the U. S. Sanitary Commission. Sold at the Fete Champetre, held at Bartram for the same object May 18th, 1864;" the following record appears:

"The *Q. heterophylla*, marked by its lobed leaves, was "named by Michaux "Bartram's Oak," as it was produced "from an acorn of his planting. The original tree grew at a "short distance from the garden, and was cut down many years "ago by mistake; but two trees raised from its acorns are "flourishing near the oak walk, which, though they have lost "the distinctive characteristics of the Bartram Oak, still differ "from *Q. phellos*. It has been supposed, of late years, that the "Bartram oak is only a hybrid, not a distinct species, but trees "with all Michaux's characteristics have been recently detected "in Delaware."

In November, 1864, De Candolle's "PRODROMUS," 16th volume, part 2, was published in Paris, describing therein all the Oaks known at that time. In this work I find this Oak is mentioned as a variety of *Quercus aquatica.*

Reference is made to Q. heterophylla as a distinct species in the new edition of Paxton's "*Botanical Dictionary,*" by Samuel Hereman, published in 1868.

In Gray's "*Manual,*" 5th edition, 2nd issue 1868, on page 453 is noted "Q. HETEROPHYLLA, Michx. (BARTRAM'S OAK), "lately rediscovered in Delaware and New Jersey, by *T.* "*Meehan, C. E. Smith, &c.,*—has laciniate leaves like those of "vigorous young shoots of Q. aquatica, to which De Candolle "refers it as a variety. It is as likely to be a state of Q. phel- "los, with dilated and toothed or cut leaves."

In Mann's "*Catalogue of Plants of the U. S. east of Mississippi,*" 1st edition in 1868 and 2nd edition 1872, it is inserted as a distinct species.

Remarks on the Variations of Plants, referring among others to this particular oak, are recorded on page 125 of the "*Proceedings of the Academy of Natural Sciences of Philadelphia,*" for the year 1872.

In a "*Catalogue of Plants of New Jersey,*" by Oliver R. Willis, published in 1874, this Oak is not mentioned, although it had been detected in the State many years before. In the revised edition of this work on page 56 I find "Q. heterophylla Mx. South Jersey, (*Austin*)." A specimen collected in Cape May County, by C. F. Austin, is now preserved in the herbarium of Charles F. Parker. Camden, New Jersey.

On page 39 of *Field and Forest,* Volume 1st, published at Washingson, D. C., 1875, is an article by Lester F. Ward, on "Oaks of the Potomac side" in which the author says "Two "trees which I have recently discovered in a wood near the "northwestern corner of the District of Columbia, growing in a "wild state, have proved unusually interesting. That these "should be called *Q. Leana* and not *Q. heterophylla,* I main- "tain for the following reasons: Their resemblance to *Q. het-* "*erophylla,* as it exists in the herbarium of the Department of "Agriculture, is not sufficiently close to warrant this name, the

"leaves being broader and less lobed. They *do* agree substan-
"tially with the specimens of *Q. Leana* in that herbarium.
"They also agree remarkably well with the tree which Mr. W.
"R. Smith, Superintendent of the U. S. Botanical Garden, has
"raised in his grounds from an acorn of *Q. imbricaria*
"Finally on considering the locality in which these trees were
"found it seems impossible to believe that *Q. phellos* can have
"entered into that combination. In the entire wood where
"they are situated not an individual of that species exists. It
"is wholly wanting throught the region of Rock Creek on
"which the grove is located. On the contrary the prevailing
"oak there is *Q. imbricaria*, although both varieties of *Q.*
"*coccinea* are also frequent. It cannot therefor be justly
"claimed that this new discovery constitutes a revival of the
"famous Bartram's Oak, since this was decided on the highest
"authority to be either a form of *Q. phellos* or a union of that
"species with *Q. Coccinea* var. *tinctoria*."

On page 415 of the "*Proceedings of the Academy of Natural Sciences of Philadelphia*," for 1875, I find recorded:

"Prof. Leidy exhibited a branch of *Quercus heterophylla*
"which he had obtained from a large tree, growing on the farm
"of Mr. J. I. Bishop, in Burlington County, New Jersey. The
"foliage, he thought, indicated a hybrid between Q. phellos
"and Q. palustris. He recommended the introduction of this
"rare hybrid oak into our city park."

"At the same meeting some remarks on this oak were made by Aubrey H. Smith (See unpublished minutes of the meeting).
"He did not think *Quercus heterophylla* was a hybrid, although
"it had been stated that the early form of *phellos* resembled it."

At the meeting of October 19th, 1875, (minutes not pub-
"lished), Prof. Cope exhibited specimens of *Quercus hetero-*
"*phylla* obtained about 2 miles from Haddonfield, Mr. Burk
"had informed him that he had also found it near Woodbury;
"the suspicion that this tree is related to *Q. phellos* was rather
"confirmed by the specimens exhibited."

At the following meeting on November 2nd, see published "*Proceedings*," page 437, "Mr. THOMAS MEEHAN said, that in
"reference to the minutes of the last meeting just read, he

"might offer a few additional remarks on *Q. heterophylla*, and "its connection with *Q. Phellos*. It was a subject of much in- "terest equally to the mere botanist, the student of the origin "of species, and to those who were investigating the frequency "or otherwise with which hybrids occurred in nature."

"He doubted, he said, whether hybrids often occurred nat- "urally, and yet with the supposed abhorrence of plants to use "their own pollen, and the consequent invitation which they "extended to foreign pollen to fertilize them, it would be re- "markable if some instances of hybridism did not occur, and "perhaps remarkable that it did not occur oftener than it is sup- "posed to do. It was such questions as these which gave the "supposed hybrid origin of this oak its chief interest. In this "connection he referred to the number of the *Revue Scientifique* "then on the table, with an abstract of some remarks of M. "Ch. Naudin before the Academy of Sciences of Paris, in "which he says, that, of a large number of cases of hybrids "that he had experimented with, only two retained their hybrid "forms beyond two generations, and these two, grasses of the "genus *Ægilops*, lost their respective forms, and reverted to "that of the original female parent in four generations."

"Mr. Meehan said that the original tree described by "Michaux grew on the original Bartram estate. That tree had "long since been destroyed; but there were now large trees, 'both at Bartram's and Marshall's, which were said by the 'late Col. Carr, who had married Miss Bartram, and up to "comparatively recent years owned the garden, to be seedlings "from that original tree. If this were correct, it would sustain "Naudin's views, as these trees were so like the willow oak as "to be scarcely distinguishable. They only differ from the "willow oak, in an occasional lobing of the leaf, a matter of "little consequence in determining a species in this genus. It "is more than likely, for reasons he would presently state, that "William Bartram found young plants with lobed leaves grow- "ing, and transplanted them to his garden, believing them to "have been seedlings of the *Q. heterophylla*, and not that they "were from seed actually gathered from the tree."

"In his description Michaux speaks of it as probably having "*Q. imbricaria* for one of its parents, but there is no proof nor "probability that this species ever grew in these parts. It "could not then be considered in this relation. Moreover, "hybrids, which cannot necessarily be abundant in nature, or "there would not be the order we see, seldom come in more "than one place, or if so, be exactly alike, and yet investigation "shows this form to be by no means uncommon. Michaux "rashly undertakes to say that there is not another tree to be "found within a hundred miles of Philadelphia, yet Professor "Buckley found one in a single day's botanizing in New Jersey "near Camden, as recorded in our Proceedings; he had him-"self found it during one day's botanizing in Delaware as re-"corded in Gray's manual, Professor Leidy, Mr. Smith, Mr. "Cope, and Mr. Burk, have found it in New Jersey, and there "were now on the table specimens gathered by the latter gen-"tleman near Woodbury, who had found two trees on this "occasion. There is no doubt that when these casual visitors "meet with trees, there is no great scarcity, and this is not in "accordance with what we have to expect from hybrid trees."

"Now as we see in these specimens of Mr. Burk, as well as "in the original drawing in Michaux, the venation is wholly "distinct from *Quercus Phellos*, and *Q. imbricaria*, and it is "here that we find the best characters for distinguishing the "species of oak. There is a petiole nearly an inch long in "these specimens, and also in Michaux's drawing, and more or "less of a petiole in all the specimens he had seen; and, while "the leaves of the *Q. Phellos* are thin, those of *Q. heterophylla* "are coriaceous. A hybrid unites the characters of two pa-"rents, but there were no two parents here, in the North, "which would unite and form a character like this, and so the "supposed Bartram and Marshall progenies are out of the "question."

"In the monograph on *Cupuliferæ* by Alphonso De Can-"dolle in the "*Prodromus*," this oak is made a form of *Q. aquat-"ica*. This suggestion, misled by the probable historical error "in regard to the living Bartram tree, he had regarded as pre-"posterous, and he believed most North American botanists "had agreed with him."

"The forms of leaf most familiar to Quercologists, in *Quercus* "*aquatica*, were the triangularly wedge shaped, nearly sessile "ones, common in the South on mature trees. But further "north, and in young and vigorous trees south, the leaves were "petiolate, approaching those now exhibited by Mr. Burk. "Besides this there was in Michaux's figure an outline of one "of these forms of leaves, which one could see by comparison "with his figure of *Q. heterophylla* to be the same."

"The habit of growth of the trees of *Q. aquatica* is very "distinct from that of *Q. Phellos*, and Mr. Burk reports these "trees in New Jersey to be so distinct from the *Q. Phellos* "among which they grow, that he can distinguish them a long "distance away. The only remaining difficulties to students "would be that De Candolle classes *Q. aquatica*, variety "*heterophylla* among the "*sempervirentes*," while we know it "is deciduous, and then that it is a too high northern range for "this species. The first difficulty he could dispose of. He had "had in his garden for a number of years a *Quercus aquatica* "from seed gathered near Vicksburg, where it was evergreen. "But with him the same tree was deciduous. In regard to the "range, De Candolle noted on the authority of Michaux that "it grew in Maryland, and Mr. Canby reports it common in "Delaware. This brings the range of the species up to our "doors."

"It is therefore clear that *Quercus heterophylla* is simply an "outpost in the camp of *Quercus aquatica*, barely indeed "ranking as a variety; and the result of our investigation is a "tribute to the remarkable acumen of Alphonso De Candolle, "who, with so little material before him, was able to guide us "who had it all."

Again, on page 465. "Referring to former remarks on this "oak, MR. THOMAS MEEHAN exhibited some leaves almost "entire, and some with lobes like the Bartram oak, which he "had recently gathered from a tree of the water oak in Missis- "sippi. There were on the same tree, but beyond reach, "leaves resembling in outline those of the willow oak. As in- "dicated by Mr. Burk in regard to the *Quercus heterophylla* of "New Jersey, and which the evidence already adduced showed

"were but *Quercus aquatica*, this last species in its home in "Mississippi was readily distinguished by the habit of the tree. "It had a tendency to branch low, forming a somewhat spread- "ing head, just as the white oak does, in which there is little "distinction between the main stem and the leading branches "ultimately, while the *Quercus Phellos* had a more slender "twiggy habit, and the distinction between the main trunk and "the branches were carried forward to old age."

In the "*Botanical Bulletin*," January, 1876, published at Hanover, Indiana, is an article by G. C. Broadhead, Pleasant Hill, Mo., on this Oak; he says:—"Gray remarks that this "oak is apparently a hybrid between *Q. Phellos*, L, and *Q.* "*tinctoria*, Bartram. Some years ago I discovered a tree in "Shelby County, Mo., where it somewhat resembled *Q. palus-* "*tris*, Du Roi. I also discovered a small tree in De Kalb "County, and two years ago another in Sullivan County. "Other oaks growing near by at the latter place were *Q. tinc-* "*toria*, Bart., *Q. imbricaria*, Mx., and *Q. nigra*, L. The "leaves present all forms from an almost entire leaf to a lobed "one, their margin often only sinuate. If, as Gray suggests, "it may be a hybrid, the general resemblance to forms of *Q.* "*imbricaria*, Mx., and *Q. palustris*, L, seemed immediately ap- "parent to me."

In Vasey's "*Catalogue of the Forest Trees of the United States*," published at Washington, D. C., in 1876, this oak is not mentioned; which would seem to be the evidence that the Author did not regard it as a good species.

In the "*Oaks of the United States*," by Dr. George Engelmann, published in the "*Transactions of the Academy of Science of St. Louis*," Missouri; I find: "*Q. heterophylla*, "Michx., must, I believe, be re-adopted as a distinct species, "as it is neither a variety of *aquatica* or *Phellos*, nor a hybrid "of any of these oaks. As I have not yet seen flower or fruit, "my opinion, which stands alone in opposition to the best "recent botanist, must for the present be taken for what it may "be worth."

"I distinguish Michaux's species by its long and distinctly "petioled leaves; which in vernation are revolute, and are

" glabrous from their earliest age. My specimens, natives from " New Jersey, cultivated ones from Bartram's and Marshall's " gardens, and from the European gardens at Verriere, Herrn- " hausen and Prague, the latter fertile, agree in this respect " among themselves and with Michaux's figure in his Sylva. In " all these specimens the leaves are lanceolate, entire, or sinu- " ate-dentate, 3 or mostly 4–6 inches long, 1–2 inches wide, on " a petiole 3–9 lines long. In the allied species, *Phellos*, " *laurifolia*, and *aquatica*, the petioles are usually inconspicu- " ous, or merely 1-2 lines long; only *Q. imbricaria*, which is " also readily distinguished by its pubescence, has plainly " petioled leaves. I suspect that some specimens claimed for " *Phellos* are entire leaved forms of the species in question. " May these suggestions induce the local botanists of the lower " Delaware region, the favorite home of this oak, to work up " the species."

A few pages farther on the same Author says:—" *Q. hetero-* " *phylla*, Michx., has by some been considered a hybrid of " some species with entire, narrow leaves, and a lobed one: De " Candolle takes it for a form of *aquatica*, and Gray partly for "that, partly for a form of *Phellos*. I have above expressed my " opinion that it is a good species, not to be confounded with " the *lobe*-leaved forms of either."

At a later date, October 1877, in the same Journal, this Author gives the result of further investigation of the Oaks of the United States on page 54 he says:—

" *Q. Phellos* + *coccinea*, *Q. heterophylla*, Michx., is dis- " tinguished by the petioled leaves of lanceolate outline, entire, " sinuate, spinulose-dentate, coarsely serrate, or with simple, " sometimes spreading or falcate, lobes; leaves of different form " on the same tree and often on the same branch, the upper- " most leaves usually entire; or some trees more with entire, " others more with dentate or with lobed leaves. Youngest " leaves strongly revolute, pubescent above, white-downy below, " becoming glabrous in summer. Acorns subglobose to oval, " 5–7 lines long, a little less wide, scarcely half immersed in " the shallow hemispherical, somewhat turbinate, canescent " cups; scales lanceolate, obtuse. Fruit of same size and very

"similar to that of *falcata*, but cup usually deeper and with "larger scales."

"The typical specimen described by Michaux, found by him "'in a field belonging to Mr. Bartram near Philadelphia,' has "long since been destroyed, but its offspring was introduced "into Europe, and the trees now seen in Bartram's garden in "West Philadelphia, at Marshall's place in Marshalltown, and "in J. Hoopes' garden in Westchester, as well as those of the "European garden at Verriere, Herrnhausen and Prague, the "latter fertile, are believed to be its seedlings. Only within "the last ten or fifteen years the tree has been re-discovered, "and now numbers of individuals are known in low woods on "both sides of the Delaware below Philadelphia (6 miles east "of Camden, *Smith*, *Leidy*, *Burk*, *Martindale*, and 2 miles west "of Wilmington, *Commons*, *Canby*), often in groups together, "probably the offspring of some few original hybrid trees."

"A. DeCandolle and others viewed this hybrid as a form of "*aquatica*, others as belonging to *Phellos*, while I was long in- "clined to follow Michaux in considering it as a distinct "species. With *aquatica*, which does not grow within a hun "dred miles, it has no relationship; aside from other charac- "ters, the revolute vernation abundantly distinguishes it from "that species; from *Phellos* it differs in the form and size of "the leaves and their thick down in youth (in *Phellos* even the "youngest leaves are almost glabrous), and in the larger acorn "in a deeper cup bearing much larger and longer scales. That "it is a hybrid is most probable on account of its great rarity "and its so very variable foliage. One of its parents is un- "doubtedly *Phellos*; for the other we must look among the "lobe-leaved Black-oaks of its neighborhood, *falcata*, *rubra* or "*coccinea*. While the sometimes falcate lobes of the hybrid "and the similarity of its acorns point to the first, and its fre- "quency in those localities to the second, we find the texture "of the leaf and its reticulation as well as size and form of the "cup and its scales intermediate between *Phellos* and *tinctoria*, "and quite different from the other two species, and thus come "to the conclusion that the former," [Phellos and tinctoria] "must be the parents."

From these voluminous extracts, will be seen how unsettled has been, and still is, the proper status of this oak. Dr. Engelmann in a recent letter to me says: "It is a question whether "that "hybrid" by general distribution will not grow up to the "dignity of a species." This I concur with entirely.

A short time since I learned that a tree of the Bartram Oak was growing abount 12 miles north of Philadelphia and near the Delaware river. I wrote at once to Dr. Charles R. King at Andalusia, Pa., and received from him some fine specimens both of foliage and of fruit, which correspond with the figure as given by Michaux, with some trifling exceptions; he also writes: "The oak tree about which you have written to me stands upon "the farm of Dr. George Fox, south of the State Road running "between Philadelphia and the Neshaminy, and about half-way "between what is known as "Borie's" and my lane some 100 "feet south of the river side of the road. It is a handsome "tree 8 feet in circumference 2 feet above the ground, has no "branches until 10 feet above, and has spread uniformly so as "to cover a circuit of 60 feet in diameter." This location is about 15 miles from that of the original tree on the Bartram estate.

The trees near Mt. Holly I have seen (the re-discovery of which being the occasion of the preparation of this article); they present the same general character; are two in number, and possibly from the same root; the larger one is 5 feet 7 inches, and the smaller 4 feet 3 inches in circumference where they separate 2 feet 6 inches from the ground, and are about 50 feet high; these are doubtless the same trees that were visited by S. B. Buckley in 1861, as before noted. The grove of trees "6 miles from Camden" were upon the farm of Dr. Howell near Park Station on the West Jersey Railroad. Several were growing in a woods within the space of two acres, but were all cut down a year or more ago, and a portion of the land cleared for farming purposes. The tree at Marshalltown is said to be a seedling from the original Bartram Tree. It was visited a short time since by Prof. C. S. Sargent, of the Arnold Arboretum, near Boston, and William M. Canby, of Wilmington, Delaware, who measured it with this result: at 3 feet 6 inches from the

ground it has a circumference of 7 feet and one-quarter of an inch, it is a very tall, spreading tree and probably 80 feet high. The Joshua Hoopes' tree, at West Chester, as I am informed by Josiah Hoopes, is now 3 feet 4 inches in circumference 12 inches from the ground, and probably about 35 feet high; this is a seedling from the tree at Marshalltown, and corresponds with it in all paaticulars; and the Marshalltown tree is the same as figured by Michaux. The tree at Bartram's Garden is, I believe, clearly a willow oak (Quercus Phellos), and, as stated by Meehan in the quotation made, very doubtful, indeed, if it be from an acorn gathered from the original tree. I have repeatedly examined it, and never yet have found a leaf upon it resembling the specimens of *Q. heterophylla* growing elsewhere: the whole habit of the tree is that of the willow oak. The specimens from near Wilmington, collected by A. Commons, are of the usual form; those from Cape May County, New Jersey, in the herbarium of Charles F. Parker, are the same. William M. Canby tells me he has specimens, collected by the late Dr. Curtis in North Carolina. I have fragments collected in Texas, by E. Hall, in 1872, which, though they are in every way smaller, I cannot distinguish from *heterophylla.* I have not seen specimens from the trees in Missouri, which are probably Q. Leana, whilst those from Cincinnati (Q. Leana, Nutt.,) are much broader, and undoubtedly are distinct from our eastern form. *Q. Leana* is also widely distributed, according to Dr. Englemann, who says: "I know of at least five localities as far apart "as Missouri and Ohio, and how many hundreds may hide in "the woods of those 4 to 6 western States."

Thomas Meehan informs me that "Dr. J. K. Eshleman, of "Downingtown, Chester Co., reports the existence of a tree "about three miles from that town which is now between two "and three feet in circumference, and to which he had taken "Dr. Darlington and Joshua Hoopes when living."

The grove of trees "6 miles from Camden" were all young trees and four of them about the same size, probably 10 inches in diameter at the base; the rest smaller. The specimen near Mt. Holly has growing, about two feet from its base, a seedling near two feet in height. The leaves on these young plants are not essentially different from those on older trees.

In conclusion I hope that the name given by Michaux, **QUERCUS HETEROPHYLLA, BARTRAM OAK,** will continue to be maintained and its specific rank re-established, as the foregoing recital of facts, I believe, fully warrant.