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SKETCH

OF THE

BOTANICAL WORK

OF THE

Rev. Moses A. Curtis,

A. M., D. D., F. A. A. S.

BY

THOMAS F. WOOD.







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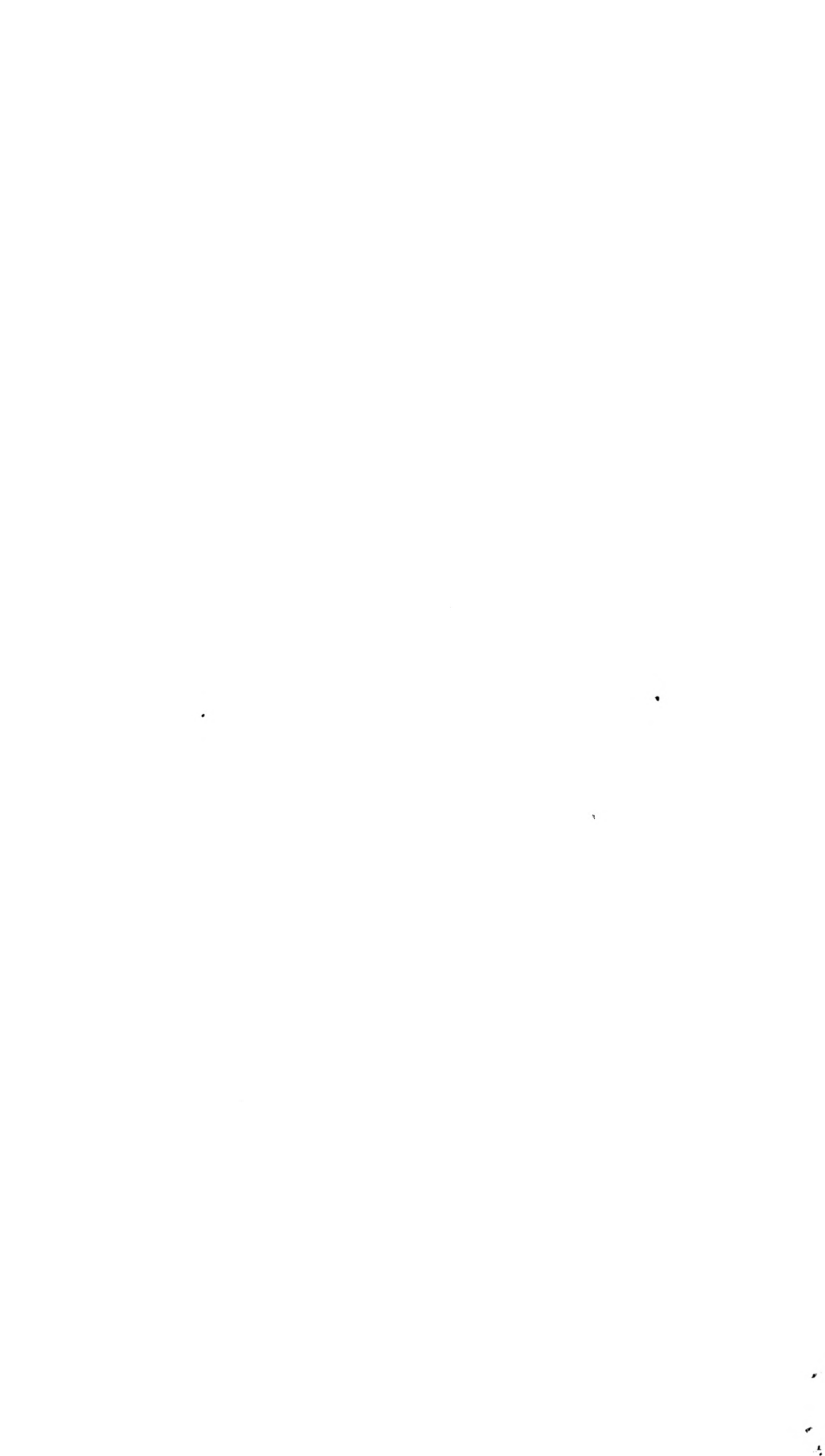
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A SKETCH

OF THE

BOTANICAL WORK OF THE REV. MOSES ASHLEY
CURTIS, D. D.

READ BEFORE THE MITCHELL SOCIETY AT THE UNIVERSITY OF NORTH
CAROLINA, MAY 22D, 1885.

By THOMAS F. WOOD.

In the early days of this century botany was the science of great expectations in America. The florid narratives of the old chroniclers were being displaced by a generation of scientific men, whose zeal and earnestness fitted them for the vast work of the exploration and study of the flora of a new continent.

From the very beginning in this country, the science of botany was an aristocracy of learning, except in the matter of lineal transmission, and even in this direction we have two illustrious examples in the case of the Bartrams and Michaux. The pioneer teachers were admitted authority in their broad domain, and received the encouragement and patronage of the mother country in our colonial state, and the sympathy and respectful admiration of the people when we became federated States. This was a very natural state of things, for although the science of botany was so well cultivated that it became a matter of national pride, still the real botanists were very few.

As we look through the superb volumes which remain the permanent monuments of the work of these men, we find a striking repetition of a very few names referred to as authority, but these men were able, industrious, and with very few exceptions, men of marked longevity, having the capacity of exciting enthusiasm among the young men who attended their instruction. It was not until the century was nearly twenty years old that botanical works began to multiply in such numbers as to be of use to the student; so at the time Dr.

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Curtis entered upon the study of botany, the science had already enlisted the men who were to give it the permanent impress of their rare ability. I propose now to pass in review the botanical career of the Rev. Dr. Curtis, rather than attempt a general biography.

Moses Ashley Curtis was born in Stockbridge, Berkshire county, Mass., May 11th, 1808. His mother was the daughter of Gen. Moses Ashley. He graduated at Williams College, September, 1827.

Mr. Curtis came to Wilmington in October, 1830, as a tutor in the family of Governor Dudley. He devoted himself in all of his leisure hours to the study of the flora of that region. Especially on Saturdays he made excursions among the sand hills and savannahs near Wilmington. At that time (1831) Wilmington was a village of about 4,000 inhabitants, and the field for botanizing existed where now are busy streets. Close up to the village reached the pine forests abounding with a flora rich and novel to the enthusiastic young botanist, while the savannahs, with their strange and interesting *Sarracenia* and *Pixidanthera*, and *Droseras*, and the thousands of gaudy heads of *Liatris*, and the brilliant yellows of *Coreopsis* and *Solidago*, charmed the eye and filled his portfolios.

A flora so vast as that of America was difficult for any one man to compass in the course of a lifetime, and so the earlier botanists had conceived the advantage of florulas, to be prepared each for his local section. Dr. Samuel L. Mitchell led off in 1807 in this work by publishing a catalogue of the plants growing around his country seat in New York, and he was followed by Maj. John le Conte in a florula for the island of New York in 1811, and in 1814 Dr. Jacob Bigelow published a model specimen of a local flora entitled *Florula Bostoniensis*. Subsequently the science of botany was enriched by the contributions of Dr. J. A. Brereton, for Washington, D. C.; and in 1830 by Prof. C. W. Short, for Lexington, Ky.

It was the result of his botanical studies that Mr. Curtis gave to the public under the title of "*Enumeration of Plants Growing Spontaneously Around Wilmington, North Carolina,*"* with remarks on some new obscure species." This first appeared in the *Boston Journal of Natural History*, September 3d, 1834, (No. 2, vol. 1,) the first edition of which was nearly all burnt, but it was subsequently reprinted "with many additions and emendations." Dr. Gray says it was one of the first works of the kind in this country in which the names are accented.

His quick eye and assiduous application may be judged by the fact that* in little more than two seasons, at intervals from other

* Enumeration of Plants, &c., M. A. Curtis, p. 83. Reprint Boston Journal Natural History, Vol. 1, No. 2, 1834.

engagements, he made a collection of over a thousand species (exactly 1,031.) This was two hundred less than were then reckoned as belonging to the flora of Massachusetts, and more than half the number described in Elliott's Botany of South Carolina and Georgia, and about a fourth of the phenogamous flora of the United States, as then known. He then adds that much ground still remains unexamined. Most of these plants were found within about two miles radius of Wilmington, and a number of maritime species discovered at Smithville, and several from Rocky Point. Dr. Darlington, who was one of his earliest and warmest friends, speaks of Mr. Curtis at that date as a careful observer and sagacious botanist.

At the time Mr. Curtis was pursuing his studies in Wilmington, there were few professed botanists in the State. The year before Dr. Curtis published his florula (1833),* H. B. Croom, Esq., and Dr. H. Loomis made a pretty careful survey of Newbern, and printed a catalogue of the plants they found growing in that neighborhood. Subsequently (1837) Mr. Croom published an enlarged catalogue. Mr. Croom was a lawyer, and a botanist of no mean ability, and besides the above contributions, prepared a valuable monograph on the Sarracénias which appeared in the third volume of the Annals of the New York Lyceum. The memory of Mr. Croom received a more distinguished record in the annals of botanic science than any of his contemporaries or successors in North Carolina, having had a genus (Croomia) named in honor of his contributions.

In a recent contribution^t to the *Botanical Gazette*, (April, 1885,) Dr. A. W. Chapman, author of the *Flora of the Southern States*, says:

“Fifty years ago, on one of those calm, hazy October evenings, peculiar to the climate of Florida, the quiet of the pleasant town of Quincy was interrupted by the rapid approach of a carriage with attendant outriders, which, having made part of the circuit of the public square, drew up before my office, and a gentleman of middle age, spare habit, light hair and blue eyes, came forth and introduced himself as Mr. Croom, of North Carolina. This was the commencement of my brief intercourse with Hardy B. Croom, the discoverer of *Torreya*; for as is well remembered, a year afterwards he was lost at sea, with all of his family, on the passage from New York to Charleston. Of his personal traits, it is needless here to say more than that he belonged to that class of wealthy and intelligent Southern gentlemen whose homes, renowned for their unostentatious hospitality, were the abode of all that is most charming in the

* Dr. Curtis gives the date of his publication as 1833, but in the reprint I have, it is stated that the paper was communicated to the Boston Journal of Natural History in 1834.

refinements of domestic life: but which now, by impoverishment, resulting from disastrous civil conflict, and consequent change of social customs and duties, and by the invasion of rude manners and looser ethics, have entirely disappeared. * * * Mr. Croom was then on one of his annual journeys from Newbern, N. C., the residence of the family, to his plantation in the adjoining county of Leon: but previously to settling in that county, he had rented a plantation on the west bank of the Apalachicola river, opposite the calcareous cliffs at Aspolaga, on the east bank, which at that time were covered by a dense grove of Torreya, and it was here probably in 1833 that he first saw it."

This glimpse of Dr. Curtis' contemporary is one of the very few I have seen, and hence its insertion here.

In Wilmington Dr. James F. McRee, Sr., also cultivated botany with assiduity, and the two botanists worked together effectively. Dr. McRee's country residence was at Hilton, the country seat of Cornelius Harnett, near the junction of the North East Cape Fear with the main stream. It was at this house that Harnett received a visit from Josiah Quincy., and where plans were laid for the prosecution of active hostilities against Great Britain. Here Dr. McRee cultivated with great care and with rare success the indigenous trees and shrubs he collected in the course of his extensive journeys in the pursuit of his calling. Dr. McRee added 34 species to Curtis' catalogue, annotated by him, besides several which were printed in the catalogue proper, and all through the writings of Dr. Curtis may be found appreciative allusions to his scientific attainments. No proper memorial has ever been made of this pioneer scientist.

Before railroads brought their freights speedily to our doors, and the art of printing had so multiplied books, there could be found upon the shelves of Dr. McRee's library the most recent and expensive works on the science of medicine in which he was a great master, but side by side with them he had a natural history collection in volumes of such rare value that to-day—the day of numerous and valuable books—it would be considered exceedingly choice. Until a late day in his life his herbarium was kept in order by replacing new specimens, but as his health failed and the war brought sorrows and cares to his home, his herbarium fell into neglect, and finding no cultured hand to preserve its scientific treasures, it was abandoned, and its crumbling remains now lie neglected in the dusty garret of a former slave, and the best of the books doubtless found their way through the intervention of plunderers, to Northern book-stalls, if they did not go down off Cape Fear in the ill fated steamer *Gen. Lyons*, with thousands of dollars belonging to others of our citizens.

Prof. Elisha Mitchell and Rev. Dr. L. De Schweinitz had preceded Dr. Curtis in the study of North Carolina plants, the former to abandon it for the more congenial study of geology, the latter to establish a world-wide reputation.

Dr. Cyrus L. Hunter, of Lincoln county, published a list of such plants as he found in his neighborhood, about the year 1834, and pursued his studies with more or less regularity and zeal since then.

This scanty review gives an idea of what degree of cultivation the pursuit of botany had reached in North Carolina when Mr. Curtis engaged in it.

To the south of us the Rev. Dr. Bachman, a diligent naturalist, had made such advance in the study of botany as to publish a catalogue of the plants growing in the vicinity of Charleston. At the same time, Mr. H. W. Ravenel was also a cultivator of the science. Of both of these gentlemen Mr. Curtis speaks in his diary as having met, while on a botanical tour in South Carolina and Georgia in 1835, also Mr. Leitner, of Georgia.

The number of botanists actually at work were few in number, but those were bound together by the closest ties of scientific and friendly interests. Much of the knowledge of plants was communicated by means of long and carefully prepared letters, written with that engaging art which unfortunately threatens to become extinct.

Mr. Curtis was twenty-two years old when he came to Wilmington a young teacher. His early associations had been favorable for the inculcation of a true scientific spirit. He found absorbing pleasure in the quiet of the fields and forests, and without ever a thought of becoming a scientific botanist, he amassed a wealth of knowledge, and won an exalted position among the botanists of the world. No doubt he looked forward to Saturday with eager expectation, that he might exchange the constrained duties of the school room for the freedom of the woods, and for pleasant intercourse with the old and new floral friends he was to meet.

If there is such a thing as a scientific instinct, Mr. Curtis possessed it. He was habitually accurate in his studies, and the results were early relied upon by his correspondents. Coming into a new field of botanical study, it was quite natural that he should have directed his attention to the habits of the very local *Dionœa muscipula*. Saturday after Saturday he would visit the savannahs, and lying at length upon the ground, would watch its peculiarities. The popular description which he gave of it in "Enumeration of Plants around Wilmington," has been repeated for the last fifty years, and

shows how greatly he possessed the gift of accurate and entertaining description. I quote the passage without apology:

“The leaf, which is the only curious part, springs from the root, spreading upon the ground or at a little elevation above it. It is composed of a petiole or stem with broad margins, like the leaf of an orange tree, two to four inches long, which at the end suddenly expands into a thick and somewhat rigid leaf, the two sides of which are semicircular, about two-thirds of an inch across, and fringed around their edges with somewhat rigid cilia or long hairs like eye lashes. It is very aptly compared to two upper eyelids joined at their bases. Each side of the leaf is a little concave on the inner side, where are placed three delicate, hair-like organs in such an order that an insect can hardly traverse it without interfering with one of them, when the two sides suddenly collapse and enclose the prey with a force surpassing an insect's efforts to escape. The fringe or hairs of the opposite sides of the leaf interlace, like the fingers of the two hands clasped together. The sensitiveness resides only in these hair-like processes on the inside, as the leaf may be touched or pressed in any other part without sensible effects.

“The little prisoner is not crushed and suddenly destroyed, as is sometimes supposed, for I have often liberated captive flies and spiders which sped away as fast as fear or joy could hasten them. At other times I have found them enveloped in a fluid of a mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it. This circumstance has suggested the possibility of their being made subservient to the nourishment of the plant through an apparatus of absorbent vessels in the leaves. But as I have not examined sufficiently to pronounce on the universality of this result, it will require further observation and experiment on the spot to ascertain its nature and importance. It is not to be supposed, however, that such food is necessary to the existence of the plant, but like compost, may increase its growth and vigor.

“But however obscure and uncertain may be the final purpose of such a singular organization, if it were a problem to construct a plant with reference to entrapping insects, I cannot conceive of a form and organization better adapted to secure that end than are found in the *Dionaea muscipula*. I therefore deem it no credulous inference that its leaves are constructed for that specific object, whether insects subserve the purpose of nourishment to the plant or not. It is no objection to this view that they are subject to blind accident, and sometimes close upon straws as well as insects. It would be a curious vegetable indeed, that had a faculty of distinguishing bodies, and recoiled at the touch of one, while it quietly submitted to violence from another. Such capricious sensitiveness is not a property of the vegetable kingdom.

“The spider's net is spread to ensnare flies, yet it catches whatever falls upon it; and the ant lion is roused from his hiding place by the fall of a pebble; so much are insects, also, subject to the blindness of accident. Therefore the web of the one and the pitfall of the other are not designed to catch insects! Nor is it in point to refer to other plants of entirely different structure and habit which sometimes entangle and imprison insects. As well might we reason

against a spider's web because a fly is drowned in a honey pot, or against a steel trap, because some poor animal has lost its life in a cider barrel."

"In his note upon the structure of *Dionœa*, or Venus Fly-Trap, a plant found only in the district around Wilmington," says Dr. Asa Gray, "Dr. Curtis corrected the account of the mode of its wonderful action that had prevailed since the time of Linnæus, and confirmed the statement and inferences of the first scientific describer, Ellis, namely, that his plant not only captures insects, but consumes them, enveloping them in a mucilaginous fluid which appears to act as a solvent."

During the preparation of his first little work he returned to Boston and commenced his studies for the ministry, 1833-'34, with the Rev. William Crosswell. While there he commenced a correspondence with Dr. Torrey, who aided him in determining species. His acquaintance with Dr. Gray commenced later, but became much more intimate.

While on his way to Boston, he formed the acquaintance of Dr. Darlington, of Westchester, Pa., and he afterwards became a valued friend and a helper so long as he needed one.

He married Miss Mary DeRosset, daughter of the elder Dr. A. J. DeRosset, of Wilmington December 3d, 1834.

He returned to the South in the latter part of 1834, continued his studies with the Rev. Dr. R. B. Drane, and was ordained to the ministry of the Episcopal church by Bishop Moore, of Virginia, in 1835. He immediately entered upon mission work in Western North Carolina from Charlotte to the mountain country as far as Morganton, with his residence in Lincolnton. It was while pursuing his work as a missionary that he took advantage of his journeying in the solitary woods to pursue his botanical researches. Most of his traveling was done in a "sulky," which was so arranged that his portfolio was under the cushion. As he came across specimens by the way, he would collect them and place them in his portfolio, and so by the end of his journey he had secured a number of ready pressed plants for future study, or for mounting permanently in his herbarium. He left the mountain section at the end of 1836, and was engaged as a teacher in the Episcopal school in Raleigh from the beginning of 1837 to May 1839.

The summer of 1839 he spent in the mountain country for health chiefly, though always carrying on his botanical explorations, and went through that region to the extreme west and southwest of the State.

Extending his botanical observations to the western borders of his adopted State, Dr. Curtis was among the first to retrace the steps and rediscover the plants found and published by the Elder Michaux, in the higher Alleghany mountains." (Silliman's Jour., January to June, 1873, p. 392.) From the very beginning of these journeys the search for a plant found in the Elder Michaux's herbarium was begun and pursued with hopeful expectation for years. Michaux had been proven so truthful and accurate in his descriptions, that he had impressed his successors with faith in him. This veteran botanist had collected a remarkable plant, as Dr. Gray says, with the habit of *Pyrola* and the foliage of *Galax*, and the only specimen extant was in the Michauxian herbarium, among the *Planta incognita*, and this only in fruit. This plant, since discovered in flower by Mr. Hyams in McDowell, had already been named by Dr. Gray, in honor of Prof. Short, of Kentucky, and now known as *Shortia galicifolia*. Over and over again did Dr. Curtis traverse the line of Michaux's travel for *Shortia*, but without success.

Prof. Gray* says in a paper in which he sketched the botanical tours of the botanists who had visited the mountains of North Carolina in 1841: "No living botanist is so well acquainted with the vegetation of the Southern Alleghany Mountains, or has explored those of North Carolina so extensively as the Rev. Mr. M. A. Curtis, who, when resident for a short time in their vicinity, visited, as opportunity occurred, Table Mountain, Grandfather, the Yellow Mountain, the Roan, the Black Mountain, &c., and subsequently, (although prevented by infirm health from making large collections) extended his researches through the counties of Haywood, Macon, and Cherokee, which form the narrow southwestern extremity of North Carolina. To him we are indebted for local information, which greatly facilitated our recent journey, and, indeed, for a complete itinerarium of the region south of Ashe county."

Early in 1840 he was called to mission work about Washington, in Beaufort county, remaining there a year, and early in 1841 he removed to Hillsborough, where he remained six years. In April, 1847, he removed to Society Hill, in South Carolina, which accounts for the fact that he is spoken of as a resident there, his residence at that place having been nine years. From Society Hill Dr. Curtis removed to Hillsborough in 1856, and resided there until his death in 1872.

*Notes on a Botanical Excursion to the Mountains of North Carolina, &c. Am. Journal Sc., Oct., Dec., 1841, p. 12.

As it is the design of this paper to speak more particularly of Dr. Curtis as a botanist, it will be observed by many of his old friends who knew of his labors in his Divine calling—how self-sacrificing they were, how full of human sympathy, how devoid of self-seeking—that I must leave this part of his life to those abler to record the victories he won for the Cross.

The first botanical essay contributed by Dr. Curtis was more than a mere catalogue, and it attracted the favorable notice of his teachers and correspondents. It was so thorough that after a lapse of half a century only about fifty species have been added to his list. One of them has a peculiar interest as illustrating the laudable jealousy with which he regarded his earlier achievements.

In the summer of 1867, Mr. Wm. M. Canby, of Wilmington, Del., an esteemed friend of Dr. Curtis, a botanist second to none in the Union for diagnostic learning, came to Wilmington to add to his collection, and look over the old botanizing territory after the smoke of war had cleared up. On the memorable occasion of this narrative he had been to Hilton Ferry, close by the estate of Dr. James F. McRee, in search of the very local Alligator Bonnets, (*Nuphar Sagittæfolium*.) He had completed his collection, and was carefully spreading them on the logs to dry. His face was turned towards the bank of the river, which at this point is an abrupt bank of grey marl, overhung by thick festoons of beautiful shrubbery. Clinging to this wall, under the drippings of the water through the marl as the tide recedes, he espied beautiful fronds of the true Maiden's Hair Fern, (*Adiantum Capillus-Veneris*.) This beautiful fern had not before been detected in this part of the State, or indeed north of Alabama. The discovery was a great pleasure and surprise to Mr. Canby, for here on the territory of Curtis he had been able to add such a beautiful plant to his list. Specimens were soon borne by the mail to Dr. Curtis, then living in Hillsborough, and the earliest mail brought me a letter of specific instructions where to go and what to look for, and I was able to verify Mr. Canby's discovery. It was not long before Dr. Curtis had important business to attend to in Wilmington, and a visit to the newly discovered *Adiantum* station was not the least important.

Dr. Curtis' method as a student was that of broad-minded scientist. Just to name a flower and preserve it carefully in his herbarium was to him but the beginning of his work. His earliest records show that he studied the relation of plant-life to geologic and climatic surroundings. The study of botanical geography was begun and continued during his whole career as a botanist, extend-

ing over 38 years. The account he has given us in his "WOODY PLANTS," is to-day the best guide to the natural climatological divisions of the State which has ever been given. His studies were also directed to the numerous economic questions which met him in his intimate acquaintance with the treasures of the field and forest. It was this feature of his labors alone which brought him an audience in his adopted State, and with this object in view he brought together the material which he published as a part of the Geological and Natural History Survey, known best by the condensed title given to it by Prof. Emmons, as the "*Woody Plants*." This volume of 124 pages was printed by the State in 1860, and at once became a popular manual for the farmer and the woodsman, and for amateur botanists, a key to the more conspicuous trees and shrubs useful for their fruit or timber, or as ornaments. The key devised to enable one of no botanical knowledge to determine a given plant or shrub was founded upon the character of the fruit, and distinguished by their common name. The preface of this little work is an introduction to the geographical distribution of plants in the State, and shows what a thorough acquaintance he had with the vast subject. This short essay attracted the attention of the whole country to the unique position which our State holds in respect to climate, soil and forest products. That North Carolina has a difference of elevation between the east and west which gives a difference of climate equal to 10 or 12 degrees of latitude, was first shown by Dr. Curtis in his comparison of the local flora in his *Woody Plants*. He made himself acquainted at the very outset of his work as a botanist with the labors of the earlier explorers of the State. In his "Plants around Wilmington," we find him quoting from Brickell's Natural History of North Carolina, and Catesby's Natural History of Carolina. The sketch he gives of the progress of botanical discoveries in the State in his *Woody Plants* is full of interest, and shows how deeply he caught the inspiration from their example of self-denial in the cause of science.

In "*Woody Plants*" is displayed, as in the succeeding works written by him, an accurate knowledge of the common names of plants—a subject full of confusion—misleading young botanists and bewildering the old ones. As though the change from one system to another were not enough, then to add to this the formidable confusion of synonyms (with no guide to its mysteries like Watson's,) and then the local names of plants, it is confusion interminable. In this study, though, Dr. Curtis had a cultivated philological turn.

Scarcely a common name escaped him, as various as they were in all the numerous localities.

Since *Woody Plants* was issued, it has been made the basis of several publications, and we fear without proper authorization. The report on Forestry by Hough, prepared for the general government, has quoted voluminously from Curtis, and since then a volume bearing on its covers the modest title of *Woods and Timbers of North Carolina* only reveals its true character after we pass the new title page. I am sure, though, that the author would have been delighted when he was preparing his little volume for the press with so much labor and such rare knowledge as a free offering to his adopted State, if he could have known that it would have been so largely read and appreciated by those for whom he originally intended it.

As great a task as the collection of the Phanogamous Plants was, Dr. Curtis had fully completed it before his *Woody Plants* was published. Of course, exception is here made to a small number of plants discovered since chiefly by Mr. W. M. Canby, Mr. Hyams, Mr. McCarthy, Maj. Young, and myself. Early in his career he undertook the study of the fungi. This very difficult branch of botany at that time had few votaries, and the unexplored field was immense. There was no book that could be considered a text-book on the subject published in America. The Rev. L. D. de Schweinitz had made two contributions to the fungi of America, one in 1820, published in Leipsic, and entitled "*Fungi Carolinae Superioris*," the other a "*Synopsis Fungorum in America Boreali media dependentium*," published in the Transactions of the American Philosophical Society in 1831. With these guides to local species, our enthusiastic student addressed himself to his labor of love.

In 1846 he commenced a correspondence with Mr. H. W. Ravenel, of South Carolina, a correspondence which was continued until Dr. Curtis' death in 1872. Mr. Ravenel was then, as he is now, a devoted student of the fungi, having made large collections. His position now among American botanists is that of very high authority on the subject.

About two years after Dr. Curtis began his correspondence with Mr. Ravenel, he also commenced a correspondence with the Rev. M. J. Berkley, of England. Mr. Berkley became greatly attached to Dr. Curtis by reason of the ardor and accuracy with which he pursued the investigation of new species. De Schweinitz had him-

self discovered over 1200 species, chiefly in this State, but the field was still far from being exhausted. Correspondence between these gentlemen continued for a number of years, and a scientific copartnership was formed which resulted in the addition of nearly five hundred new species to the list up to the year 1867, and since Dr. Curtis' death a number of new species appeared in "Grevillia" under the joint authorship of Berkley and Curtis.

Correspondence between botanists at that time was very active, and the letters which were interchanged comprised the principal stock of knowledge then available. The letters which have been preserved are very instructive, even at this date. Not only do we find in them the growth of botanical science, but such notes about the state of civilization as to roads, forests, dwellings, farms, taverns, and the social condition of the people, which make them treasure houses for the general historian. The correspondence between John Bartram, and Collinson, Humphrey Marshall, Ellis, Benj. Franklin, and other notables of the day, with an editorial by Dr. Darlington, is one of the few volumes which have preserved letters in a printed form, and few volumes give a more satisfactory insight into the state of our social affairs than this one. It is not a complete panorama, but the passing allusions to what these itinerant botanists saw, gives a keen relish to their work. It is to be regretted that such a small part of this correspondence is preserved, for like that of McRee and Curtis, much of it is long since inaccessible.

En passant it is interesting to observe how little notice these pioneers of science took of the current of political affairs. For although the travels of Wm. Bartram through the Carolinas and Georgia were made during the war of the Revolution, our zealous botanist has no ear for the war-like preparations which must have resounded in the air, but was totally absorbed in what Nature had so lavishly spread out before him. For him no triumph was equal to the discovery of a new plant, the solution of the mysteries of the habits of birds and insects. Like all of his sect, the Friends, Bartram had the strictest bias against the commotion of war, and this, added to love of the knowledge of nature, may account for his silence.

But to return from this digression. Dr. Curtis found this new field of botany greatly to his liking. His habit of study was painstaking and accurate, and the microscopic work necessary for the determination of species became in his hands a triumph of skill. It was in this steady sedentary pursuit that Dr. Curtis injured his health. For hours at a time, day by day, he pored over the micro-

metry of fungus spores. Few were the botanists with whom he could compare specimens and interchange notes. He pursued this specialty without the stimulus offered now by special societies, and for the greater part of his career absolutely without an audience. It is certain, therefore, that nothing but the intensest love of his studies led him up to the highest station occupied by any American botanist. I have heard him say, "Nothing surprised me more than to be called a botanist at first. Although I had accomplished the survey of the phenogamous plants of the State, I still felt that I was comparatively not a botanist." But this modesty was habitual with him. It was a modesty, however, not begotten of uncertainty, for in all his work Dr. Curtis was accurate. If he spoke at all it was always with the authority of the master.

Shortly after Dr. Hawks' History of North Carolina appeared, Dr. Curtis published in the University Magazine, (1860), "*A Commentary on the Natural History of Dr. Hawks' History of North Carolina.*" This paper demonstrated the thorough knowledge Dr. Curtis had obtained of the botany of the old travelers and explorers. Dr. Hawks had drawn with too free a hand the wonders of our truly wonderful forests and fields, and had been led away quite unconsciously by the florid accounts of Harriot, and Amadas & Barlowe, and Lawson. The analysis which Dr. Curtis made left but little of the fabulous statement of the early chroniclers disproved, and proved Dr. Hawks to have been but slightly informed about natural history. This paper is an almost complete key to Lawson's History, as far as the natural history items are concerned, although it is not a continuous narrative. The circulation which the University Magazine had at the time was not large enough to overtake the natural history errors of Hawks' History, and many of them are extant to this day as traditions among the common people.

It was during the war 1861—1865, that Dr. Curtis conceived the idea of preparing a work on the *Edible Fungi*. The events which led up to this scientific essay, it may be well to narrate. Although he was well acquainted botanically with fungi, he was not an avowed mycophagist until somewhere about 1855. Before this he expressed himself to Mr. Berkeley as being afraid of them, as he had grown up with the common prejudices against them entertained by most people in this country. Having occasionally read of fearful accidents from their use, and there being abundance of other and wholesome food obtainable, he felt no inclination to run any risks in needlessly enlarging his bill of fare, and so he passed middle life without having once even tasted a mushroom. But as his confidence

increased, under the guidance and assistance of Mr. Berkeley, a confidence to discriminate species grew up with it, and a curiosity to test the qualities of these much-lauded articles got the better of timidity, and at the time he wrote (1869) he could safely say that he had eaten a greater variety of mushrooms than any one on the American continent. He introduced several species before untried and unknown. From the beginning of his experiments he exercised great caution even with the species long recognized as safe and wholesome. In every case he began only with a single mouthful. No ill effect following, he made a second essay upon two or three mouthfuls, and so on gradually until he made a full meal of them.

Fortunately he did not blunder upon any kind that was mischievous, although he ate freely of forty species. This, he says, was due to the fact that his general acquaintance with species which have been long used in Europe, and his experiments were only with species bearing some affinity or analogy to them.

Mycophagy was an art and a science with Dr. Curtis, and in a letter to Mr. Berkeley he thus describes some of his experiences:

“Of the *Merisma* group of Polypores, having already tried *P. frondosus*, *confluens*, and *sulphureus*, I ventured, after some hesitation, and with more than usual caution, to test the virtues of the new American species, (*P. Berkeleyi*, Fr.) notwithstanding the intense pungency of the raw material, which bites as fiercely as *Lactarius piperatus*. When young, and before the pores are visible, the substance is quite crisp and brittle, and in this state I have eaten it with impunity and with satisfaction, its pungency being all dissipated by stewing. I do not, however, deem it comparable with *P. confluens*, which is rather a favorite with me, as it is with some others to whom I have introduced it. *P. sulphureus* is just tolerable; safe, but not to be coveted when one can get better.

“When I say safe, I mean not poisonous. I cannot recommend it as a diet for weak stomachs, which should be said of some other fungi of similar texture. I am here reminded of an experience I had three or four years ago with this species, which would have greatly alarmed me had it happened at an early date in my experiments, and which would probably have deterred any one unused to this kind of diet from ever indulging in it again. I had a sumptuous dish of it on my supper table, of which most of my family, as well as a guest staying with us, partook very freely. During the night I became very sick, and was not relieved until relieved of my supper. My first thought on the accession of the illness was of *Polyporus sulphureus*; but as I remembered that inflammation was one of the symptoms of fungus poisoning, and I could detect no indications of this in my case, I soon dismissed the rising fear, did not send for the doctor, nor take any remedy. Others who had partaken of the fungus more freely than myself, were not at all affected; and I presume my sickness was no more induced by the *Polyporus* than by the bread and butter I had eaten. And yet

had I alone partaken of the dish, or had one or two others been affected in like manner, doubtless the night attack would have been very confidently attributed by some to the mushroom ; or had this been my first trial of that article, possibly I might ever after have regarded it with suspicion. I learned a few days afterwards, from one of our physicians, that this kind of sickness was then somewhat prevalent in the community, and could be attributed to no known cause. For the credit of this species, therefore, we were fortunately able to distinguish the *post hoc* from the *propter hoc*.

There are families in America that for generations have freely and annually eaten mushrooms, preserving a habit brought from Europe by their ancestors. In no case have I heard of an accident among them. I have known no instance of mushroom-poisoning in this country, except where the victim rashly ventured upon the experiment without knowing one species from another. Among the families above mentioned, I have not met with any whose knowledge of mushrooms extended beyond the common species (*A. campestris*) called Pink Gill in this country. Several such families live near me, but not one of them was aware, until I informed them, that there are other edible kinds. Everything but the Pink Gill, which had the form of a mushroom, was to them a toadstool, and poisonous. When I first sent my son with a fine basket of imperials (*A. cæsaræus*) to an intelligent physician, who was extravagantly fond of the common mushroom, the lad was greeted with the indignant exclamation, " Boy, I wouldn't eat one of those things to save your father's head !" When told they were eaten at my table, he accepted them, ate them, and has eaten many a one since with all safety and with no little relish. Since that time our mycophagists eat whatever I send them without fear or suspicion.

" I have interested myself to extend the knowledge of these things among the lovers of mushrooms, and also their use among those who have not before tried them. In the latter work I am not always successful, on account of a strong prejudice against vegetables with such contemptuous names, and an unconquerable fear of accidents. Yet, as in my own case, curiosity often conquers these errors. When away from home I have frequently obtained ready permission from a kind hostess to have cooked a dish of mushrooms that I had found on her premises. It has rarely occurred in such cases that the dish, then tasted for the first time, was not declared to be delicious, or the best thing ever put in the mouth. This latter phrase was once used in reference to so indifferent an article as *A. salignus*. Indeed, I have found several persons who class this among the most palatable species. To such persons, a dish of fresh mushrooms need seldom be wanting, as this one can be had every month of the year in this latitude. I am induced to believe that the quality of this species varies with the kind of wood it grows from, and that it is better flavored when gathered from the mulberry, and especially from the hickory, than when taken from most other trees. Its fitness for the table seems also to depend much upon the rapidity of its growth ; those which grow slowly, as is the case with some of our garden vegetables, being of tougher texture and of less delicate flavor. A warm sun, after heavy rains, brings them out in greatest perfection.

“ I have several times been asked by persons eating mushrooms for the first time, whether these things belong to the vegetable or animal kingdom. There is certainly a very noticeable resemblance in the flavor of some of them to that of flesh, fish, or mollusc, so that the question, as founded merely on taste, is not an unnatural one. But I was much struck with the propriety when reading an article in “ Fraser’s Magazine ” a few years since, written by the late Mr. Broderip, who therein says that mushrooms contain osmazome. If this be so, it accounts both for their flavor and for their value as food. Of this latter quality I had become so well convinced that, during our late war I sometimes averred, and I doubt if there was much, if any, exaggeration in the assertion, that in some parts of the country I could maintain a regiment of soldiers five months of the year upon mushrooms alone.

“ This leads to a remark which should not be overlooked, upon the great abundance of eatable mushrooms in the United States. I think it is Dr. Badham who boasts of their unusual number in Great Britain, stating that there are 30 edible species in that kingdom. I cannot help thinking that this is an underestimate. But if the doctor is correct, there is no comparison between the number in your country and this. I have collected and eaten 40 species found within two miles of my house. There are some others within this limit which I have not yet eaten. In the catalogue of the plants of North Carolina, you will notice that I have indicated one hundred and eleven species of edible fungi known to inhabit this State. I have no doubt there are 40 or 50 more, as the alpine portion of the State, which is very extensive and varied, has been very little explored in search of fungi.

“ In October, 1866, while on the Cumberland mountains in Tennessee, a plateau less than 1,000 feet above the valleys below, although with little leisure for examination during the two days spent there, I counted eighteen species of edible fungi. Of the four or five species which I collected there for the table, all who partook of them, none of whom had before eaten mushrooms, declared them most emphatically delicious. On my return homeward, while stopping for a few hours at a station in Virginia, I gathered eight good species within a few hundred yards of the depot. And so it seems to be throughout the country. Hill and plain, mountain and valley, woods, fields, and pastures, swarm with a profusion of good nutritious fungi, which are allowed to decay where they spring up, because people do not know how or are afraid to use them. By those of us who know their use, their value was appreciated as never before during our late war, when other food, especially meat, was scarce and dear. Then such persons as I have heard express a preference for mushrooms over meat, had generally no need to lack grateful food, as it was easily had for the gathering, and within easy distance of their homes, if living in the country. Such was not always the case, however. I remember on one occasion during the gloomy period, when there had been a protracted drought, and fleshy fungi were to be found only in damp shaded woods, and but few were there, I was unable to find enough of any one species for a meal ; so gathering of every kind, I brought home 13 different kinds, had them all cooked together in one grand *pot pourri*,

and made an excellent supper. Among these was the *Chantarelle*, upon which I would say a few words in confirmation of what I have already said upon the varying qualities of mushrooms in different regions and localities. You have somewhere written of this mushroom as being so highly esteemed a delicacy, that it is much sought for when a dinner of state is given in London. Can this be because it is a rarity? (for nothing common and easily obtained is deemed a delicacy, I believe), or because you have it of finer flavor in England? Here, where it abounds, no one seems to care at all for it, and some would forego mushrooms entirely rather than eat this. It certainly varies much in quality, as I have occasionally found it quite palatable, and again, though cooked in the same mode, very indifferent. I have been unable to ascertain whether this difference is due to locality, exposure, shade, soil, moisture, or temperature. That soil has much to do with the flavor of some mushrooms I am well convinced. In a parcel of Pink Gills I have sometimes found one or two specimens, though perfectly sound, of such unpleasant odor and taste as would spoil a whole dish. So also with the Snow Ball, (*A. arvensis*), of which I annually find a few beautiful specimens growing near my residence, upon a grassy turf which covers a pile of trash made up of decomposed sticks, leaves and scrapings from the adjoining soil. Their taste and odor are perfectly detestable. I had one specimen cooked, but no amount of seasoning could abate the offensiveness of the odious thing; yet within 100 yards of these I gather specimens of the same identical species, which are of fine flavor, equal to that of the best mushrooms. As I have before intimated, the varying flavor of mushrooms growing on different kinds of wood, so here I suppose the unpleasant qualities of some specimens of these two well known and favorite species may be owing to something in the soil where they grow which they cannot assimilate, and so render a palatable and wholesome species totally unfit for the table. Whether such specimens, if eaten, would be poisonous or unwholesome, I do not feel any temptation to prove. It is not probable that they will ever do any mischief, for it is incredible that any human being should so pervert his instincts as to swallow such a villainous concoction.

“Experience and observation like these would perhaps justify the inference that an innocent species may sometimes be deleterious, on account of its taking up some bad element from the soil. But as I have never known a case of poisoning in families that are well acquainted with the common mushroom or Pink Gill, that gather the specimens for themselves and have used this article of food annually for many generations, I cannot agree with an objection somewhere made by you, that perhaps all mushrooms contain a poisonous element, but some of them in such small quantity as to have no appreciable effect. Now, had you seen the quantities of stewed mushrooms swallowed at a single meal which I have seen thus devoured, and with no more harm than from the same amount of oyster or turtle soup, I think you would be forced to the conclusion that such an amount, even of poisonous infinitesimals, must have had some very unpleasant manifestations, or else be a very innocent diet.”

It would seem that our rigidly scientific botanist did not disdain the subtle arts of the gastronomist. For example, in this letter to the Rev. Mr. Berkeley, from which I have already made a lengthy extract, he says, "The *Lycoperdon giganteum* is also a great favorite with me, as indeed, with all my acquaintances who have tried it. It has not the high aroma of some others, but it has a delicacy of flavor that makes it superior to any omelette I have ever eaten. It seems, furthermore, to be so digestible as to adapt it to the most delicate stomachs. This is the Southdown of mushrooms."

Could gastronomic enthusiasm run higher than to compare a devil's snuff box, that the school boy takes particular delight in using as a foot ball to show his detestation, to the luscious meat of a Southdown mutton! And then triumphantly he adds, in this latitude (about 36°) we can find good mushrooms for the table nine or ten months of the year, and some even the year round, and one sometimes emerging from the soil frozen solid!

Dr. Curtis' neighbors shared largely his gastronomic pleasures. It was his custom to send baskets of the choicest of them to his friends, until the divine art of mycophagy reached a good degree of cultivation, and many of them learned to distinguish for themselves the edible ones. Some members of his family became especially expert in foraging for the table among the mushrooms, and Mr. Chas. J. Curtis, now the Rev. Mr. Curtis, afterwards put his knowledge of the forms of these plants to use, by drawing and coloring specimens to illustrate his father's still unpublished work on the "*Edible Fungi*." This work was designed to popularize the use of mushrooms as an article of food. It was written during the late war, when the subject of food was a matter of daily solicitude to thousands of families. In taking up the pen for this work, Dr. Curtis succeeded admirably in divesting himself of every technicality, and, indeed, of describing minutely about 40 of the 111 species, in language not only easy to be understood, but he really made the subject very enticing. Illustrations and comparisons were occasionally drawn from the numerous foreign authors he had mastered. When the war ended and a publisher was sought for the work on "*Edible Fungi*," little encouragement was given. It now remains in MS.

The subject has never been very popular in the United States, and the students who undertake its study are not numerous, and mycophagists do not abound: the former seek for information in works of English and French authorship, and the latter are content with the authenticity of the trade mark on the cans of Champignons, imported from France.

In 1867, the State published as a part of the Geological and Natural History Survey, "A Catalogue of the Indigenous and Naturalized Plants (of the State,") by Dr. Curtis. It was intended that this work should have been printed with "Woody Plants," but the outbreak of the war prevented it. At the time of its issue, in 1867, its author stated that it was the most extensive local list of plants ever published in North America, comprising over 4,800 species. It was the first attempt to enumerate the cryptogamous as well as the phenogamous plants made by any botanist in this country, and its appearance was a matter of much scientific congratulation. The volume consisted of 158 pages of catalogue, with no scientific description, but a mere statement of the locality of each plant. This was the result of twenty-five years of botanical study, over a territory of 50,000 square miles. Still he was quite confident in the assertion that few flowering plants would be added to his list, and that the additions which would reward the researches of future observers would be entirely cryptogams.

It has always been a matter of regret that this work of a lifetime should have been given to the public in such a skeleton form, and produced in such a primitive state of the typographer's and book-maker's art. The only reward to the man of science was the consciousness of his thorough work, and the State could well have afforded to have made an ample volume in which he might have recorded the rich treasures of his research for the use of the future student. But it seems that Dr. Curtis was very many years in advance of his time, and the expectation that his broad foundation would have been built upon by his early successors has little prospect of fulfilment.

The part which Dr. Curtis took in the progress of American Botany, was always recognized as important. His correspondence was very extensive, and his herbarium was consulted by botanists with great satisfaction. So largely did Dr. Chapman feel himself indebted to Dr. Curtis for aid, that he dedicated the first edition of his Flora of the Southern United States to him, and the two botanists were in close communication until the death of Dr. Curtis in 1872.

"All our associate's work was marked by ability and conscientiousness. With a just appreciation both of the needs of the science and of what he could best do under the circumstances, when he had exhausted the fields in Phænogamous Botany within his reach, he entered upon the inexhaustible ground of Mycology, which had been neglected in this country since the time of Schweinitz. In this difficult department he investigated and published a large

number of new species, as well as determined the old ones, and amassed an ample collection, the preservation of which is most important, comprising, as it does, the specimens, drawings and original notes which are to authenticate his work. By his unremitting and well directed labors, filling the intervals of an honored and faithful professional life, he has richly earned the gratitude of the present and ensuing generations of botanists."

(Am. Jour. of Science. Third series, Vol. V, No. 29, May, 1873.)

During Dr. Curtis' lifetime very little attention had been paid to the life-history of fungi by the medical profession. The theory of *contagium vivum* was barely foreshadowed by J. H. Mitchell, and afterwards by Salisbury, but so crude was the botany of even these writers, that they made but little impression upon the medical profession, and only excited the mild derision of the real botanists. I well remember upon one occasion when a group of doctors had accidentally met at the office of a brother physician, and were admiring the beautiful microscopic appearance of several fungi, especially the *Oidium albicans*, as figured in the book of the season—Beale on the "*Microscope in Practical Medicine.*" This fungus was supposed to stand in relation of a causative agent in *muguet* or *thrush*. Dr. Curtis came up in the midst of our discussion of the subject, and at once recognized a very familiar fungus and made it very clear to us that fungus spores only found lodgment when the soil was prepared to receive it, and that we must beware of a two hasty conclusion of the disease-carrying properties of the fungi. *Oidium* was found in the mouth of the baby with thrush because there was a condition precedent which favored its lodgment, and so far from being the cause of the disease, it was the result of the disease. His familiarity with the forms, which to doctors who had been four years cut off from medical literature, was truly wonderful, but was a pretty clear statement of the general principles which to-day are held by some of the best thinkers in the medical profession.

I have spoken of Dr. Curtis' splendid achievements, his scientific precision, his ardor in the pursuit of natural history, his completion of a botanical survey almost to the remotest domain of the lowest microscopic plant, but I would not have you believe that this was the sum of his life work. Botanical science was his pastime and recreation. In the mission he had chosen as a servant of Christ, he was no sluggard. He was a pioneer missionary in the rugged hills of North Carolina, when to be a pioneer was to suffer hardship and privation. Love and sympathy beamed from his benignant face, and wherever he went his Master's mission of "Peace on earth

and good will towards men," was made actual by the tenor of his own life.

An intimate friend, Rev. Dr. F. M. Hubbard, who knew him well as a collegian, as a minister of the gospel, as a scientific botanist, thus speaks of him :

The Diocese of North Carolina has suffered a great loss, and the church at large hardly less, in the recent death of the Rev. Dr. Curtis, and his many excellences deserve a larger notice than the customary announcement that one much loved has been called to his reward. His health had been rather feeble for several years, but the end came very suddenly, and was a sad blow to all who knew him. The Rev. Moses Ashley Curtis was a native of Stockbridge, Mass., and graduated at Williams College, in that State, in the class of 1827. Some three or four years after leaving college he removed to Wilmington, North Carolina, where he was married, and in that State the most of his later life was spent. He was ordained by Bishop Ives, and after a brief tour of missionary duty, took charge of St. Matthew's Church, Hillsboro. To this parish, excepting that he was for a few years the Rector of Trinity Church, Society Hill, S. C., the active, clerical service of his life was given. Here, by the great strength, as well as the sweetness of his character, his unwearied labors, his quick and tender sympathies, his high attainments in learning, and warm and steadfast affections, he won from his people, and, indeed, from all who knew him, a love and reverence that were hardly less than devotion. Few men are more earnestly loved while they live, or, when they are called to die, are more sincerely mourned.

By his brethren of the clergy he was no less valued. Indeed, it is no disparagement of the many excellent men of that order in that diocese to say that no one among them was more esteemed and revered by them than was Dr. Curtis. He was a well read and skillful theologian, a good classical scholar, and not unfamiliar with modern languages. His degree of Doctor in Theology was given by the University of North Carolina. His duties as the rector of a parish, of course, occupied him chiefly; but as his tastes, developed in very early life, led him to give much of his leisure to the study of natural history. In all the departments that are included under this name, he was singularly well informed. Botany was, however, his favorite field, and in it he gained a very enviable reputation. He had thoroughly—none so much so—explored the plants of North Carolina from the sea to the mountains, and the monographs he published are very accurate and of great value. His correspondence on this subject, both at home and in Europe, was very extensive, and no man in the Southern States had a higher or wider reputation. For many years his investigations were mainly microscopic, and in cryptogamic botany he was in that region without a peer. The standard work of the Rev. Dr. Berkely on English mycology owed much to his minute and careful researches, and was at first published under their joined names. In the survey of the State, ordered by the Legislature, the department of natural history was entrusted to him, and his

report on the woody shrubs, etc., was of great and popular value. He had also ready for the press a treatise on edible mushrooms, which would be of much use to the people of this country, should it see the light.

These were his amusements, and such is an imperfect statement of the results. Yet they never diverted his thoughts or labors from the cure of souls, in which he delighted, or from his Master's cause, for which he lived. Besides the care of his own parish, he served for many years as a member of the Standing Committee of the Diocese of North Carolina. He was sent as a deputy to the General Convention and to the Southern Councils as often as he could be induced to accept the trust, and was the clerical trustee from North Carolina of the "University of the South," from its inception through his life, and rendered to its interests wise and faithful service.

To his family and parish, to which he was so dear, and to his diocese and brethren that so highly regarded his noble qualities and eminent usefulness, the departure of such a man is a most sad loss. One who had been in intimate relations with him for well nigh half a century may close this scanty sketch by saying that in all that time he has met no man to whom he gave a heartier esteem, or a more sincere affection; no man more true in word and deed, more steadfast in friendship, of a more beautiful simplicity, of a more sterling worth, of a more humble temper of devotion.

Science did not mislead him into the paths of skepticism; for him

"The earth was crammed with heaven,
And every common bush afire with God."

God's wondrous works were visible to him in every plant he saw, and all his converse with nature only drew him nearer to that divine life towards which it was his mission to lead his fellow men.

To our young men we point to his life as an example of the immense advantage of patient training, and of the renown it is possible to achieve by quiet, unobtrusive work, even in the stillness of the forest. Also to our young men, and to all men, we will say, his life was the proof that profound scientific study is not only not incompatible with profound faith in revealed religion, but is the safest path through which to attain it.

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