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C. Chemistry—W. P. MASON, of Troy, N. Y.

D. Mechanical Science and Engineering—JOHN GALBRAITH, of Toronto, Canada.

E. Geology and Geography—I. C. WHITE, of Morgantown, W. Va.

F. Zoology—G. BROWN GOODE, of Washington, D. C.

G. Botany—GEORGE F. ATKINSON, of Ithaca, N. Y.

H. Anthropology—W J MCGEE, of Washington, D. C.

I. Social and Economic Science—RICHARD T. COLBURN, of Elizabeth, N. J.

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*BOTANICAL GARDENS.**

ORIGIN AND DEVELOPMENT.

THE cultivation of plants within small areas for their healing qualities by the monks of the middle ages appears to have been the beginning of the modern botanical garden, although these mediæval gardens doubtless took their origin from others of greater antiquity. Botanical gardens were thus primarily formed for purely utilitarian purposes, although the æsthetic study of planting and of flowers must doubtless have appealed to their owners and visitors. Their function as aids in scientific teaching and research, the one which at present furnishes the dominating reason for their existence, did not develop much, if at all, before the 16th century, and prior to the middle of the 17th century a considerable number existed in Europe, in which this function was recognized to a greater or less degree, of which those at Bologna, Montpellier, Leyden, Paris and Upsala were, perhaps, the most noteworthy. The ornamental and decorative taste for planting had meanwhile been slowly gaining ground, as well as the desire to cultivate rare or unusual species, and during the 18th century attained a high degree of development. Many persons of wealth and influence fostered this taste and became, through the employment of men skilled in botany and horticulture, generous patrons of science. The world was searched for new and rare plants, which were brought home to Europe for cultivation, and many sumptuous volumes, describing and delineating them, were published, mainly through the same patronage. The older gardens were essentially private institutions, but as the rights of the people became more and more recognized, many existing establishments and an increasing number of newly founded ones became, to a greater or less extent, open to the public, either through an admittance fee or without charge. The four main elements of the modern botanical garden have thus been brought into it successively:

1. The utilitarian or economic.
2. The æsthetic.

* Vice-Presidential address before Section G, American Association for the Advancement of Science, Buffalo, N. Y., August 24, 1896.

3. The scientific or biologic.
4. The philanthropic.

These four elements have been given different degrees of prominence, depending mainly upon local conditions, some gardens being essentially æsthetic, some mainly scientific, while in our public parks we find the philanthropic function as the underlying feature, usually accompanied by more or less of the æsthetic and scientific.

The Economic Element.—In the broadest extension of this department of a botanical garden there might be included, to advantage, facilities for the display and investigation of all plants directly or indirectly useful to man, and their products. This conception would include forestry, pharmacognosy, agriculture, pomology, pathology and organic chemistry, and, in case the management regards bacteria as plants, bacteriology.

The display of the plants may be effected by growing such of them as will exist without protection in the locality in a plot, more or less individualized, commonly known as the Economic Garden, while those too tender for cultivation in the open are grown in the greenhouses, either in a separate house or section, or scattered through the several houses or sections, in the temperatures best adapted to their growth. The display of plant products, best accompanied by mounted specimens of the species yielding them, by photographs and by plates, is accomplished by the Economic Museum, where these are arranged in glass or glass-fronted cases, suitably classified and labeled. It is believed that the most useful results are obtained by arranging this museum by the products themselves, and thus not in biologic sequence, but by bringing together all drugs, all fibres, all woods, all resins; where the same product is used in more than one industry the exhibit may be duplicated, more or less modified, without disadvantage.

The investigation of economic plants and their products is accomplished through the Scientific Department, and few valuable results can be reached unless the scientific equipment is well developed. The two departments must work conjointly, both on account of the necessity of knowing just what species is under investigation, its structure, distribution and literature, and in order that the most approved and exact methods may be used in the research. Any idea that the scientific element can be dispensed with in connection with economic studies is palpably untenable.

Teaching and research in agriculture, pomology and plant pathology are so well organized in America, through our National Department of Agriculture and our numerous agricultural colleges and schools, that there is no great necessity for providing elaborate equipments for those branches in botanical gardens. But in case the endowment of a garden were sufficiently large to enable them to be successfully prosecuted, in addition to more necessary work, there can be no doubt that important additions to knowledge would be obtained. On the other hand, no such liberal allowances have been made with us for forestry or pharmacognosy, and research and instruction in these sciences must prove of the greatest benefit to the country.

The Æsthetic Element.—The buildings, roads, paths and planting of a botanical garden should be constructed and arranged with reference to tasteful and decorative landscape effect. The possibilities of treatment will depend largely upon the topographical character of the area selected and the natural vegetation of the tract. The buildings required are: A fire-proof structure or structures for museum, herbarium, libraries, laboratories and offices; a glass house with compartments kept at several different temperatures for exhibition, propagation and experimentation, or several

separate glass houses; and to these will usually be added dwelling houses for some of the officers, a stable and other minor buildings. The character, number and sizes of the buildings generally depend on financial considerations. In placing the structures intended for the visiting public, considerations of convenient access, satisfactory water supply and the distribution of crowds must be borne in mind, in connection with the landscape design. The planting should follow, as nearly as possible, a natural treatment, except immediately around the larger buildings and at the entrances, where considerable formality is desirable for architectural reasons. It is especially desirable that as much natural treatment as possible should be given to the areas devoted to systematic planting—herbaceous grounds, frutecetum, arboretum. The rectilinear arrangement of plant beds found in most of the older gardens has become abhorrent to landscape lovers, and the sequence of families desired can usually be quite as well obtained by means of curved-margined groups.

The cultivation of decorative plants, and especially the fostering of a taste for them, and the bringing of unusual or new species to attention and effecting their general introduction, are important functions of a botanical garden. For the accurate determination of these plants, information concerning their habits and structure, and suggestions regarding the conditions of their growth, the æsthetic side must rely on the scientific.

The Scientific or Biologic Element.—The important relations of the scientific department to the economic and æsthetic have already been alluded to. The library, herbarium, museums and laboratories are the sources whence exact information regarding the name, structure, habits, life-processes and products of plants are derived, and they are the more useful as they are the more complete and thoroughly equipped. It is practically impossible for any one library to have all the literature of botany and related sciences; any one herbarium to possess an authentic and complete representation of all species of plants, or any one museum to be thoroughly illustrative; absolute perfection along these lines cannot be obtained, but the more closely it is approximated the better the results. The research work of the scientific department should be organized along all lines of botanical inquiry, including taxonomy, morphology, anatomy, physiology and paleontology, and the laboratories should afford ample opportunities and equipment for their successful prosecution.

The arrangement of the areas devoted to systematic planting, and the proper labeling of the species grown, are important duties of the scientific department. The sequence of classes, orders and families is usually made to follow some 'botanical system.' It is highly desirable that this should be a system which indicates the natural relations of the families, as understood at the time the garden is laid out, and be elastic enough to admit of subsequent modification, as more exact information relative to those relationships is obtained. The weight of present opinion is overwhelmingly in favor of an arrangement from the more simple to the more complex, and this will apply not only to the systematic plantations, but to the systematic museum and the herbarium.

The scientific possibilities of a botanical garden are the greater if an organic or co-operative relationship exists between it and a university, thus affording ready facilities for information on other sciences.

The Philanthropic Element.—A botanical garden operates as a valuable philanthropic agency, both directly and indirectly. Its direct influence lies through its affording an orderly arranged institution for the instruction, information and recreation of the people,

and it is more efficient for these purposes than a park, as it is more completely developed and liberally maintained. Its indirect, but equally important, philanthropic operation is through the discovery and dissemination of facts concerning plants and their products, obtained through the studies of the scientific staff and by others using the scientific equipment.

NUMBER AND DISTRIBUTION OF BOTANICAL GARDENS.

There are somewhat over 200 institutions denominated botanical gardens, but only a few of them meet the requirements of the foregoing sketch. Some are essentially pleasure parks, with the plants more or less labeled; most of them pay some attention to taxonomy and morphology; many to economic botany; while a small number are admirably equipped in all branches of the science.

I have drawn freely on Prof. Penhallow's first annual report of the Montreal Botanical Garden, published in 1886, for the following approximate statement of the number in different countries:

Algeria, 1.	Italy, 23.
Australia, 5.	Japan, 1.
Austro-Hungary, 13.	Java, 1.
Belgium, 5.	Malta, 1.
Brazil, 2.	Mauritius, 1.
Canada, 1.	Natal, 1.
Canary Islands, 1.	New Zealand, 1.
Cape of Good Hope, 3.	Norway, 1.
Ceylon, 1.	Peru, 1.
Chili, 1.	Philippine Islands, 1.
China, 1.	Portugal, 3.
Cochin China, 1.	Reunion, 1.
Denmark, 2.	Roumania, 2.
Ecuador, 1.	Russia, 16.
Egypt, 1.	Servia, 1.
France, 22.	Siberia, 1.
Germany, 36.	Spain, 2.
Great Britain and Ireland, 12.	Straits Settlements, 1.
Greece, 1.	Sweden, 6.
Guatemala, 1.	Switzerland, 4.
Guiana, 1.	Tasmania, 1.
Holland, 4.	United States, 10.
India, 7.	West Indies, 6.

NOTES ON SOME FOREIGN GARDENS.

1. Buitenzorg, Java. This is the largest botanical garden, occupying some 1100 acres, at altitudes from sea level to about 6000 feet. It was founded by the Dutch government in 1817, and has been well supported. Affording as it does highly favorable conditions for the growth of tropical and subtropical plants under natural conditions, it has yielded most important results, especially in taxonomy and plant physiology, many of which have been published in the ten large volumes of its 'Annales.'

2. The Royal Botanic Gardens at Kew are situated on the south bank of the Thames, about 6 miles west of Hyde Park Corner. They are reached by several railway routes, the time from Charing Cross being about 40 minutes, by steamer, and by omnibus lines. The present area of the gardens is about 260 acres, an addition having been made during the past year. These world-famed gardens originated in the exotic garden of Lord Capel, in 1759. In 1840 they were adopted as a national establishment and opened as a public park. The botanic garden proper occupies about 70 acres, and the remainder is given to arboretum and pleasure grounds. There are two main greenhouses: 1. The palm house, 362 feet long, the central dome rising 66 feet; 2. The temperate house, of which the central portion is 212 feet long, 137 feet broad, and about 60 feet high, flanked by wings which give a total length of about 580 feet, the whole covering between one and one and one-half acres of ground. There are also fourteen other houses, grouped in two ranges and more or less connected, given to special collections. There are three botanical museums: 1. Devoted to economic products; 2. to miscellaneous products; 3. to timbers. There is also a large museum hall given to the exhibition of floral paintings by the late Mari-

enne North. There is a small laboratory equipped for research in physiological botany. The herbarium and library occupy the old palace of the King of Hanover, near the main entrance to the garden, and they are the largest and most complete in the world. The herbaceous ground is planted in long parallel beds and contains several thousand species. The arboretum is thoroughly illustrative of all trees that will grow in the open at Kew, and the shrubs are, for the most part, cultivated in areas by themselves. There are numerous special features, such as the rock garden, the bamboo garden, and the American garden.

The research work of Kew is principally economic and taxonomic. Around it center the 24 botanical gardens and botanical stations of the British colonies, which are manned chiefly by men who have studied or worked at Kew. The principal publications at present emanating from Kew are:

1. The Kew Bulletin of Miscellaneous Information.
2. Hooker's Icones Plantarum.
3. The Continuation of Hooker's Flora of India.
4. The Continuation of the Flora of Tropical Africa.
5. Annual Reports.
6. The Index Kewensis.

The monographs and separate writings of its staff of scientific men are too numerous to review at this point.

3. The Royal Botanical Garden of Berlin is situated in the southwestern part of the city, but a project for moving it out into the country is now being seriously considered. The palm house reaches a height of about 90 feet, being the highest one yet constructed, and too high for satisfactory operation. The botanical museum is very extensive and has series of economic, systematic and archæological collections. The herbarium is one of the largest in the world. The systematic beds are arranged on a strictly modern sequence, and portions of the garden are devoted to plant geography and plant biology. The arboretum is not extensive. Among special features may be mentioned the alpine garden and the collections of Cacti. The garden is an institute of the University, where the principal laboratories are situated. There is also an institute of plant physiology with a small separate garden. The official publications of the Berlin Garden are the 'Notizblatt' and annual reports. A series of volumes of 'Jahrbücher' was issued some years ago. The publications of the garden staff are voluminous and cover all lines of botanical inquiry.

4. The long-established 'Jardin des Plantes,' the gardens of the Museum of Natural History at Paris, are situated in the heart of the city, fronting on the Seine. The conservatories are grouped near the main museum building, at one end of the grounds, are very large and contain a great variety of plants. The botanical library, laboratories, and the enormous herbarium are in a separate older building. The systematic beds are arranged in rows; owing to the limited size of the area devoted to them, they are much crowded, but contain a splendid assortment of species. But little space is given to trees; there are, however, some famous specimens. Many valuable contributions to the literature of botany along all its lines have emanated from this grand institution for over 100 years, published for the most part, in the 'Annales' and 'Archives' of the Museum of Natural History, and in the Bulletin of the Botanical Society of France.

5. The Botanical Garden of the University of Vienna was established about 1754 and is located in the heart of the city. There are here very important and extensive museums, herbaria and libraries, and one large fine greenhouse. The systematic

plantations occupy the larger portion of the tract, and special areas are devoted to the cultivation of medicinal and other economic plants, to an arboretum of native trees, and to groups illustrating plant geography. The garden and associated laboratories provide equipment for the prosecution of all lines of botanical research.

6. The Botanical Garden of Geneva was founded in 1817, and is situated in the heart of the city, near the University. There are two small greenhouses, a very large and important herbarium and library, and a small museum. The laboratories of the University are extensive and well equipped, affording capital facilities for work along all lines of botanical investigation. The De Candolle herbarium and library, and the Boissier herbarium and library, which are near by, afford, in connection with the collections of the garden, unsurpassed facilities for taxonomic study.

7. The Royal Botanic Garden of Edinburgh covers about 60 acres, of which about one-half was added to the older portion some 12 years ago; there are possibilities of still further enlargement. The main greenhouses have a frontage of about 200 feet, the palm house rising some 70 feet, and there are six small special houses. The botanical museum, lecture room and laboratories are in one building, the large herbarium and library in another. The systematic plantations of herbaceous species are extensive, the rock garden being an especially strong feature. The development of arboretum and frutecetum in the newer portion of the tract has made good progress. The institution is in intimate relationship with the University, nearly all the instruction in botany being given at the garden. The research work has been extensive, along taxonomic, morphologic and physiologic lines.

8. The Royal Botanic Garden of Dublin, situated at Glasnevin, just without the city, was founded through the influence of the Honorable and Honorable Dublin Society, in 1790, was for many years supported by this Society with the aid of government grants, and was transferred to the Science and Art Department in 1877. It includes about 40 acres of undulating land, bounded to the north by the small river Tolka. There are eight greenhouses, most of them rather old, but containing a valuable collection. There is a small botanical museum and herbarium. The systematic herbaceous plantations are irregularly shaped beds, arranged in a somewhat radial manner. The arboretum and frutecetum occupy about one-half of the area.

9. The Brussels Botanical Garden lies in the heart of the city and embraces not more than ten acres of land, of which about one-half is given to arboretum. The greenhouses are large but old. There is a very extensive herbarium and library. The systematic beds are arranged as quadrants of a circle, separated by concentric and radial paths. Special areas are devoted to ornamental and economic plants. Owing to the restricted size of the area available a very dense grouping of plants is necessitated. The research work accomplished here has been mainly taxonomic. The Botanical Society of Belgium has its headquarters at the garden.

10. The Imperial Botanical Garden at St. Petersburg is in close affiliation with the Academy of Sciences and the University. There is here a famous herbarium, a large botanical library and museum, and commodious and well-stocked greenhouses. The garden publishes 'Acta,' and many researches prosecuted there are printed in the Bulletin and Memoirs of the Imperial Academy.

11. The Royal Botanic Garden of Trinidad, situated at Port of Spain, was established in 1818, and now occupies about sixty-three acres, with some outlying plantations.

There is a vast collection of tropical plants in cultivation, an extensive botanical library and herbarium and a small laboratory. The garden publishes 'Annual Reports' and 'Bulletin,' dealing especially with topics of economic application.

12. The Botanical Department of Jamaica, West Indies, operates extensive gardens at Kingston, smaller ones at Castleton, and the several large Cinchona plantations. The scientific collections and library are valuable. The department publishes 'Annual Reports' and 'Bulletin,' especially devoted to economic botany.

13. McGill University, at Montreal, Quebec, carries on a small botanical garden in connection with its laboratories. The Montreal Botanic Garden, begun in 1885 on about seventy-five acres of ground in Mount Royal Park, was soon abandoned, owing to political complications.

14. Among other foreign gardens of which mention must be made, and of which a description would be interesting if our time allowed, are those at Munich, Würzburg, Tübingen, Stockholm, Copenhagen, Upsala, Zurich, Calcutta and Oxford.

BOTANICAL GARDENS IN THE UNITED STATES.

The first botanical garden established in America was begun by John Bartram in Philadelphia, in 1728. In it he placed a considerable number of plants obtained in the course of his extensive travels. The plot still remains, including the family homestead, somewhat modified, and it is a pleasure to know that it will be preserved as public ground.

Andre Michaux, in the latter part of the last century, planted gardens at Charleston, S. C., and New Durham, N. J., but they were essentially nurseries from which he sent seeds and plants to Europe.

In the year 1801 Dr. David Hosack, then professor of botany and materia medica in Columbia College, purchased twenty acres of ground in New York city, and called it the Elgin Botanic Garden; in this tract he accumulated, with great labor during the next ten years, a very large and valuable collection of plants. The institution was transferred to the State of New York, through an act of the Legislature, in 1810, and was then known as the Botanic Garden of the State of New York. It was subsequently granted to Columbia College. Funds for its maintenance were not provided, however, and it was ultimately abandoned. Two catalogues of its plants were issued by Dr. Hosack, one in 1806, and another in 1811. The condition of botanical gardens in America at that time is indicated by the following note in Dr. Hosack's catalogue of 1806:

"I learn, with pleasure, that a Botanic Garden is proposed to be established near Boston, and connected with the University of Cambridge. The Legislature of Massachusetts, with a munificence which does them honor, have granted, for this purpose, a tract of land, the value of which is estimated at thirty thousand dollars; and several individuals have evinced their liberality and love of science by voluntary subscriptions, to the amount of fifteen thousand dollars, towards the establishment and support of that institution. Another is also begun at Charleston, S. C., and a third is contemplated in New Jersey, in connection with the College of Princeton."

In the year 1824 there was published at Lexington, Ky., the 'First Catalogues and Circulars of the Botanical Garden of Transylvania University at Lexington, Ky., for the year 1824,' by W. H. Richardson, M. D., President of the Board of Managers, and C. S. Rafinesque, Ph.D., Secretary. This rare pamphlet, which is not recorded in Dr. Call's very complete life and writings of Rafinesque, is of 24 pages, and is printed alternately in English and French. It is essentially an appeal for

plants and material for the garden, and a list of species that it could furnish to kindred institutions. This garden was evidently short-lived, inasmuch as in Rafinesque's 'Neogenyton' of the following year, 1825, he remarks, "I mean, therefore, to indicate and propose in this small essay, many of the numerous new genera of plants detected or ascertained, some of which were indicated last year, 1824, in the Catalogue of the botanical garden which I have tried in vain to establish in Lexington."

The principal gardens at present operated and in course of development in the United States are as follows:

1. The Botanic Garden of Harvard University, at Cambridge, Mass., founded in 1805. There are about seven acres of land under cultivation, a small greenhouse, and a famous herbarium and library from which have flowed during the past 40 years voluminous and invaluable contributions to taxonomy and morphology, especially of North American plants. There is also a small morphologic laboratory. The main laboratories and museums connected with the institution are situated in other of the Harvard buildings, a short distance away. The system of garden, libraries, museum, laboratories and herbaria operated by Harvard College is one of the most complete in existence. It is hard to say, indeed, in what respect it is not ideal, except in the rather wide distance separating the several elements and the small amount of land available for planting.

2. The Arnold Arboretum of Harvard University, at Jamaica Plain, Mass., was founded through a bequest of $100,000, made about 1870, by Mr. James Arnold, of Providence, R. I., to three trustees, to be used for the improvement of agriculture or horticulture. The trustees wisely determined to devote it to forestry and dendrology, and effected cooperative agreements with Harvard College and the City of Boston, which have now given us the greatest tree museum in existence, freely open to the visiting public. The planted area is about 160 acres, and will be materially increased in size. A small museum, library and herbarium building has been erected near the main entrance. The great *Silva of North America* and the journal *Garden and Forest* are noteworthy publications from this noble institution.

3. The Botanic Gardens of the United States Department of Agriculture, at Washington, have an extensive range of greenhouses and a large tract of land under cultivation. The herbarium of the department, now deposited with the United States National Museum, is very large and is at present increasing more rapidly than any other in America. There is a somewhat effective working library, which greatly needs material enlargement, and several poorly located and equipped laboratories, in which a vast amount of important investigation is being accomplished, under very unfavorable conditions, which urgently demand improvement. Publications include: Bulletin of the Botanical Division, Bulletin of the Division of Forestry, Bulletin of the Division of Plant Pathology and Physiology, Contributions from the United States National Herbarium, Year-book of the United States Department of Agriculture, and circulars of the several divisions.

4. The Missouri Botanical Garden, at St. Louis, Mo., was established in 1889, through the provisions of the will of Mr. Henry Shaw, who for over thirty years previously had been bringing together material for it on the land about his residence, which was known as Shaw's Garden. There were in all some 670 acres devised to the institution under the will of the generous and philanthropic founder, and from the income yielded by much of this land, not nearly all the area being required for garden purposes, the institution derives its large main-

tenance fund which will certainly be greatly increased as the land becomes more valuable, and will supply an income sufficient to operate the institution in the most effective manner. There are several greenhouses, a very large and valuable herbarium and library, while the laboratories of the Shaw School of Botany, at Washington University, are in close relationship to the garden. Much important research, principally taxonomic, has been prosecuted. Publications consist of seven volumes of Annual Reports, and nine 'Contributions from the Shaw School of Botany.'

5. The Botanical Garden of the Michigan Agricultural College was begun in 1877. There are now about three acres under high cultivation, exclusive of the arboretum and decorative grounds, which together cover several acres. There are several small greenhouses, an herbarium of about 60,000 specimens, a good botanical library and extensive, well equipped laboratories.

6. The University of California, at Berkeley, has a botanical garden of several acres, established some years ago, in which a large number of plants are grown. It furnishes a valuable adjunct to the work of the botanical department, which has well appointed laboratories, a working library and a large herbarium.

7. The University of Pennsylvania has recently established a garden of about three acres in the immediate vicinity of its building, in Philadelphia, and has many species under cultivation. The extensive and well appointed laboratories of its School of Biology, good library facilities and a small herbarium afford capital opportunity for research, especially in physiology and morphology.

8. Smith College, at Northampton, Mass., has also recently established a botanical garden, on the campus.

9. The Buffalo Botanical Garden, in South Park, Buffalo, N. Y., was commenced in 1893, and has since made rapid and encouraging progress. A small range of greenhouses has been built and others are planned. A beginning has been made in accumulating a library and herbarium, and much permanent planting has been accomplished.

10. The New York Botanical Garden. The establishment of the New York Botanical Garden was authorized by the Legislature in 1891, and the enabling act was amended in 1894. The enterprise was inaugurated and the legislation procured by a committee of the Torrey Botanical Club, appointed in 1889. The Act of Incorporation provided that when the corporation created should have raised or secured by subscription a sum not less than $250,000.00 the Commissioners of Public Parks were authorized to set apart and appropriate a portion of one of the public parks, not exceeding 250 acres, and the Board of Estimate and Apportionment was authorized to issue bonds, aggregating the sum of $500,000.00, for the construction and equipment, within the grounds, of the necessary buildings. The subscription of $250,000.00 required by the Act of Incorporation was completed in June 1895, and the Commissioners of Public Parks, in the following month, formally appropriated 250 acres of the northern part of Bronx Park for the purposes of the Garden. Since that time the preparation of plans for the development of the tract has been steadily progressing, including designs for the museum building and a large horticultural house. This planning is still in progress, in charge of a commission of architects, engineers, gardeners and botanists, who will complete their work within a short time, and be ready to submit a complete scheme to the Board of Managers during the coming autumn. Meanwhile, much preliminary work has been accomplished in clearing the ground, in grading, in the planting of borders, in the establishment of an extensive

nursery, and in the accumulation of herbarium, museum and library material. Through a cooperative agreement entered into with Columbia University, the herbarium and botanical library of the University will be deposited with the Garden, and most of the research and graduate work of the University in botany will be carried on in the Museum Building.

The endowment fund has been materially increased, and about 430 persons have become annual members of the Garden, contributing ten dollars a year each to its support. The publication of a Bulletin has been commenced by the issue, in April, of the first number of Volume I.

N. L. BRITTON.

NEW YORK BOTANICAL GARDEN.

PHILIP LUTLEY SCLATER.

PHILIP LUTLEY SCLATER, Secretary of the Zoological Society of London, is one of the best known of zoologists. Few men now living have contributed so much as he to systematic ornithology, and none have done so much in the identification and description of new forms from the Western Continent.

His work has been largely in connection with the luxuriant fauna of Neotropical America, little known at the time when he began his researches. Nearly every year since he began work, in 1853, his correspondents in tropical America have laid at his feet new wealth in the form of collections from regions hitherto unexplored.

He has characterized 1,067 new species (245 in collaboration with Osbert Salvin) and 135 new genera (25 with Salvin), as well as two new families of American birds.

Mr. Robert Ridgway writes:

"The name of Sclater is so much a part of Neotropical ornithology that any knowledge of the latter without equal familiarity with the former would be impossible. Certainly no other name occurs so frequently nor ranks more highly in the literature pertaining to the birds of tropical America. Covering a period of more than forty years of unceasing activity, chiefly devoted to this, his favorite geographical field, the importance of Mr. Sclater's contributions to the ornithology of the Neotropical region can hardly be over-estimated. Other ornithologists, it is true, have rendered important services so far as portions of America are concerned, as Salvin for Mexico and Central America, and Lawrence for the same area and the West Indies, while the former has been associated with Sclater in the preparation of various monographic papers, the 'Nomenclator Avium Neotropicalium' and other works; but only Sclater has covered impartially the Neotropical region as a whole.

"Mr. Sclater's treatment of ornithological subjects is concise and conservative—more so, frequently, than some of us would wish it to be. Some of us on this side of the Atlantic differ with him in nomenclatural matters and regarding the status and discrimination of subspecies or geographical races; but in these respects his methods are those of a particular school, which we are pleased to call the 'old,' and which few, if any, of his countrymen have forsaken. We fondly hope, however, that the conservatism of our English brethren may sometime yield to the sound principles upon which the so-called 'American' schools have based their 'innovations,' and the complete harmony of methods between ornithologists of the two countries, so much to be desired, be thereby established.

"Sclater," writes Merriam, "is a good type of the industrious, systematic natuarlist. His official and personal energy brought him a wealth of new material. This he described in an endless series of papers on new species and new genera. Then, as additional specimens and additional species came in, he promptly published more comprehensive treatises in the form of synopses of genera or larger assemblages. And later, when still ampler material cast new light on the subject, he, in numerous instances, revised the same groups over again, correcting early errors, adding new species and bringing the history of the groups down to date. These synopses and monographic revisions are the most important and useful of Sclater's contributions to science. Their number is amazing. In addition to all these, his 'Nomenclator Avium Neotropicalium' and 'Argentine Ornithology' have come to be indispensable to the student of South American birds. And finally, as a fitting climax to this remarkable series, he has lived to erect his own monument in the admirable volumes he has contributed to the British Museum's 'Catalogue of Birds.'

"He has written many important papers concerning mammals, illustrated by colored plates of high