SOUTHERN CONTRIBUTIONS TO NATURAL HISTORY

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Within the narrow limits of this article one has only one of two alternatives in the discussion of this question. Either he must make his treatment of the subject a dry recital of facts or briefly stated annals for the sake of completeness, or he must choose from the great mass of details those most essential and typical or illustrative of the whole, and remain content to sacrifice completeness of detail. The writer has chosen the latter alternative, and much of paramount importance has of necessity been omitted.

When we attempt to divorce the exponents of natural history from those of other branches of physical science we are struck with the analogy of the developmental history of organisms themselves. We find that just as the lines of descent of these organisms converge back to a common ancestry in the remote past, so were our early men of science "generalized types," and often included in the same individual the chemist, the physicist, the botanist, zoologist, and geologist. As knowledge advanced we find more and more specialization until the present time. Therefore, we are not surprised to find that many of the men of more or less prominence in the early science of the South enjoy distinction in more than one field.

The Anglo-Saxon historian in America is prone to begin any branch of American history with the advent of his own race to this continent. The French and German elements have played a prominent part in their contributions to the study of natural history of the South. The early explorers from Spain touched mostly on the shores of the West Indies, Mexico, and South America.

The first Englishman of science to come to America was Thomas Harriott (1560-1621), Raleigh's mathematical tutor, who accompanied him on his voyage in 1585 and assisted in the establishment of the first English colony in this country. As was true of most scientific men of his time, Harriott was more of a mathematician and astronomer than naturalist. He published in 1590 a 33-page quarto volume entitled "Brief and True Report of the New Found Land of Virginia." In this volume he listed twenty-eight species of mammals, eighty-six of birds, a number of fishes and crustaceans and various trees, shrubs, and herbs, wild and cultivated. John With, Harriott's companion, made drawings of many species which are still preserved in the British Museum. Harriott assigned for

*The author of this paper died in January, 1919. It appears that Professor Bain had in mind a series of papers, or a book, along this general line, but his death prevented the completion of these plans.—L. R. Hesler, University of Tennessee.

the most part the Indian names to his species. Many of his characters are easily recognized by the layman as evidenced by the following: "Artamoches, the linguist; a bird that imitateth and useth the sounds and tones of almost all birds in the Countrie." American natural history thus began with Harriott, and was first planted on the shores of Virginia and North Carolina, if indeed we may dignify these early contributions as natural history. These early efforts must be attributed as much to the curiosity of the explorer as to a genuine scientific spirit.

The contribution next following Harriott's was by Captain John Smith, whose quaint descriptions were accurate and trustworthy. Goode gives some interesting quotations from his work: "An *opossum* hath a head like a Swine and a taile like a Rat, and is of the bigness of a Cat. Under her belly she hath a bagge, wherein she lodgeth, carrieth, and suckleth her young." "Plums are of three sorts—that which they call *Putchamins* grow as high as a *Palmetu;* the fruit is like a Medler; it is first greene, then yellow, and red when it is ripe; if it be not ripe it will draw a man's mouth awry with much torment." Smith thus described about twenty mammals, some birds, fish, and "Shell fish."

Raphe Humor, secretary of the Jamestown Colony, published in 1615 names of over 60 animals of Virginia. John Clayton visited Virginia in 1685 and published an important list of mammals, birds, and reptiles in the Philosophical Transactions of the Royal Society. About this time Thomas Glover, in Virginia, and Rev. Hugh Jones, in Maryland, made minor contributions. The latter collected plants and insects for Petiver.

Early in the 18th century Lawson, surveyor of the colony of North Carolina, published accurate lists and description of North Carolina plants. About the same time Bohnn and Lord (N. C.) and Vernon (Md.) also supplied specimens to Petiver in London.

During this period the collector's instinct was in the ascendancy, and many curios illustrative of the fauna and flora of Virginia, Maryland, and North Carolina found their way into the cabinets of curious monarch and tavern keepers of the Mother Country. James I and Charles I seem to have been especially active in this direction, and this doubtless contributed to a more wide-spread interest in such matters than exists even today.

Early in the 18th century the French explorers began to penetrate "Louisiana" from the North. In 1672 Denyse published two works including discussions of the natural history of the coastal and interior of our territory. Pere Laval and Le Pye Du Pratz may be mentioned as authors on various subjects relating to the natural history of Louisiana. Kalm (after whom our beautiful mountain laurel Kalmia was named) and Swartz, touched somewhat on the South.

In the latter part of the 17th century an important group of naturalists of the "new school" appeared in Virginia, among whom were Banister, Clayton, Mitchell, and Garden.

John Banister emigrated to Virginia before 1665, and was styled by John Ray, the great English naturalist, "erudissimus vir et consummatissimus Botanicus." He was the first to give serious attention to American mollusks and insects. He contributed in 1686 America's first systematic work on natural history to Ray's *Historia Plantarum, "Catalogus Plantarum in Virginia Observatarum."*

John Clayton, the naturalist (according to Thomas Jefferson, born in Virginia) published between 1739 and 1762 a work under the editorship of Gronovins, entitled *"Flora Virginica."* He was an acute botanist of his time, and left two volumes of manuscript and an herbarium, which were destroyed by fire along with the official records of new Kent County during the Revolutionary war. His name is perpetuated in the delicate little spring flower popularly known as *Spring* Beauty, *Claytonia Virginica.*

Dr. John Mitchell (1680-1772) emigrated to Virginia from England early in the 18th century, and spent nearly 50 years in the practice of his profession at Urbanna. He was a man of broad scientific tastes, and wrote on a number of different topics. He is known as a botanist and zoologist, as well as an investigator of yellow fever. He was a correspondent of Linnaeus, and the beautiful little trailer Partridge-berry, *Mitchella repens* is dedicated to his memory. Tuckerman states, "Mitchell and Clayton together gave to the botany of Virginia a distinguished lustre."

Dr. John Tenuent was a contemporary of Clayton and Mitchell, and introduced Seneca snakeroot to our materia medica.

Dr. Alexander Garden (1728-1791), of Scottish birth, was a distinguished naturalist who spent about 30 years in Charleston, South Carolina. He directed his attention to plants, fishes, and reptiles. According to Goode he was one of the most careful collectors of his day. He returned to England after the Revolutionary War, and was vice-president of the Royal Society in 1783. The well known Cape-Jasmine, *Gardenia Gardeni,* commemorates his name.

Mark Cutesby, (1679-1749) lived in Virginia and the Carolinas from 1712 to 1725, and also spent a year in the Bahamas. He wrote a valuable work on the natural history of Carolina, Florida, and the Bahamas.

John Bartram, of Philadelphia, was as active collector of plants in the southern colonies and supplied many specimens to Linnæus and his contemporaries. George III in 1765 appointed him "Botanist to his Majesty for the Floridas," with a pension of £50 a year. Bartram is, however, to be classed as a collector and enthusiastic lover of nature rather than an investigator.

Moses Bartram, a nephew of John, was also a botanist, but William Bartram (1739-1823), son of Moses, is a more noted figure in American natural history. Cones attributes the beginning of an American School of Ornithology to William Bartram's "Travels through North and South Carolina" (1791).

It is much to the credit of the American scientific men of colonial times that the revolutionary system of the immortal Linnæus found devotees at once, in striking contrast to the conservatism of English naturalists. The two distinguished Virginia botanists accepted the Linnæan reforms, as shown in the following letter from Collinson to Linnæus in 1742: "Your System I can tell you, obtains much in America. Mr. Clayton and Dr. Colden at Albany are complete professors, as is Dr. Mitchell at Urbanna, in Virginia."

Thomas Jefferson was a scientist as well as a statesman. His "Notes on Virginia" was published in 1781. This work treated of the natural history, resources, and topography of Virginia, and was the first publication of the kind brought out in the young republic. Goode says, "When Jefferson went to Philadelphia to be inaugurated Vice-President he carried with him a collection of fossil bones which he had obtained in Greenbrier County, Virginia, together with a paper, in which were formulated the results of his studies upon them. This was published in the Transactions of the American Philosophical Society, and the species (a gigantic fossil sloth) is still known as *Megalonyx Jeffersonia*. This is said to have been the first paper on paleontology presented in this country.

Jefferson maintained his interest in matters relating to natural history during his term as President. His dispatching of the Lewis and Clark expedition, the precurser of the various scientific surveys and departments of the federal government of today, is evidence of the part which he played in the development of science in this country. Goode says, "It is probable that no two men have done so much for science in America as Jefferson and Agassiz—not so much by their direct contributions to knowledge as by the immense weight which they gave to scientific interests by their advocacy." Jefferson's name is embalmed in the graceful little plant known as "twin-leaf," *Jeffersonia diphylla:*

It is a little singular that Jefferson's personal interest in natural history and his prominent part in the establishment of the University of Virginia did not result in a more widespread popular interest in the subject through the South. His service to science, however, was not so much as a propagandist as a political economist, resulting in giving science wider opportunity for development in the entire country. He was thus an important factor in the building of the nation.

Dr. Hugh Williamson (1735-1819), of North Carolina, among important contributions in other fields of science, in 1775 published in the Philosophical Transactions a paper on the electric eel.

One of the most remarkable contributors to Southern natural history was Constantine S. Rafinesque (1784-1840), who was born of French parentage at Galeta near Constantinople and came to Philadelphia in 1802. He was a pronounced, though extremely erratic, genius. It is hard to give an adequate estimate of his work. We find on the one hand that he distinctly foreshadowed the theory

of evolution, while on the other hand we find him publishing in the regular binomial nomenclature of natural history *twelve* new species of thunder and lightning! Many amusing incidents are told by his contemporaries illustrating his eccentricities. While but little of his work in natural history has stood the test, he may be regarded as a genius who deserved better of the world than he received, and who might have left the world a much greater legacy had it received him more kindly. He was for seven years professor of natural sciences in Transylvania University, and during this period worked over much of Kentucky and adjoining states. Meehan says, "He endured rarely paralleled misfortunes, and sacrificed a large fortune for the sake of science. . . . He died on a cot (in Philadelphia) with hardly a rag to cover him, and without a solitary friend to stand by him in his last hours."

Shortly after the Revolutionary War there was a lull among the naturalists of the South, and the section was henceforth destined to play a secondary part in this field. There were left Jefferson and Greenway (botanist), of Virginia; Latrobe (ichthyologist), of Baltimore, and MacBride, of South Carolina. This retrogression has been attributed partly to the sparsely settled character of the region.

John Abbot contributed the materials for the first American volume on insects, entitled "The Natural History of the Rarer Lepidopterous Insects of Georgia" (1797). The work was compiled by Sir James E. Smith. Scudder calls Abbot "the most prominent student of the life histories of insects we have ever had."

Both Michaux (father and son) visited America, and made important contributions to the botany of the South. The elder Michaux founded in 1804 at Charleston the first botanical garden in this country, which, however, was destined to a brief span of life. Several other foreign collectors made similar excursions and published their work about this time, as Basc in the Carolinas in 1800.

Dr. Lewis LeConte (1782-1838), father of Joseph and John L. LeConte, was an acute naturalist, and had a chemical laboratory and botanical garden on his plantation in Liberty County, Georgia. He refrained from publishing his own observations, which were entrusted to other contemporary naturalists. His zoological manuscripts were destroyed by fire at Columbia near the close of the Civil War.

Stephen Elliott (1771-1830) was born in Beaufort, South Carolina. He graduated in the class of 1791 at Yale, and was prominent in the political affairs of his state. He founded the Literary and Philosophical Society of South Carolina in 1813. In 1829 he was chosen professor of natural history and botany in South Carolina Medical College. His chief work was his "Sketch of the Botany of South Carolina and Georgia" (1821-1827). In this work he was assisted by Dr. James MacBride, another South Carolina naturalist of note. Elliott's descriptions were all at first hand. The characters of each species were given in parallel in Linnæn Latin and

English. He exhibited great discriminative skill in his diagnoses of forms, and his work among the difficult family of grasses was especially well done. His herbarium is still in the custody of South Carolina College, at Charleston, and is frequently consulted by botanists. The Elliott Society of Natural History, founded at Charleston in 1853, commemorated his labors. Rovend says, "The versatility as well as the vigor of Mr. Elliott's mind may be seen in the variety of attainments in which he excelled. Beginning life as a legislator, in which capacity he served for many years, he took prominent and leading parts in many of the important measures of that time."

Gerard Troost (1776-1850) was born and educated in Holland, and came to Philadelphia in 1810. He helped to found the Philadelphia Academy and was its first president. In 1827 he was appointed professor of chemistry, mineralogy, and geology in the University of Nashville. He was also state geologist of Tennessee from 1831 to 1849, and in this capacity brought out some of the first state geological reports published in this country. He made important studies of Tennessee and its geology, publishing papers on a variety of topics. He appears to have appreciated dimly the importance of fossils in determining the age of rocks. His extensive list of titles (Glenn: Am. Geol. *35:* 90-94, 1905) comprises matter on mineralogy, geology, and paleontology. One of his important papers on Crinoids found its way into the hands of James Hall, state geologist of New York, who kept it until the latter's death, after which, as shown by Glenn, it appeared that Hall had described from time to time many of Troost's species, thus robbing Troost of the fruits of his labor.

John James Audubon (1780-1851) was born near New Orleans, and had his first lessons in art under the tuition of David, the French painter. While a man of affairs in his younger days, he began his monumental work of portraits of American birds, which Cuvier, the great French anatomist, pronounced "art's greatest monument of nature." Audubon is to be classed as an artist rather than a man of science, though his work must be considered as one of the world's great contributions to natural history. When one reads of Audubon's enthusiastic devotion to his work and his privations in the forests, there is a distinct touch of pity for the man of genius. In order to atone for his lack of knowledge of zoology he frequently associated with himself men of technical training, as Bachman and Baird.

Having now considered a few representatives among the earlier Southern naturalists, a few types will now be considered among the more recent ones. In the choice of them one is at a loss to select. Many must be omitted that ought to be included, such as John Edwards Holbrook, of South Carolina, the author of a monumental work on the reptiles of North America (1842).

Southern science owes a great debt to New England and her older institutions of learning. Among the men who came here from

that section may be mentioned Rev. Moses A. Curtis, who was born in Berkshire County, Massachusetts, in 1808. At the age of 22 he went to Wilmington, North Carolina, as tutor in the family of Governor Dudley. He was a very active and energetic botanist. In 1834 he published an "Enumeration of the Plants Growing Spontaneously around Wilmington, North Carolina." Among the plants he especially investigated may be mentioned Venus's Fly-trap (*Dionaea muscipula*), the most remarkable plant growing in this country. Curtis entered the ministry in 1835, and spent some time as an Episcopal missionary in Western North Carolina. He carried his plant portfolio with him, and collected specimens in the mountainous region. Asa Gray said of him, "No living botanist is so well acquainted with the vegetation of the Southern Alleghany Mountains." While Curtis published some papers on the flowering plants of North Carolina, he is best known as a student of the fungi. When one considers that in his day there was no descriptive manual of these remarkable and difficult plants, he is led to marvel at the skill and perseverance he displayed in working them out. He paid especial attention to the edible mushrooms, and published several papers on this subject. In 1867 he published a "Catalogue of the Indigenous and Naturalized Plants of North Carolina," enumerating 4,800 species. This was the first attempt made in the United States to list the lower as well as the higher forms of a local flora.

Henry William Ravenel (1814-1887) was born in the parish of St. John's, Berkley, South Carolina. He graduated with distinction at South Carolina College in 1832. He formed early in life a passion for natural history, which soon centered on the field of botany. As a result of an attack of illness resulting in serious impairment of his hearing, he was debarred from a career as a teacher in his chosen field. He devoted himself, like his friend Curtis of North Carolina chiefly to the fungi. Professor Farlow his biographer, says: "It is doubtful whether any other American botanist has ever covered so wide a range of plants . . . . He discovered a surprisingly large number of new species . . . . For a long time he and his friend, the late Rev. M. A. Curtis of North Carolina, were practically the only Americans who knew specifically the fungi of the United States." Between 1853 and 1860, he published "Fungi Caroliniani Exsiccati," which was the pioneer in this field in America. He also published a number of minor papers, not however commensurate with his actual services to science. Prof. Farlow says: "Apart from the publications which bear his name, if we would correctly estimate his contributions to American botany, we must also include the very numerous notes and comments furnished by him to other writers, through whose pages they are scattered a monument to his liberality and freedom from professional jealousy as well as to his industry and acuteness." Ravenel's name is perpetuated in the very peculiar genus of rusts, *Ravenelia*.

The German Revolution of 1848 sent to America a number of worthy citizens, including prominent naturalists of which the South

obtained a share. Among these may be mentioned Gattinger, of Tennessee, and Mohr, of Alabama.

Charles Theodore Mohr was born in Esslingen on the Neckar December 28, 1824. He brought with him to America that enthusiastic devotion to science for which his countrymen are so justly celebrated. After a rather varied career in several sections of the country, he finally settled in Mobile in 1857. Here he engaged in a profitable drug business until the period of the Civil War, during which time he was employed by the Confederate Government in manufacturing and testing drugs. Dr. Mohr subsequently came into touch with the prominent botanists of the country and contributed a number of papers especially along economic lines. The greater part of Dr. Mohr's collections are the property of the Alabama Geological Survey, and are deposited with the University of Alabama. His name is perpetuated in the beautiful shrub, *Mohrodendron*, Silver Bells, which grows in his adopted state. Dr. Mohr was a careful, painstaking student and kept fully abreast of the advancing thought in his field, even to his ripe old age, as indicated by the fact that he spent his last days classifying and arranging the herbarium of the University of Alabama according to the latest advanced system of Engler and Prantl. Mohr's chief work was "Plant Life of Alabama," published in 1900 by the U.S. Department of Agriculture from materials furnished by the Alabama Geological Survey.

(*To be continued*)