

ART. XVII.—*Memorial of George Bentham*; by ASA GRAY.

[From the Report of the Council of the American Academy of Arts and Sciences, for the year 1884-5.]

GEORGE BENTHAM, one of the most distinguished botanists of the present century, and at the time of his death one of the oldest, was born at Stoke, a suburb of Portsmouth, September 22, 1800. He died at his house, No. 25 Wilton Place, London, on the 10th of September, 1884, a few days short of 84 years old. His paternal grandfather, Jeremiah Bentham, a London attorney or solicitor, had two sons, who both became men of mark, Jeremy and Samuel. The latter and younger had two sons, only one of whom, the subject of this memoir, lived to manhood. George Bentham's mother was a daughter of Dr. George Fordyce, a Scottish physician who settled in London, was a Fellow of the Royal Society, a lecturer on chemistry, and the author of some able medical works, also of a treatise upon Agriculture and Vegetation. It was from his mother that George Bentham early imbibed a fondness for botany.

The early part of his life and education was somewhat eventful and peculiar, and in strong contrast with the later. His father, General, subsequently Sir Samuel Bentham, was an adept in naval architecture. At the age of twenty-two he visited the arsenals of the Baltic for the improvement of his knowledge; thence he traveled far into Siberia. He became intimate with Prince Potemkin, by whom he was induced to enter the civil and afterwards the military service of the Empress Catharine. He took part in a naval action against the Turks on the Black Sea, and was rewarded with the command of a regiment stationed in Siberia, with which he traversed the country even to the frontiers of China. After ten years he returned to England, where his inventive skill and experience found a fitting field in the service of the Admiralty, in which he attained the post of Inspector-General of Naval Works. Among the services he rendered was that of bringing to England the distinguished engineer, Isambard Mark Brunel. In the year 1805, Gen. Bentham was sent by the Admiralty to St. Petersburg to superintend the building in Russia of vessels for the British Navy. He took his family with him; and there began the education of George Bentham, in the fifth year of his age, under the charge of a Russian lady who could speak no English, where he learned to converse fluently in Russian, French, and German, besides acquiring the rudiments of Latin as taught by a Russian priest. On the way back to England two or three years later, the detention of a month or

two in Sweden gave opportunity for learning enough of Swedish to converse in that language and to read it with tolerable ease in after life. Returning to England the family settled at Hampstead, and the children pursued their studies under private tutors. In the years 1812–13, during the excitement produced by the French invasion of Russia and the burning of Moscow, our young polyglot “budded into an author, by translating (along with his brother and sister) and contributing to a London magazine a series of articles from the Russian newspapers, detailing the operations of the armies.” In 1814, upon the downfall of Napoleon, the Bentham family crossed over to France, prepared for a long stay, remained in the country (at Tours, Saumur, and Paris) during the hundred days preceding Napoleon’s final overthrow; and in 1816 Sir Samuel Bentham set out upon a prolonged and singular family tour, *en caravane*, through the western and southern departments of France. To quote from the published account from which most of these biographical details are drawn, and which were taken from Mr. Bentham’s own memoranda:\*

“The *cortège* consisted of a two-horse coach fitted up as a sleeping apartment; a long, low, two-wheeled, one-horse spring van for Gen. and Mrs. Bentham, furnished with a library and piano; and another, also furnished, for his daughters and their governess. The plan followed was to travel by day from one place of interest to another, bivouacking at night by the road, or in the garden of a friend, or in the precincts of the prefectures, to which latter he had credentials from the authorities in the capital. In this way he visited Orleans, Tours, Angoulême, Bordeaux, Toulouse, Montpellier, and finally Montauban, where a lengthened stay was made in a country house hired for the purpose. From Montauban (the *cortège* having broken down in some way) they proceeded still by private conveyances to Carcassone, Narbonne, Nîmes, Tarascon, Marseilles, Toulon, Hyères.”

It was in the early part of this tour that young Bentham’s attention was first turned to botany. Happening to take up DeCandolle’s edition of Lamarck’s *Flore Française*, which his mother, who was fond of the subject, had just purchased, he was struck with the methodical analytical tables, and he proceeded immediately to apply them to the first plant he could lay hold of. “His success led him to pursue the diversion of naming every plant he met with.” During his long stay at Montauban he entered as a student in the Protestant theological school of that town, pursuing, “with ardor the courses of mathematics, Hebrew, and comparative philology, the latter a favorite study in after life,” and at home giving himself to

\* An article in *Nature*, October 2, 1884, by Sir Joseph Dawson Hooker.

music, in which he was remarkably gifted, to Spanish, to botany, and, with great relish, to society. Soon after, the family was established upon a property of 2,000 acres, purchased by his father in the vicinity of Montpellier. Here he resumed the intimacy of his boyhood with John Stuart Mill, who was five years his junior, and whose life-long taste for botany was probably fixed during this residence of seven or eight months in the Bentham family in the year 1820. About this time Bentham occupied himself with ornithology and then with entomology, finding time, however, for another line of study; for at the age of twenty he had begun a translation into French of his uncle Jeremy's *Chrestomathia*, which was published in Paris some years afterwards, and he soon after translated also the essay on *Nomenclature and Classification*. This was followed by his own *Essai sur la Nomenclature et Classification*, published in Paris. This, his original scientific production, was one of some mark, for it is praised by Stanley-Jevons in his recent *History of the Sciences*.

On attaining his majority, his elder and only brother having died, he was placed in management of his father's Provençal estate, an employment which he took up with alacrity and prosecuted with success, turning to practical account his methodical habits, his indomitable industry, and his familiarity with Provençal country life and language. The latter he spoke like a native. A language always seemed to come to him without effort. Meanwhile his leisure hours were given to philosophical studies, his holidays to botanical excursions into the Cevennes and the Pyrenees. In the year 1823, a visit to England upon business relating to his father's French estate, where it seemed probable that he was to spend his life, was followed by circumstances which gave him back to his native country. He brought to his uncle Jeremy a French translation of the latter's *Chrestomathia*; he made the acquaintance of Sir James Edward Smith, Robert Brown, Lambert, Don, and the other English botanists of the day; visited Sir William, then Professor Hooker, at Glasgow, and Walker Arnott in Edinburgh; took the latter with him the next summer to France, where the two botanists herborized together in Languedoc and the Pyrenees; and, returning to London, he accepted his uncle's pressing invitation to remain and devote a portion of his time to the preparation of the latter's manuscripts for the press, at the same time pursuing legal studies at Lincoln's Inn. He was in due time called to the bar, and in 1832 he held his first and last brief. In that year Jeremy Bentham died, bequeathing most of his property to his nephew. This was much less than was expected, owing to bad management on his uncle's part and to the extravagant sums spent by his

executors in the publication of the philosopher's posthumous works. But it sufficed, in connection with the paternal inheritance, which fell to him the year previous, for the modest independence which allowed of undistracted devotion to his favorite studies. These were for a time divided between botany, jurisprudence, and logic, not to speak of editorial work upon his father's papers relating to the management of the navy and the administration of the national dock yards.

The first publication was botanical, and was published in Paris, in the year 1826, his *Catalogue des Plantes Indigènes des Pyrénées et du Bas Languedoc*. To this is prefixed an interesting narrative of a botanical tour in the Pyrenees, and some remarks upon the mode of preparing such catalogues in order to their greatest utility,—remarks which already evince the wisdom for which he was distinguished in after years. He also reformed and re-elaborated four difficult genera of the district. *Cerastium*, *Orobanche*, *Helianthemum*, and *Medicago*. The next, perhaps, was an article upon codification—wholly disagreeing with his uncle—which attracted the attention of Brougham, Hume and O'Connell; also one upon the laws affecting larceny, which Sir Robert Peel complimented and made use of, and another on the law of real property.

But his most considerable work of the period received scant attention at the time from those most interested in the subject, and passed from its birth into oblivion, from which only in these later years has it been rescued, yet without word or sign from its author. This work (of 287 octavo pages) was published in London in 1827, under the title of "*Outline of a New System of Logic, with a critical examination of Dr. Whately's Elements of Logic.*" It was in this book that the quantification of the predicate was first systematically applied, in such wise that Stanley-Jevons\* declares it to be "undoubtedly the most fruitful discovery made in abstract logical science since the time of Aristotle." Before sixty copies of the book had been sold, the publisher became bankrupt, and the whole impression of this work of a young and unknown author was sold for waste paper. One of the extant copies, however, came into the hands of the distinguished philosopher, Sir William Hamilton, to whom the discovery of the quantification of the predicate was credited, and who, in claiming it, brought "an acrimonious charge of plagiarism" against Professor De Morgan upon this very subject. Yet this very book of Mr. Bentham is one of the ten placed by title at the head of Sir Wm. Hamilton's article on logic in the *Edinburgh Review* for April, 1838, is once or twice referred to in the article, and, a dozen years later, in the course of the controversy with De Morgan, Sir William

\* In *Contemporary Review*, xxi, 1873, p. 823.

alluded to this article as containing the germs of his discovery. We may imagine the avidity with which De Morgan, injuriously attacked, would have seized upon Mr. Bentham's book if he had known of it. It is not so easy to understand how Mr. Bentham—although now absorbed in botanical researches—could have overlooked this controversy in the *Athenæum*, or how, if he knew of it, he could have kept silence. It was only at the close of the year 1850, that Mr. Warlow sent from the coast of Wales a letter to the *Athenæum*, in which he refers to Bentham's book as one which had long before anticipated this interesting discovery. Although Hamilton himself never offered explanation of his now unpleasant position (for the note obliquely referring to the matter in the second edition of his *Discussions* is not an explanation), Mr. Baine did (in the *Athenæum* for Feb. 1, 1851) immediately endeavor to discredit the importance of Bentham's work, and again in 1873 (*Contemporary Review*, xxi), in reply to Herbert Spencer's reclamation of Bentham's discovery. To this Stanley-Jevons made reply in the same volume (pp. 821–824); and later, in his *Principles of Science* (ii. 387), this competent and impartial judge, in speaking of the connection of Bentham's work "with the great discovery of the quantification of the predicate," adds:

"I must continue to hold that the principle of quantification is explicitly stated by Mr. Bentham; and it must be regarded as a remarkable fact in the history of logic, that Hamilton, while vindicating in 1847, his own claims to originality and priority as against the scheme of De Morgan, should have overlooked the much earlier and more closely related discoveries of Bentham."

It must be that Hamilton reviewed Bentham's book without reading it through, or that its ideas did not at the time leave any conscious impression upon the reviewer's mind, yet may have fructified afterwards.

After his uncle's death in 1822, Mr. Bentham gave his undivided attention to Botany. He became a Fellow of the Linnean society in 1828. Robert Brown soon after presented his name to the Royal Society, but withdrew it before the election, to mark the dissatisfaction on the part of scientific men with the management of the society when a Royal Duke was made president. Consequently he did not become F. R. S. until 1862. In 1829, when the Royal Horticultural Society was much embarrassed, he accepted the position of Honorary Secretary, with his friend Lindley as associate. Under their management it was soon extricated from its perilous condition, attained its highest prosperity and renown, and did its best work for horticulture and botany. In 1833 he married the daughter of Sir Harford Brydges, for many years British

Ambassador in Persia, and the next year he took up his residence in the house in Queen Square Place, Westminster, inherited from his uncle, in which Jeremy Bentham and his own paternal grandfather had dwelt for almost a century. The house no longer exists, but upon its site stands the western wing of the "Queen Anne Mansions." The summer of 1836 was passed in Germany, at points of botanical interest and wherever the principal herbaria are preserved, the whole winter in Vienna. Some account of this tour and interesting memoranda of the botanists, gardens, and herbaria visited, communicated in familiar letters to Sir William Hooker, were printed at the time (without the author's name) in the second volume of the *Companion to the Botanical Magazine*. Similar visits for botanical investigation, mingled with recreation, were made almost every summer to various parts of the continent; in one of them he revisited the scenes of his early boyhood in Russia, traveled with Mrs. Bentham to the fair at Nischni-Novgorod, and thence to Odessa, by the rude litter-like conveyances of the country.

In 1842 he removed with his herbarium to Pontrilas House in Herefordshire, an Elizabethan mansion belonging to his brother-in-law, and combined there the life of a country squire with that of a diligent student, until 1854, when, returning to London, he presented his herbarium and botanical library to the Royal Gardens at Kew, where they were added to the still larger collections of Sir William Hooker. After a short interval Mr. Bentham took up his residence at No. 25 Wilton Place, between Belgrave Square and Hyde Park, which was his home for the rest of his life. Thence, autumn holidays excepted, with perfect regularity for five days in the week he resorted to Kew, pursued his botanical investigations from ten to four o'clock, then, returning, he wrote out the notes of his day's work before dinner, hardly ever breaking his fast in the long interval. With such methodical habits, with freedom from professional or administrative functions which consume the precious time of most botanists, with steady devotion to his chosen work, and with nearly all authentic materials and needful appliances at hand or within reach, it is not surprising that he should have undertaken and have so well accomplished such a vast amount of work: and he has the crowning merit and happy fortune of having completed all that he undertook.

Nor did he decline duties of administration and counsel which could rightly be asked of him. The Presidency of the Linnean Society, which he accepted and held for eleven years (1863 to 1874), was no sinecure to him; for he is said to have taken on no small part of the work of Secretary, Treasurer, and Botanical Editor. Somewhat to the surprise of his younger

associates, who knew him only as the recluse student, he made proof in age of the fine talent for business and the conduct of affairs which had distinguished his prime in the management of the Horticultural Society; and in his annual presidential addresses, which form a volume of permanent value, his discussions of general as well as of particular scientific questions and interests bring out prominently the breadth and fulness of his knowledge and the soundness of his judgment.

The years which followed his retirement from the chair of the Linnean Society, at the age of seventy-three, were no less laborious or less productive than those preceding; at the age of eighty (as the writer can testify) the diminution of bodily strength had wrought no obvious abatement of mental power and not much of facility; and he was able to finish in the spring of 1883 the great work upon which he was engaged. As was natural his corporeal strength gave way when his work was done. After a year and a half of increasing debility he died simply of old age—the survivor of his wife for three or four years, the last of the Benthams, for he had no children, nor any collateral descendants of the name.

A large part of his modest fortune was bequeathed to the Linnean Society, to the Royal Society, for its scientific relief fund, and in other trusts for the promotion of the science to which his long life was so perseveringly devoted.

The record of no small and no unimportant part of a naturalist's work is to be found in scattered papers, and those of George Bentham are quite too numerous for individual mention. The series begins with an article upon *Labiatae*, published in the *Linnæa* in 1831; it closes with one in the *Journal of the Linnean Society*, read April 19, 1883, indicating the parts taken by the two authors in the elaboration of the *Genera Plantarum*, then completed. Counting from the date of the *Catalogue of Pyrenean plants*, 1826, there are fifty-seven years of authorship. His first substantial volume in botany was the *Labiatarum Genera et Species*, or a description of the genera and species of plants of the order *Labiatae* with their general history, characters, affinities, and geographical distribution, an octavo of almost 800 pages, of which the first part was published in 1832, the last in 1836. He found even the European part of this large order in much confusion; his monograph left its seventeen hundred and more of species so well arranged (under 107 genera and in tribes of his own creation), that there was little to alter, except as to the rank of certain groups, when he revised them for the *Prodromus* in 1848, and finally revised the genera (now increased to 136, and with estimated species almost doubled) for the *Genera Plantarum* in 1876. Although the work of a beginner, it took rank as the best extant monograph of its kind,

viz: one of a large natural order, without plates. In it Mr. Bentham first set the example, in any large way, of consulting all the available herbaria for the inspection and determination of type-specimens. To this end he made journeys to the continent every year from 1830 to 1834, visiting nearly all the public and larger private herbaria.

In the years during which the monograph of *Labiatae* was in progress, Mr. Bentham elaborated and published the earlier of the papers which have particularly connected his name with North American Botany. These are, first, the reports on some of the new ornamental plants raised in the Horticultural Society's Garden from seeds collected in Western North America by Douglas, under the auspices of that society, by which were first made known to botanists and florists so many of the characteristic genera and species of Oregon and California, now familiar in gardens, *Gilia* and *Nemophilas*, *Limnanthes*, *Phacelias*, *Brodiaeas*, *Calochorti*, *Eschscholtzias*, *Collinsias*, and the like; then the monograph of *Hydrophyllae* (1834), followed the next year by that on *Hosackia*, and that on the *Eriogonae*,—all American and chiefly North American plants,—the first fruits of a great harvest which even now has not wholly been gathered in, the field is so vast, though the laborers have not been few. Later the *Plantae Hartwegianae*, an octavo volume begun in 1839, but finished in 1857 with the Californian collections; and in 1844, the *Botany of the Voyage of the Sulphur*, in quarto, the first part of which relates to Californian botany. The various papers upon South American Botany are even more numerous; one of them being that in which *Heliamphora*, of British Guiana, a new genus of Pitcher Plants, of the *Sarracenia* family, was established.

Bentham's labors upon the great order *Leguminosae* began early, with his *Commentationes de Leguminosarum Generibus*, published in the Annals of the Vienna Museum, being the work of a winter's holiday (1836-7) passed in that capital, in the herbarium then directed by Endlicher. This was followed by a series of papers, mostly monographs of genera, in Hooker's Journal of Botany, in the Journal of the Linnean Society, and elsewhere, by the elaboration of the order for the imperial Flora Brasiliensis, and later, by the *Revision of the Genus Cassia* and that of the *Sub-order Mimoseae*, in the Transactions of the Linnean Society, the latter (a quarto volume in size) published as late as the year 1875. Both are perfect models of monographical work.

An important series of monographs in another and more condensed form was contributed to DeCandolle's *Prodromus*, namely, the Tribe *Ericaceae* in the seventh volume, the *Polemoniaceae* in the ninth, the *Scrophulariaceae* in the tenth, the *Labiatae*



forming the greater part of the twelfth, and the *Eriogoneæ* in the fourteenth; these together filling 1133 pages according to the surviving editor. If not quite the largest collaborator of the DeCandolles, as counted in pages, he was so in the number of plants described, and his work was of the best. It was also ready in time, which is more than can be said of the collaborators in general.

There are few parts of the world upon the botany of which Mr. Bentham has not touched—Tropical America, in the ample collections of Mr. Spruce, and those of Hartweg, distributed, and the former partly and the latter wholly determined by him, as also Hinds' collections made in the voyage of the *Sulphur*, besides what has already been adverted to; Polynesia, from Hinds' and Barclay's collections; Western Tropical Africa, in the Niger Flora, most of the *Flora Nigritiana* being from his hand; the *Flora Hongkongensis*, in which he began the series of British Colonial floras, and finally that vast work, the *Flora Australiensis*, in seven volumes, which the author began when he was over sixty years old and finished when he was seventy-seven. Nor did he neglect the cultivation of the narrow and more exhausted field of British Botany. His *Handbook of the British Flora*, for the use of beginners and amateurs, published in 1858, has gone through four large editions. Its special object was to enable a beginner or a mere amateur, with little or no previous scientific knowledge and without assistance, to work out understandingly the characters by which the plants of a limited flora may be distinguished from each other, these being expressed as much as possible in ordinary language, or in such technical terms as could be fully explained in the book itself and easily apprehended by the learner. The immediate and continued popularity of this handy volume, bringing the light of full knowledge and sound method to guide the beginner's way, illustrates the advantage of having elementary works prepared by a master of the subject, whenever the master will take the necessary pains. To the same end, the author prepared for this volume an excellent and terse introduction to structural and descriptive botany, which has been prefixed to all the Colonial Floras. In the first edition to this British Flora it was attempted to use or to give English names to the genera and species throughout. This could be done only in such a familiar and well-trodden field as Britain, where almost every plant was familiar; but even here it failed, and in later editions the popular names were relegated to a subordinate position.

It has been stated that Mr Bentham was over sixty years old when he undertook the *Flora Australiensis*, and he was seventy-seven when he brought this vast work to completion,

assisted only in notes and preliminary studies by Baron von Mueller of Melbourne. About the same time he courageously undertook the still greater task of a new *Genera Plantarum*, to be worked out, not, like that of Endlicher, mainly by the compilation of published characters into a common formula, but by an actual examination of the extant materials, primarily those of the Kew herbaria,—this work, however, in conjunction with his intimate associate, Sir Joseph Hooker. This work is the only “joint production” in which Mr. Bentham ever engaged. The relations and position of the two authors made the association every way satisfactory, and the magnitude of the task made it necessary. The training and the experience of the two associates were very different and in some ways complementary, one having the greatest herbarium knowledge of any living botanist, the other, the widest and keenest observer of vegetable life under “whatever climes the sun’s bright circle warms,” as well as of Antarctic regions which it warms very little. It would be expected, on the principle “juniores ad labores,” that the laboring oar would be taken by the younger of the pair. It was long and severe work for both; but the veteran was happily quite free from, and his companion heavily weighted by, onerous official duties and cares; and so it came to pass that about two-thirds of the orders and genera were elaborated by Mr. Bentham. In April, 1883, the completion of the work (i. e. of the genera of Phænogamous plants, to which it was limited) closed this long and exemplary botanical career; and the short account which he gave to the Linnean Society on the nineteenth of that month, specifying the conduct of the work and the part of the respective authors, was his last publication.

In this connexion, mention should also be made of the essays (which he simply calls “Notes”) upon some of the more important orders which he investigated for the *Genera Plantarum*,—the Compositæ, the Campanulaceous and the Oleaceous orders, the Monocotyledoneæ as to classification, the Euphorbiaceæ, the Orchis family, the Cyperaceæ and the Gramineæ. These are not mere abstracts, issued in advance, but critical dissertations, with occasional discussions of some general or particular question of terminology or morphology. When collected they form a stout volume, which, along with the volume made up of his anniversary addresses when president of the Linnean Society, and the paper on the progress and state of systematic botany, read to the British Association for the Advancement of Science in 1874, should be much considered by those who would form a just idea of the largeness of Mr. Bentham’s knowledge and the character of his work.

It will have been seen that Mr. Bentham confined himself to the Phænogamia, to morphological, taxonomical and descriptive work, not paying attention to the Cryptogamia below the Ferns, nor to vegetable anatomy, physiology, or palæontology. He was what will now be called a botanist of the old school. Up to middle age and beyond he used rather to regard himself as an amateur, pursuing botany as an intellectual exercise. "There are diversities of gifts;" perhaps no professional naturalist ever made more of his, certainly no one ever labored more diligently, nor indeed more successfully over so wide a field, within these chosen lines. For extent and variety of good work accomplished, for an intuitive sense of method, for lucidity and accuracy, and for insight, George Bentham may fairly be compared with Linnæus, DeCandolle, and Robert Brown.

His long life was a perfect and precious example, much needed in this age, of persevering and thorough devotion to Science while unconstrained as well as untrammelled by professional duty or necessity. For those endowed with leisure, to "live laborious days" in her service, it is not a common achievement.

The tribute which the American Academy of Sciences pays to the memory of a deceased Foreign Honorary Member might here fittingly conclude. But one who knew him long and well may be allowed to add a word upon the personal characteristics of the subject of this memorial; the more so that he is himself greatly indebted for generous help. For, long ago, when in special need of botanical assistance, Mr. Bentham invited him and his companion to his house at Pontrilas, and devoted the greater part of his time for two months to this service. Mr. Bentham's great reserve and dryness in general intercourse and his avoidance of publicity might give the impression of an unsympathetic nature. But he was indeed most amiable, warm-hearted, and even genial, "the kindest of helpmates," the most disinterested of friends.