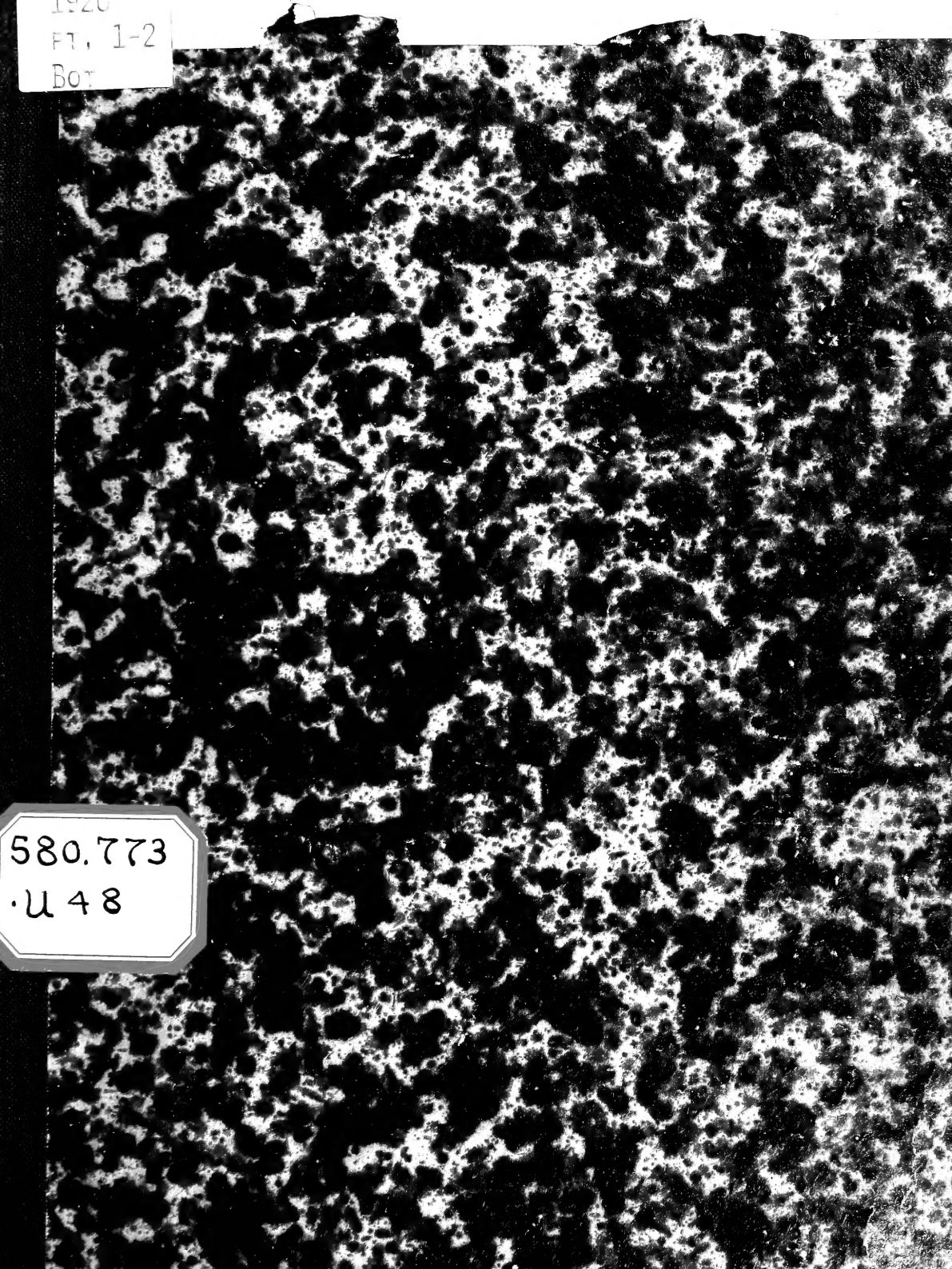
.S.Congress.Joint committee on the Library.

.blishment of a national botanic garden. 1920.



Establishment of a National Botanic Garden

HEARING

BEFORE A

JOINT COMMITTEE ON THE LIBRARY

CONGRESS OF THE UNITED STATES

SIXTY-SIXTH CONGRESS.

SECOND SESSION

ON

S. 497

A BILL TO INCREASE THE AREA OF THE UNITED STATES BOTANIC GARDEN IN THE CITY OF WASHINGTON, DISTRICT OF COLUMBIA

AND

S. RES. 165

DIRECTING THE COMMITTEE ON THE DISTRICT OF COLUMBIA TO REPORT PLANS FOR THE CREATION IN OR NEAR THE DISTRICT OF COLUMBIA OF A BOTANIC GARDEN COMPARABLE WITH THE BEST EXISTING GARDENS

PART 1

COMMITTEE HEARING

Printed for the use of the Joint Committee on the Library

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

186037

JOINT COMMITTEE ON THE LIBRARY.

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J. C. W. BECKHAM, Kentucky.	BEN JOHNSON, Kentucky.
	HERBERT C. PELL, Jr., New York.

W. DON LUNDY, *Clerk.*

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ESTABLISHMENT OF A NATIONAL BOTANIC GARDEN.

FRIDAY, MAY 21, 1920.

CONGRESS OF THE UNITED STATES,
JOINT COMMITTEE ON THE LIBRARY,
Washington, D. C.

The committee met in the committee room, Capitol, at 10 o'clock a. m. Senator Frank B. Brandegee presiding.

Present: Senators Brandegee (chairman) and Williams and Representatives Gould, Fess, Luce, Johnson of Kentucky, and Pell.

Also present: Senator Knox.

The committee had under consideration the following bill and resolution.

[S. 497, Sixty-sixth Congress, first session.]

A BILL To increase the area of the United States Botanic Garden in the city of Washington, District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the United States Botanic Garden, situated in the city of Washington, District of Columbia, be, and the same is hereby, increased and enlarged by attaching thereto those two certain parcels of land situated, lying, and being between Third Street on the east and Sixth Street on the west, and Missouri Avenue on the north and Maine Avenue on the south, which said parcels are known as East Seaton Park and West Seaton Park.

SEC. 2. That said two described parcels shall upon the passage of this act become part and parcel of the said United States Botanic Garden and immediately available for the purposes thereof.

SEC. 3. That all laws and parts of law inconsistent with any of the provisions of this act be, and the same are hereby, repealed.

[S. Res. 165, Sixty-sixth Congress, first session.]

Resolved, That the Committee on the District of Columbia be, and it is hereby, directed to consider and report to the Senate plans for the location and development, in or near the District of Columbia, of a botanic garden of a size and excellence comparable with the best existing botanic gardens.

For the purpose of preparing such plans the committee may secure the services of such experts as may be necessary for a proper consideration of the subject. The expenses of such investigation, not exceeding $3,000, shall be paid from the contingent fund of the Senate.

The CHAIRMAN. The committee has under consideration this morning Senate resolution 165, introduced by Senator Phelan, directing the Committee on the District of Columbia of the Senate to consider and report to the Senate plans for the location and development, in or near the District of Columbia, of a botanic garden of a size and excellence comparable with the best existing botanic gardens.

It also has under consideration Senate bill 497, introduced by Senator Moses, to increase the area of the United States Botanic Garden in the city of Washington, D. C.

The bill introduced by Senator Moses embodies part of a resolution or bill which Senator Gallinger had previously introduced, and Senator Williams informs me he thinks the Senate passed it, although he is not sure. At any rate the committee reported it favorably.

The object of this hearing is to hear what the Fine Arts Commission, and witnesses whom they have asked to be here, have to say upon the general subject of a botanic garden in Washington and for making a record of what the recommendations and plans of the Fine Arts Commission are, and ascertaining what the proposal of the authorities is for the development of the Mall, whether the development of the Mall and the erection of the statue of Gen. Grant at the east end of it is going to necessitate the removal of the present Botanic Garden, and if so, what is best to do about getting another botanic garden, if anything can be done at the present time. The purpose of the hearing is to hear these gentlemen. There are landscape architects and others, who are skilled in such questions, from other parts of the country here to-day, so I think it better that we should take their testimony. Whether Congress intends to take final action upon this question at this session or not, it will be of some avail to have collected this information. Mr. Moore, I will ask you, please, to call your witnesses in such order as you choose, for I do not know who they are.

Senator WILLIAMS. I would like to have each witness when he testifies give us some idea of what he thinks the scheme recommended by him would cost.

The CHAIRMAN. Certainly.

Senator WILLIAMS. The Treasury is not in very good condition right now.

The CHAIRMAN. I would suggest to Mr. Moore—and it is only a suggestion, as he is more familiar with this whole question than I am—that in the first place he outline what the proposals of the governmental authorities are who give any attention to this matter, and how they accord with or differ from the general plan for the development of the park system of Washington and of the Mall, then afterwards bunch your witnesses, when it comes to talking about a particular kind of botanic garden or a particular place at which they think it should be located.

STATEMENT OF MR. CHARLES MOORE, CHAIRMAN OF THE COMMISSION OF FINE ARTS.

Mr. MOORE. Mr. Chairman, Senator Williams is correct. Senator Gallinger introduced a bill for the extension of the Botanic Gardens into East and West Seaton Parks. That bill passed the Senate and went to the House. Mr. Slayden, the chairman of the House Committee on the Library, referred the bill to the Commission of Fine Arts. The commission made a report to the House Committee on the Library. That is the way in which the Commission of Fine Arts came into this matter.

The Commission of Fine Arts at that time called attention to the fact that Congress had located the Grant Statue in the Botanical Garden in accordance with the plans of 1901 for the development of the Mall. Subsequently, Congress also authorized the State of

Pennsylvania to erect a memorial to Gen. Meade, and the Meade Memorial Commission, consisting of the Secretary of War, the chairman of the Senate Committee on the Library, and the chairman of the House Committee on the Library, located that memorial in the Botanical Garden area. Congress located both of those memorials in the Botanical Garden area, with the idea that ultimately the plan of L'Enfant for an approach to the Capitol from the west would be restored, and that the garden should become such an approach to the Capitol. It would also become the head of the Mall system.

The House did not act on the Gallinger Bill, and no action by Congress has been taken subsequently. Senator Moses introduced a bill similar to the Gallinger bill, but with fewer restrictions than were in the Gallinger bill. The Gallinger bill provided that the roads and walks as laid down in the plan of Washington should be maintained in any enlargement of the Botanical Garden. When the Commission of Fine Arts came to study the question, they found that the area was insufficent for a botanical garden of the kind which the United States ought to support.

Senator WILLIAMS. Allow me to say here that Senator Gallinger's intention, and the intention of the Senate committee, was not to make this a great botanical garden. It was merely to preserve here at the foot of the Capitol this little flower garden, which was a source of great instruction and profit and pleasure to the school children and people and laboring men of Washington, and whether they put a botanical garden out at Rock Creek Park or elsewhere, still to preserve this little flower garden. There was no idea in his mind, and none in mine, of substituting this for what would finally be the great Washington Botanical Garden, either in Rock Creek Park or somewhere else.

Mr. MOORE. That is the way I understood it generally. The question came up as to whether the time has not arrived now when changes must be made so as to get an adequate botanical garden.

Senator WILLIAMS. He and I were both very emphatically of the opinion that whether we established a botanical garden or not, this little flower garden ought not to be interferred with except to the extent necessary to put the roads through contemplated in the great plan in connection with the Mall.

Mr. MOORE. That simplifies the matter very much. This morning we are going to ask the committee to consider the question first as to what a botanical garden corresponding to the needs of the present day should be, and if the United States is going to maintain a botanical garden, where an adequate botanic garden may be located. This garden was begun in 1820. It has developed very slowly. Some relocation for it must be found, because the greenhouses are overcrowded, and the space is insufficient to accommodate the Grant Memorial and the Meade Memorial and the Botanical Garden.

I ask the chairman first to call Dr. N. L. Britton, director of the New York Botanical Garden.

Senator KNOX. Before you sit down, Mr. Moore, will you tell me what became of the project of erecting a monument to Gen. Meade in the Botanical Garden?

Mr. MOORE. It is progressing very favorably indeed. The Commission of Fine Arts has approved the model which was made by

Mr. Charles Grafly, of Philadelphia. He has designed a memorial that will stand with the Grant Memorial, and will be an adequate monument to Gen. Meade.

Senator KNOX. Has its site been determined?

Mr. MOORE. Its site has been determined and fixed by the commission created by Congress.

Senator KNOX. Where is it to be located?

Mr. MOORE. In the Botanical Garden area, near the Grant Memorial, so that Meade and Grant shall stand together.

Senator KNOX. It will be within the garden?

Mr. MOORE. Within the garden; yes.

The CHAIRMAN. What is the map to which you just pointed when you showed us the location of the statue?

Mr. MOORE. That is the plan of 1901 for the development of the Mall in accordance with the L'Enfant plan of 1792.

The CHAIRMAN. The plan of 1901 adopted by what, or whom?

Mr. MOORE. Never adopted by anybody.

The CHAIRMAN. Proposed by whom?

Mr. MOORE. It was a report made to the Senate by the Senate Committee on the District of Columbia for the development of the park system of the District of Columbia; never adopted at all by Congress, but Congress has never gone contrary to the plan during the 19 years which have elapsed since it was submitted.

Senator KNOX. By whom was it prepared?

Mr. MOORE. It was prepared by Mr. Burnham, Mr. McKim, Mr. Saint-Gaudens, and Mr. Olmsted, the latter of whom is here this morning. He is the last surviving member of the park commission of 1901.

Senator KNOX. That was my recollection. I was in Mr. Roosevelt's Cabinet at the time that report was made.

The CHAIRMAN. Is there a report now in print which describes the locations shown on this map? If so, will you not identify it so that we can have a reference to it in the record?

Mr. MOORE. The report is Report No. 166, on the improvement of the park system of the District of Columbia, Fifty-seventh Congress, first session.

The CHAIRMAN. Was it printed as a Senate document?

Mr. MOORE. Yes; the document consists, first, of the report of the Senate Committee on the District of Columbia, prepared by a subcommittee made up of Senator McMillan, Senator Gallinger, and Senator Martin, and, second, the report of the park commission; that is, of Daniel H. Burnham, Charles F. McKim, Augustus Saint-Gaudens, and Frederick Law Olmsted.

Both reports proposed, in the first place, the development of the Mall according to the L'Enfant plan adopted to the new area reclaimed from the Potomac marshes. In carrying out that plan they drew a line from the dome of the Capitol to the Washington Monument, and prolonged it to the Potomac River, and there located the memorial to Abraham Lincoln; they also made a general recommendation as to the design of that monument.

The first trouble came over the location of the Agricultural Department buildings, and eventually they were located according to the new axis of the Mall. Next the National Museum was located according to the new plan of the Mall, and the development has gone

on steadily step by step, in conformity with the plan of 1901. It was not expected that Congress would adopt the plan; it was not necessary to adopt the plan. All that was necessary was that as each individual proposition came up, each location, the buildings should be located according to the plan, and that has been done.

The plan of 1901 called not only for the development of the Mall and for certain changes in the interior of the city, but it also provided for park connections throughout the District of Columbia, for the taking of those particular areas of land which were adapted for park purposes primarily, and for park connections, so as to develop an entire park system for the District of Columbia, just as the other cities are having their park developments made according to a regular, well-defined plan. In the plan of 1901 it was proposed to take Mount Hamilton as a park, and therefore Mount Hamilton came into our survey.

Senator KNOX. Where is Mount Hamilton?

Mr. MOORE. Mount Hamilton is at the end of Maryland Avenue, 2 miles from the Capitol.[1]

Senator KNOX. East?

Mr. MOORE. East and north. It is the highest point of land, I think, in the District of Columbia.

Senator KNOX. Is it on the way to Bladensburg?

Mr. MOORE. It is on the way to Bladensburg, yes; and on the way to Baltimore. There are, according to the claims, at least six highest points in the District of Columbia, and this is one of them. As a matter of fact it is next to the highest point in the District, Fort Reno being the highest.

Senator KNOX. Is Mount Hamilton between the city and the reform school?

Mr. MOORE. Yes, adjoining the reform school. It also adjoins the new Anacostia park, so that if Mount Hamilton shall finally be decided upon, and the 400 acres available at Mount Hamilton shall be taken, another 400 acres would be available in the upper portion of Anacostia Park, for the purpose of a botanical garden. So that at least 800 acres would be available.

The CHAIRMAN. From this high point to which you refer, the Mount Hamilton site, one overlooks not only the Anacostia River, but the land on the other side of it, and also the District generally? You get a fine view?

Mr. MOORE. You overlook the District generally. You get a fine view of the entire Anacostia Park development, and you also get a view into the superb Maryland hills which are beyond.

The CHAIRMAN. That is the tract of land to which you took me once, and which we walked over together, is it not?

Mr. MOORE. Yes.

Senator KNOX. Does the view take in the Capitol and the Washington Monument, and the Lincoln Memorial as well?

Mr. MOORE. I am not so sure about the Lincoln Memorial, but it takes in the Capitol and the Monument.

The CHAIRMAN. Was there any estimate made of the probable cost of the plan of 1901 as recommended by the commission? It did not get that far, did it?

[1] See map facing p. 64, vol. 2.

Mr. MOORE. No. We did not get that far, because the development was to be done piecemeal. Mr. Cannon, in objecting to the plan of 1901, said that it would cost $200,000,000 to carry it out. Before he left the chairmanship of the Committee on Appropriations of the House, $50,000,000 had already been spent in accordance with the plan. So I think his estimate was far too low.

The CHAIRMAN. Too low?

Mr. MOORE. Yes. He himself within five years after the plan was suggested passed on appropriations amounting to $50,000,000.

The CHAIRMAN. For the purchase of part of these lands?

Mr. MOORE. For the building of the National Museum, for the building of the Agricultural Department, for the building of the Lincoln Memorial—for all of those things. They all come into the plan.

The CHAIRMAN. I did not refer to buildings which were to be put upon the land recommended to be acquired, but to the expense of purchasing the land only.

Mr. MOORE. The expense of the land would come up as an incident to the buildings or parks, as those projects should come up. It was impossible to make estimates, because the price of land would depend on the date of taking.

The CHAIRMAN. The people who recommended the plan of 1901 did not even make a guess at the expense of acquiring the land which they recommended should be acquired, did they?

Mr. MOORE. No, Senator; because the plan was made for 50 years in the future, to be developed during 50 years; and it was impossible to make any estimate. Chicago has made an estimate that its plans (known as the Burnham plan) are going to cost two hundred and sixty millions, and of that amount Chicago has appropriated during the past 10 years $61,510,000. Chicago railway companies have agreed to spend $162,091,000, and the forest reserve commission $5,316,000.

Senator KNOX. Have you ever made an estimate as to the cost of the 400 acres included in the Mount Hamilton tract?

Mr. MOORE. We always take the assessed valuation and add one-third to that.

Senator KNOX. What is the assessed valuation of that tract?

Mr. MOORE. Mr. Langdon has that.

Senator KNOX. Approximately, is all I care for.

Mr. MOORE. About $250,000.

The CHAIRMAN. For 400 acres?

Mr. MOORE. Yes.

Dr. Britton will proceed.

STATEMENT OF DR. N. L. BRITTON, DIRECTOR IN CHIEF, NEW YORK BOTANICAL GARDEN.

The CHAIRMAN. State your name and place of residence.

Dr. BRITTON. N. L. Britton; I reside in New York City, and am director in chief of the New York Botanic Garden. I will say in this connection that over several years I had a very interesting correspondence wtih Senator Wetmore, of this committee, relative to this whole subject, and provided him with a great deal of information and data, which I think have been tabulated, and very likely have been brought into use since. But, of course, the subject was laid

aside of necessity on account of the war. I am very glad, indeed, to have it followed up now.

I have prepared a concise statement giving my view as to the need and the general scope of a botanical garden. I have not gone into the question of the plan, because I think that depends very largely on the scope, and very largely on the site. It must come in as a secondary consideration.

The statement I prepared is as follows: Botanical gardens, under scientific development and maintenance have become the most important institutions for the investigation, teaching, and display of the vegetable kingdom.

The number of kinds of plants is so vast, and their products so numerous that we are as yet only upon the threshold of knowledge as to their relationships, life histories, and uses. Plants furnish food, forage, clothing, drugs, lumber, oils, resins, spices, gums, and a great number of minor products essential to the existence of mankind. Any discoveries of new facts concerning plants or new applications of old facts may be of importance in the relation of man to vegetation.

The desirability of bringing us closer and closer to nature has been emphasized by the necessity of conserving and increasing the products of plants, not alone of the kinds in ordinary cultivation but the immense number of other kinds not yet put into useful application. The best way of teaching this lesson is to bring together, under scientific arrangement, care, investigation, and explanation as many different kinds in as many different places as practicable. The number of well-equipped and well-maintained extensive collections of plants hitherto established is quite insufficient to meet this need.

Plant collections, by their beauty and their interest, are attractive to everybody; they give untold pleasure to great numbers of people and their reaction is elevating to all who visit them. Their greatest efficiency, both as regards instruction and enjoyment is, of course, when located within easy reach of dense populations.

The present Botanic Garden in the city of Washington is insufficiently developed, and its restricted area prevents any satisfactory rearrangement or expansion. The relocation, or new establishment, now contemplated if providing very greatly increased acreage, coupled with liberal provision for construction, installation, maintenance, research, and teaching under scientific direction, would, in a few years, provide an institution of enormous usefulness, of great beauty, of national significance, and of international repute.

Mr. MOORE. If you care to ask questions of Dr. Britton, he will be glad to answer them. He is the head of the New York Botanical Garden, which is one of the three or four great botanical gardens of this country.

The CHAIRMAN. Mr. Moore, I am so ignorant of this entire subject, and it is so technical, that as you have the men here who are familiar with the subject, I wish you would put them on and put in your case, say what you think ought to be done, take their recommendations and substantiate your recommendations. We are here to get knowledge. We do not know what questions to ask.

Senator KNOX. I would like to ask Dr. Britton one question. What would your judgment be as to an adequate area for a botanical garden such as the United States ought to maintain here at the Capital?

Dr. BRITTON. I should think you ought to have at the minimum four or five hundred acres. You ought to have that to develop an institution which would meet the necessities.

Senator KNOX. What is the acreage of the New York garden?

Dr. BRITTON. We have about 394 acres.

Senator KNOX. What is the largest one in the United States?

Dr. BRITTON. Ours.

The CHAIRMAN. Is the Bronx Park a botanical garden?

Dr. BRITTON. Yes; the north half of the Bronx Park.

Mr. PELL. The Lorillard property?

Dr. BRITTON. Yes: it was part of the Lorillard property when it was condemned for park purposes.

The CHAIRMAN. Can you give us an idea of what the capitals of other large countries of the world have done in relation to botanical gardens—London, Paris, Berlin, and cities like that?

Dr. BRITTON. Of course, the most famous institution of its kind in the world, and probably the most beautiful, is one which lies on the outskirts of London. That is the Botanical Garden of Kew. They have a total acreage of something like 300 hundred acres, and it has always been regarded as insufficient for their best development. That is an institution which dates back over more than a hundred years, and has been of untold value to the development of the British Empire and its colonies—something which they all look to. The old Jardin des Plantes, at Paris, though smaller, has been a center of scientific information since the time of Tournefort, about 1700. Then there was the great botanical garden up at Petrograd, where there were more kinds of plants in cultivation prior to the war than there were at Kew, strangely enough, away up there in Russia. That has been of enormous value to the agriculture and horticulture of the Russian Empire. There are others, of course, all through Europe. Those three may be cited at this time, I think, as the three most important.

The CHAIRMAN. Has Australia a large garden, or have any of the South American countries large gardens?

Dr. BRITTON. They all have gardens of one kind or another, very unequally developed. The Brazilians have an enormous tract of land right outside of Rio de Janeiro—3,000 acres. They have there a most important collection of trees of South America, etc. It is very valuable information which they send out. We need to have first-hand information, as these complicated questions concerning trees, and plants, and their application to man, are coming up frequently. The scientific repositories of knowledge are becoming of greater and greater importance every year. We have not enough of them. None of them are sufficiently developed to meet the needs of any nation, as I take it. Of course, they are coming to be more and more, but it seems to me you have an opportunity here to utilize the great resources of the United States.

Senator KNOX. What is the nature of the demands made upon the New York garden?

Dr. BRITTON. They are of all kinds. There are questions all the way through, from the application of the most minute vegetables to health and hygiene, right through up to the most beautiful orchid, or the most beautiful dahlia, or the most beautiful lily that grows,

all the way through. You could hardly classify the questions. There are all kinds. That is the kind of information the public is asking for, and the demand is increasing.

Senator KNOX. I was going to ask you to what extent there is a demand upon you.

Dr. BRITTON. There is an enormous demand. We can not always solve the questions in one institution. Very often we are obliged to transfer references down here to Mr. Fairchild or Mr. Coville, representing the Department of Agriculture. Our staff is not sufficient, as at present organized, to answer all these questions. We really need a great central establishment, such as you gentlemen have in mind, to study this matter of the relation of man to vegetation in the United States.

Senator KNOX. The point I wanted to make was to show that they are not merely places of beauty, and for the gratification of the eye, but they have a utility feature of which the public avails itself.

Dr. BRITTON. I think that is the real reason for their existence; that is their application, at least. They are also beautiful. They are bound to be beautiful.

Senator KNOX. There is no objection to that, of course.

Dr. BRITTON. Not a bit. Our attempt is to make them as beautiful as we can, and we do in all reason, but we have to bear in mind that our chief object is the information and instruction of the public in the matter of the relation of man to vegetation, and we believe we are doing a great work.

Senator KNOX. You can readily see that we need to be fortified upon that point, because we shall be met with this flower garden suggestion.

Dr. BRITTON. You can take it from me that that is a secondary consideration as regards the real functions of botanical gardens.

Mr. FESS. How far are we on the way? Have we done well as a Nation in this matter?

Dr. BRITTON. We have not done as well as other nations. There are not as many such establishments in the United States as there are in France or Great Britain.

Mr. FESS. We have not done anything like as much as we should do?

Dr. BRITTON. No, sir; we have not.

Mr. GOULD. Would the work that is proposed to be done here be a duplication of your work in New York City?

Dr. BRITTON. I do not think it would be a duplication, but it would be a parallelism, in which unduobtedly information would be divided between the two institutions, so that one institution would do certain things and the other other things. That is all we try to accomplish.

Mr. GOULD. Would there be space enough in New York City for the Government to take over that botanic garden and add to it?

Dr. BRITTON. I never thought of that. That is a new idea.

Mr. GOULD. I am trying to save the Government some money.

Dr. BRITTON. I do not think you ought to try to save the Government money on this proposition. You have to come to it sooner or later. You have to get a great deal closer to vegetation than you are.

Mr. FESS. We all agreed on that.

The CHAIRMAN. Have you anything particular to say as to the propriety, inasmuch as this city is the Capital of the Nation, of its

doing something perhaps on a larger scale, and a little more elaborate than is done by a mere city here and there in the country?

Dr. BRITTON. I should think that would be the rational course to pursue, and one we would all welcome.

The CHAIRMAN. To have it as a model?

Dr. BRITTON. To have it as a model, and have it as a maximum.

The CHAIRMAN. What have you to say about the wisdom of doing it as soon as possible, rather than to wait?

Dr. BRITTON. I think the sooner you accomplish it, the better. Of course, practical considerations may come up, but it seems to me it should begin right away. It ought to be developed over a series of years, rather than attempt to spend a vast amout of money at once.

The CHAIRMAN. No; but as to the acquisition of a site, the land?

Dr. BRITTON. That I should accomplish immediately.

The CHAIRMAN. You think it would be wiser to locate your site and acquire the property if you are going to do anything?

Dr. BRITTON. As I take it, your park commission desires this land as an addition to the park system anyway. So why not secure it?

The CHAIRMAN. Your theory is, as I understand it, that the Botanical Gardens should not only be made a beautiful park but also a great utility?

Dr. BRITTON. That is my thesis: yes, sir.

The CHAIRMAN. In these botanical gardens, do they do anything in the way of propagating and distributing through the country various species of plants?

Dr. BRITTON. Yes, sir; they certainly do.

Mr. PELL. Is the object of your botanical garden experiment—that is, experiment in the sense Burbank is making his experiments—or for the acclimatization of foreign plants and, in addition, of vegetables and trees from other countries?

Dr. BRITTON. Our work includes all of those subjects in a way. We do all such things. Of course, we do not do them all equally intensively, but we are supposed to be equipped, or might be equipped if we had the resources, to carry on all those lines of work. Every large botanical garden ought to have facilities for all those things.

Mr. PELL. A great deal of good work could be done in bringing over vegetable foods from other countries.

Dr. BRITTON. Look at the results reached by Mr. Fairchild already with the limited facilities he has and with no great facility such as is proposed to back him up. If he had had an institution of the kind proposed to furnish the means of experimenting, the benefit to the country would be enormously greater.

Mr. FESS. Doctor, originally the seed proposition was a scientific one. Now it has come to be pretty generally a distributive one throughout the country.

Dr. BRITTON. Yes.

Mr. FESS. Is there any any danger of this degenerating into a thing of that sort?

Dr. BRITTON. Certainly it would not under scientific control.

Mr. FESS. Should it be under scientific control?

Dr. BRITTON. It should be under scientific control. In fact, if you want to make this a great institution of international repute, you will have to put it under scientific control, and keep it there.

Mr. FESS. I agree with you, if it can be done.

Dr. BRITTON. I do not see why you should not, at this stage of civilization. You are all looking to science practically to control the world. Science does control the world at the present time, except in its government. You can take that from me. I think you will find I am right.

Mr. FESS. I agree with you.

Dr. BRITTON. Science controls your hygiene; controls your transportation and your communication.

The CHAIRMAN. You do not mean that as a partisan remark, I trust? [Laughter.]

Dr. BRITTON. No; there is no partisanship intended. I am only speaking from the standpoint of a man of science.

STATEMENT OF MR. DAVID FAIRCHILD, UNITED STATES DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. State your position, Mr. Fairchild.

Mr. FAIRCHILD. I am in charge of the Office of Foreign Seed and Plant Introduction.

The CHAIRMAN. How long have you been in the department?

Mr. FAIRCHILD. Thirty-one years.

The CHAIRMAN. You may proceed.

Mr. FAIRCHILD. It seems to me that one of the greatest practical uses of the botanical garden is to furnish seeds for the commercial users of plants. In connection with my work I have had an opportunity of visiting 35 of these botanical gardens in differents parts of the world, and as illustrating the tremendous value of a botanical garden I would like to read into the record two noted cases of their use: one, that of the cinchona, which was established in the gardens of Buitenzorg, Java, which has resulted in the establishment of the monopoly in cinchona, which those of you who are familiar with the actions of the War Trade Board know was a very serious matter during the war. The shifting of the center of the production of quinine from the wild forests of Peru, Ecuador, and Colombia to the cultivated plantations of Java was started from seeds introduced into the Dutch East Indies from South America. I was in Java when the first cinchona bark was turned commercially into the drug quinine in Java. I saw the industry start.

India rubber has grown in our time from a wild product, gathered by native Indians on the Amazon, to the product of over 2,000,000 acres of plantation rubber in the Dutch East Indies and the British East Indian possessions. The original trees are still standing of this Para rubber from which the seed was gathered, and the Dutch plant breeder, Dr. Cramers, of Java, who visited me this last winter, told me the only trouble was that the original introducer brought the seeds from only one tree and there are better strains of rubber trees in Brazil. The seed has been disseminated from this one tree standing in that botanical garden.

Of course, those two cases are tropical ones. But the same thing applies to our own northern crops. I returned from the Arnold Arboretum region less than a week ago, after a conference with Prof. Sargent with regard to the securing of all the pear seeds which we

can get from a Chinese species of pear, which is, in our opinion, the best species that has ever been introduced into this country for a pear stock on which to bud our cultivated varieties of pears. You all realize that the greatest difficulty in pear growing in this country is caused by the destructive disease known as the pear blight. Millions of dollars are spent yearly in the fight against pear blight. We have found among these Chinese pear trees certain strains; they are not even species—that is, they are varieties of species which when grown in this country have proven resistant to this disease—and the nurserymen want these pears for stocks to-day on which to bud the ordinary pear. Because of the difficulty of getting pear and apple stock plants from Europe the nurserymen are asking us to study these Chinese pear trees, and the demand is coming for their seeds and the old tree in the Arnold Arboretum will be extremely valuable because it can furnish authentic seeds of this species.

Mr. GOULD. Do most of the pear seeds come from Europe?

Mr. FAIRCHILD. Yes.

The CHAIRMAN. Is this Chinese strain immune from blight?

Mr. FAIRCHILD. It is very resistant to the disease, as discovered by a very remarkable man in Oregon by the name of Reimer, who, by means of artificial inoculation, determined the immunity or resistance to disease of the Chinese stocks.

The question of area of such a garden is an extremely important one. If you are looking at a full-grown pear tree, or apple tree, or oak, or any one of the many species of trees we propose to grow in these gardens you will find that they will cover about 40 feet square of ground. When you divide 400 acres by the area which it is necessary to give one good-sized oak tree you discover that there are places for about 10,000 full-grown trees. Inasmuch as it is unsafe to put less than two specimens of a kind in a collection—it is the rule in all botanical gardens I know of to put at least two—in view of the fact that to-day, as Mr. Swingle will show you in connection with his extensive breeding experiments, we must not only have the species but the strains or varieties, which differ somewhat less from each other than the species, but sufficiently to be of immense importance, you will soon discover that 10,000 trees are not enough for a botanical garden.

I should urge at least 400 acres, and to put it on a par with our rival in the south, Rio, we should have 2,000 acres. I presume many of you realize that Rio de Janeiro, because of its scenic beauty, as well as the broad-minded policies they have adopted in the development of their arboreal vegetation, is rapidly becoming the most beautiful capital in the Western Hemisphere.

Another important factor in the utilization of botanical gardens arises from the actual disappearance of species. I have had the pleasure of helping to preserve from extinction a valuable tree, a relative of the cotton plant, occurring in the Hawaiian Islands, allowed to be browsed upon by the cattle of those islands. It took an edict from the governor and special fences to preserve those last survivals, and we got their discoverer to send seeds from the islands of this relative of the cotton plant, and we have distributed it to the only places that are safe, the botanical gardens of the world.

It is a mistake to think that these valuable species are not disappearing, and they are extremely valuable. In China, even where we

got this pear seed, our explorer, Mr. Frank N. Meyer, reported that we must get these at once or they would be gone. In the interval between his two trips the forests of these wild pears had been cut down. F. H. Wilson said the same thing to me recently in regard to the Formosan Conifer, which he has just brought over and which the arboretum is distributing in the extreme South.

Mr. MOORE. Do you distribute to botanical gardens now?

Mr. FAIRCHILD. Extensively.

Mr. MOORE. But you have no adequate place in Washington?

Mr. FAIRCHILD. We have a place in Washington, but on a rental basis. We shall be obliged to leave our present site in about eight years, and you can imagine the encouragement which this short lease gives to one in the planting of these foreign trees and shrubs.

Senator KNOX. Where is that place located?

Mr. FAIRCHILD. Near Rockville, between Rockville and Washington, on the Rockville Pike.

The CHAIRMAN. How extensive is it?

Mr. FAIRCHILD. We have the use there of about 200 acres of land. We bring in about 2,000 species and varieties a year, and we have been forced, I say, with a great deal of feeling, to send these all out to different places in the country, where we have small gardens—California, the Puget Sound region, Florida, Georgia, and other places, where we have tracts of land which have been deeded in trust to us and which Congress is now acting upon; and we trust they will accept these small parcels of land.

Mr. FESS. Do climatic conditions force you to go to various sections?

Mr. FAIRCHILD. Certainly. Not all the plants in the world can be grown here, but we can grow a larger variety of interesting plants here in this region, exclusive of conifers, than in most of the gardens in the United States to-day.

Mr. FESS. Does the Government support or own the various gardens in various sections of the country under your jurisdiction?

Mr. FAIRCHILD. Those are what I am speaking of. Those were given to the Government, or an attempt was made to give them to the Government by the owners of the land, but the Government had no authority to accept them, and we are getting that authority now from Congress.

The CHAIRMAN. For this purely utilitarian use to which you referred, why do you not ask Congress, if you have not already asked them, to appropriate for lands in the country, which would be well enough for you to plant these importations in until distributed? You do not need a botanical garden or a park for that sort of work, do you?

Mr. FAIRCHILD. We do, indeed.

The CHAIRMAN. Why?

Mr. FAIRCHILD. Because of the length of time required to grow these plants. We have recently acquired a small tract between here and Baltimore for the propagation of these plants, which we send out to the amount of about 250,000 a year, but such a tract as that is not adequate for the maintenance of these long-lived plants. An arboretum or botanical garden of this character comes into its full usefulness in about 25 years. The big trees, the important trees,

are then in full swing. That is true not only of this region, but of other regions. We have a small one in Miami, which Mr. Swingle and I started, and it has now grown up. The city has grown up around it, and in a few years we will be obliged to move out.

The CHAIRMAN. I should think, as you stated, it would be a good policy for the Government to go a little farther away from a large city. Instead of using expensive land in the city for park purposes I should think it would be good enough for your purposes to go a few miles out and get an old farm.

Mr. FAIRCHILD. That would be quite true if it were not for the fact that here in Washington you have the largest body of scientific men connected with agriculture in the world.

The CHAIRMAN. Ten miles in the country over a good road is not a very serious setback in these days.

Mr. FAIRCHILD. You would think not, but when you think of the breeding of plants, you can not get too close to them, and the general criticism which might be made of the small amount of plant-breeding work done in this country to-day is that it has not been done because these establishments have been too far away from their collections. The Arnold Arboretum has its office in the arboretum itself. Burbank lives in his garden, and to my mind, one of the greatest difficulties in connection with the development of the Department of Agriculture has been the fact that the department has been in a city, and the environment in which the young men have lived has not been the environment of plants but the environment of office buildings. It is a fact which can not be overstated that it is extremely important to have collections of trees and other plants which when in flower can be visited in a few minutes by the research men of the Department of Agriculture. They need near them these collections so that they can become familiar with them or they soon forget all about the living plants and become city laboratory workers. At least, this is the strong tendency, and it ought to be counteracted.

Mr. MOORE. Now, Mr. Chairman, we have Mr. Olmsted to speak on the subject of Mount Hamilton, and the general plan for the District. Mr. Olmsted prepared the plan of 1901, so far as it related to the outlying districts of Washington.

STATEMENT OF MR. FREDERICK LAW OLMSTED, OF BROOKLINE, MASS.

Mr. OLMSTED. In regard to the point about which Mr. Moore has just asked me to speak, in the report of our commission 20 years ago attention was called to the importance of providing, in connection with the development of the park system of the District of Columbia, for an adequate national botanical garden and arboretum. No attempt was made in that preliminary study to assign a site, or to go into the question of where it would be best to do it. The suggestion was made of the possibility of using the land in Potomac Park for that purpose, but the whole thing was not carefully studied.

In going over the lands in the District which seemed better adapted for park purposes in general, including the possibility of a botanical garden and arboretum, than for use for streets and buildings, the Mount Hamilton district was one which I felt then, and have felt

ever since, to be extremely desirable for park purposes, to be more useful to the community in that way than for building development. It is pretty rough ground, relatively costly to develop for ordinary city purposes, and peculiarly valuable for park purposes.

I do not think there is any need for me to attempt to rehearse the details of that situation. It is a very beautiful piece of ground, with diversified soil, on which, in connection with the Anacostia Park, which, as Mr. Moore pointed out, is contiguous with it, it would be possible to accomplish many of the purposes which have been explained to you and at the same time to make it valuable as a place of recreation for the people of the city.

Mr. Moore. The grading of that would cost the District probably more than to purchase it for park purposes, would it not?

Mr. Olmsted. That well might be. I have made no calculations of grading, but it is a very rough piece of ground in part, where that condition would very likely result.

I made careful calculations of grading cost for Senator Newlands in regard to a piece of somewhat similar land that he had, and those calculations showed that the cost of grading would be such that the land could not be marketed at a price which would carry the investment in grading, and I was compelled to advise Senator Newlands that the most profitable thing he could do with that land would be to give it away. He continued to carry it until his death, and I think he lost in carrying charges all that time.

The Chairman. Is the character of the soil at this Mount Hamilton site proper for the establishment of a botanical garden?

Mr. Olmsted. Yes; it is quite varied. Some of it is not very good, but there are plants which are better grown on soil which is, generally speaking, not very good, and the variety of soil is advantageous, and the variety of exposure is decidedly good.

The Chairman. There is a good deal of stony soil in the hills, is there not?

Mr. Olmsted. Yes; gravelly. I should like to add just a few words to what has already been said about the functions of and the need for an adequate national botanical garden and aboretum.

I have been a member for a few years of the American joint committee on horticulture nomenclature. That is a committee created by and representing several organizations concerned with the growing and use of plants, the American Association of Nurserymen; the Ornamental Growers' Association; the American Society of Landscape Architects, of which I happen to be president just at present; the American Association of Park Superintendents; and the American Pharmaceutical Association, which, from the point of view of the users of drugs, is very much concerned with the matter of plants and plant nomenclature. I have been a member of the working subcommittee of that organization. We published a few years ago a preliminary list attempting to standardize the nomenclature of plants in commercial use in this country. That preliminary list contains the names of about 3,000 plants, but is very incomplete. We expect to get out a new list shortly which will be fully twice as large as that, and that list will not begin to include all of the varieties, distinguishable and distinct entities in the horticultural world and in horticultural commerce.

The function of this committee has been to standardize the nomenclature of these many plants to facilitate dealing with them in the horticultural trades, and in working on that subject we have been very strongly impressed with the need of a central clearing house where plants can be positively identified and attached to their correct names. There are facilities for this through the great herbarium of the Department of Agriculture. But the use merely of printed description and dried specimens is not completely adequate for purposes of identification; and when it comes to the horticultural varieties, which are constantly multiplying, not only is the nomenclature much more uncertain but there is lacking the means of identification and of settling what the thing is which has the qualities that make it worth while to give it a new name and to establish its identity in commerce. Those difficulties can only be met by having specimens of these plants growing where the identification can be complete and they can be carefully studied. Of course, you run into constantly multiplying varieties, and while some of them may appear without essential distinction, without value, still many of them prove to have distinctions of extreme importance such as Mr. Fairchild pointed out in regard to certain economic plants. A mere difference in strain in the pear tree makes it resistant to the blight; and in regard to the ornamental plants for landscape work and gardens you get differences in variety which are sometimes very important distinctions. They are, botanically, not great, but for the purpose of the actual use of the plant they become extremely important; and a place of sufficient area to grow these many varieties, with positive identification, is necessary.

The CHAIRMAN. Mr. Fairchild spoke of various varieties of the species being discovered, or rather new varieties appearing among plants all the time.

Mr. OLMSTED. Yes: new varieties are being developed partly by mere discovery, by accident, and also by deliberate experiment in hybridizing.

The CHAIRMAN. I mean, are new varieties appearing in wild life among plants spontaneously, by evolutionary processes, or otherwise, by natural selection?

Mr. OLMSTED. I think that Mr. Fairchild or Mr. Coville can give you a better scientific answer than I can. I could hazzard an opinion on that subject, but I think you had better go to an authority on that subject.

Mr. PELL. You think that as a national function this clearing garden, so to speak, should be here at Washington and ought to be a national matter?

Mr. OLMSTED. It seems to me decidedly so. An immense amount of help has been given on these various subjects by local institutions. An immense amount, of course, has been done by Dr. Britton's institution in New York and by the Arnold Arboretum at Boston. Lipsky, a Russian scientist, has said, the most valuable one in the world, the one that has done the most, has been the garden at Kew, which is a national institution of Great Britain. I think it is extremely unlikely that we could get the thing taken care of by purely voluntary cooperative action. There are so many interests concerned each one of which has only a relatively small interest in the whole

thing. To combine them all into an organization on a purely voluntary basis would be extremely difficult and it is so closely related to the work which the Department of Agriculture has been doing for the agricultural and horticultural interests of the country that it logically connects up with that in some form.

Now, I do not know that there is anything more that you want me to say; I do not know that I have said what you want.

Mr. JOHNSON. Mr. Chairman, with your permission I would like to ask a few questions.

The CHAIRMAN. Certainly, Mr. Johnson.

Mr. JOHNSON. Do I correctly understand Mr. Moore to say that you were the author of the park plan for the District of Columbia?

Mr. OLMSTED. Yes; I was member of the commission, and that portion of the report which dealt with the outlying sections of the District and the rural parks and park connections was chiefly my work.

Mr. JOHNSON. Was that a congressional commission?

Mr. OLMSTED. That was a Senate commission; it was a commission appointed by and reporting to the Senate Committee on the District of Columbia.

Mr. JOHNSON. How many members were there on that commission?

Mr. OLMSTED. There were four.

Mr. JOHNSON. I have heard their names, but I forget them. Will you please recite them?

Mr. OLMSTED. Mr. Burnham, Mr. McKim, Mr. St. Gaudens, and myself.

Mr. JOHNSON. Was that a paid commission?

Mr. OLMSTED. That was a nonpaid commission.

Mr. JOHNSON. All work being done without compensation?

Mr. OLMSTED. Yes.

Mr. JOHNSON. When was the work done?

Mr. OLMSTED. Most of it was done in 1901.

Mr. JOHNSON. How long did it take?

Mr. OLMSTED. I think it was about a year and half or two years before we turned in our final report. It dragged over a long time after that, after the commission went out of existence. I remember that I maintained correspondence with Washington and came down here often in response to requests.

Mr. MOORE. In order to keep the record straight I will state as part of the answer to Mr. Johnson's question that the resolution was adopted by the Senate March 8, 1901; the report was made on the 15th day of January, 1902.

Mr. JOHNSON. There was much work done, however, by you after the report was made, as you just said?

Mr. OLMSTED. Yes; quite a good deal.

Mr. JOHNSON. Were there any other members of the commission engaged as you were?

Mr. OLMSTED. Yes.

Mr. JOHNSON. They did work subsequent to the making of the report?

Mr. OLMSTED. Oh, yes; from time to time.

Mr. JOHNSON. That is all.

Senator KNOX. Mr. Burnham and Mr. McKim were architects?

Mr. OLMSTED. Yes.

Senator KNOX. And St. Gaudens a sculptor?

Mr. OLMSTED. Yes; a sculptor.

Senator KNOX. And you a landscape architect?

Mr. OLMSTED. Yes.

Mr. FESS. Mr. Olmsted, do you think that what you have recommended here could be secured by the proposed site at Mount Hamilton?

Mr. OLMSTED. In connection with the Anacostia Park, which could be used largely for the same sort of purposes without interfering with the purpose for which it was acquired, I think the area would very largely accomplish the purpose. I think it is quite possible that it would be advisable in connection with such a botanic garden and arboretum so located to have certain areas of more distant outlying cheap land well out in Maryland for certain purposes requiring larger space and not needing such constant work back and forth between the departments and scientific institutions in the city and the main collections.

Mr. FESS. That would be in addition?

Mr. OLMSTED. That would be for certain kinds of things requiring large space.

Mr. FESS. You think this could be made available? While you were engaged in this work with your fellow commissioners, were other sites called to your attention, and what did you think of them if there were?

Mr. OLMSTED. Specifically for this purpose?

Mr. FESS. For Botanic Garden.

Mr. OLMSTED. No; other sites were not called to our attention at that time, and, as I say, we did not attempt at that time to say what would be the best location in the District for these purposes.

Senator KNOX. Was your attention particularly concentrated upon the Botanic Garden as distinct from a chain of parks?

Mr. OLMSTED. No; it was not; that was merely mentioned as one of the things which should be taken care of in the course of the general development.

Mr. MOORE. Senator, the idea of using Mount Hamilton was developed quite largely during the time when Gen. Harts was the secretary of the Commission of Fine Arts. Gen. Harts has come here this morning and I would like to have you hear him about the availability of Mount Hamilton.

The CHAIRMAN. Just before he takes the stand, I have here on my desk what is entitled "Report on the Botanic Garden Situation in the District of Columbia, by the National Commission of Fine Arts, 1920." Did you leave this here?

Mr. MOORE. We had it brought up; yes.

The CHAIRMAN. Is it in print anywhere? This is typewritten; has it been printed?

Mr. MOORE. No, Senator; and I have a note here to ask you if you will have it printed.

The CHAIRMAN. Do you intend to have it printed?

Mr. MOORE. We have no funds available for printing it. We print our report and it takes $1,500 out of our very meager appropriation.

The CHAIRMAN. You want this printed in the hearing?

Mr. MOORE. In the hearing; yes.

The CHAIRMAN. Without objection that will be done.

Mr. OLMSTED. If I may add just one more word about the connection of the work of this American joint committee on horticultural nomenclature. I have here a letter to Mr. Moore from Mr. Harlan P. Kelsey, secretary of that committee, and also a member of its working subcommittee. Rather I should say it is a telegram. It reads as follows:

SALEM, MASS, *May 17, 1920.*

CHARLES MOORE,
Chairman Commission of Fine Arts, Washington, D. C.:

Yours of May 14, with reference conference on botanic garden on 20th. Regret impossible to attend. American nursery interests vitally affected and benefited by an adequate botanic garden, especially since drastic quarantine excluding foreign transportations. It is an economic proposition and will be of vast importance in developing economic as well as ornamental tree and plant material. Production is lessening, and it is of vital importance in the future of our industry that a real botanic garden be immediately established and maintained. Four hundred acres entirely inadequate in size, in my opinion and I plead for not less than 1,000 acres, with diversified soil suitable for all classes of plants.

HARLAN P. KELSEY.

Mr. Kelsey is representative on the joint committee of the Ornamental Growers' Association and is also a member of the American Nurserymens' Association. He is a large grower of plants, and the point on which he touches is an important one. The restrictions upon the importance of plants at the present time in effect, in connection with the general disturbance of transportation, has put American horticulture in a very difficult situation at the present time by closing the foreign sources of supply, and there is greater need for a national botanic garden than ever before. There is greater need than ever before of helping to encourage and stimulate the propagation of plants in this country.

Mr. MOORE. Now, I would like to have Gen. Harts address the committee.

The CHAIRMAN. Gen. Harts.

STATEMENT OF GEN. W. W. HARTS, CORPS OF ENGINEERS, UNITED STATES ARMY, FORMER SECRETARY AND EXECUTIVE OFFICER OF THE COMMISSION OF FINE ARTS.

Gen. HARTS. Mr. Chairman, Mr. Moore, and gentlemen, I would be pleased to have you ask me any questions you desire.

Mr. MOORE. I would like to have Gen. Harts state how his attention was directed to Mount Hamilton in connection with the Botanical Garden and what he did in the way of developing the information in regard to the availability of Mount Hamilton for a botanic garden.

Gen. HARTS. We were very much impressed while I was in charge of the public parks of the District of Columbia, with the need of having some possibility of expansion for the present Botanic Garden which, in its present site may not be improved on an adequate scale; so it was part of my duty, and I was very happy to undertake it, to look about all over the District to try to find some site which would be more suitable for a larger and more adequate botanic garden in the District of Columbia than its present site.

The CHAIRMAN. During what period of years did you have charge, Gen. Harts?

Gen. HARTS. I was in charge from about 1913 to 1917. I went to Europe in the autumn of 1917 and was separated from this subject which was of tremendous interest to me at that time; and it has also been of great interest to me since, so that I think my memory is very clear on a good many points.

The CHAIRMAN. Who preceded you in that office?

Gen. HARTS. Col. Spencer Cosby, of the Engineer Corps.

The CHAIRMAN. And who has it now?

Gen. HARTS. Col. Ridley has it now. He has been there nearly three years.

In looking over the District of Columbia we were very desirous of finding a place which would give us great diversity of soil and exposure, which would be suitable for the different purposes for which a botanic garden is intended.

The CHAIRMAN. Were you in the Engineer Corps, too?

Gen. HARTS. Yes, sir.

The CHAIRMAN. Does the Superintendent of Parks have to be an engineer?

Gen. HARTS. Yes, sir; it is so by law; it is limited to a member of the Engineer Corps.

In connection with our studies I made a visit to several botanic gardens: I went to the New York garden, I made a study of the Kew gardens and other gardens in order to find out right where we stood in comparison with other countries.

In the course of our work we examined sites on the Virginia shore, sites on Potomac Park, Rock Creek Park, and a number of other places in the District of Columbia but found that from the questions of cost, area, exposure, and other conditions the Mount Hamilton tract appealed to me from the beginning as being an exceedingly desirable place because it was comparatively easy to obtain, inexpensive; it had a magnificent exposure to the eastern and southern sun: it had a variety of soil on account of its over 200 feet elevation[1]—I think it is the second highest point in the District of Columbia. It has magnificent rich soil in the lowlands, and this changes to a very poor rocky soil on the top, all of which gives a variety between these extremes. Possibly the area might not have been enough, but we thought that 400 acres would be approximately the area that we should have for a central botanic garden. Besides adding to the park system a botanic garden placed in that locality would afford a beautiful approach to the city from that direction. I think a report was prepared with regard to the desirability of having a botanic garden placed on that site. The location of the gardens on that site had a double purpose: it not only gave us a new area for botanic gardens which was especially large and apparently adequate, but it also combined with the park system and gave us an opportunity for development of another section of Washington. Out in that neighborhood we have at the present time the Reform School property; we have the area for Anacostia Park, which is now developing very satisfactorily and will be a marvelous place of city improvement in the course of a reasonable number of years. If, at the same time, we could join with these two pieces of public property a botanical

[1] See map 38, end of vol. 2.

garden in that same locality we could make an entrance to the city of Washington which would be thoroughly worthy of the Capitol City of a country like ours.

Mr. GOULD. May I interrupt you a second, please? I notice in the Sixty-fourth Congress there was a special subcommittee of the Joint Committee on the Library to look into this question. Was that the report to which you referred, the report made to the Committee on the Library of the Senate?

Gen. HARTS. Yes, sir.

The CHAIRMAN. What is the date of the report?

Gen. HARTS. It was in 1916.

Mr. LUCE. Did the commission ever make a report on Mount Hamilton site?

Gen. HARTS. Just once, sir.

Mr. LUCE. Did they recommend it?

Gen. HARTS. Yes, sir; yes, sir. I had the pleasure of taking a number of the members of the Library Committee out to visit the site so that they would be familiar with the points as they came up in the hearings, the questions of locality for buildings and the exposure either to the sun or the elements; and so you would see how it joined in with the other pieces of Government property in the locality and how it all fitted in with the general plans for the development of the city of Washington. I do not see that there could be any very serious objections to it if we are going to develop at all in that line and I was at that time extraordinarily interested, and am still, as a matter of fact in the development of Washington so that we will not permit too much that is not desirable to take place before we get a system which is going to be satisfactory for a long time ahead, because now is the time to acquire lands if you are going to make parks. We had a magnificient groundwork 150 years ago and since then we have been negligent in maintaining that fine standard.

In developing the city we have also to keep in mind the other capitals of the world. Rio de Janeiro is an extraordinarily beautiful place and is a rival of Washington. Paris, we all know, is a remarkable city and its beauty has been fostered and cared for. I feel that we should do everything we could to see that Washington is not encroached upon for commercial purposes, for business alone, because Washington has always got to be the Capital of the country and it always must be an enjoyable place and must always be a place of which the whole of our country will be proud and desire to be developed along proper lines. The Fine Arts Commission of which Mr. Moore was chairman and myself as secretary tried various things that would be creditable in the future so that we would not, as I say, close the door to the proper development of the city.

The CHAIRMAN. You spoke about having more creditable approaches to the city; what is the present condition as to approaches to the city?

Gen. HARTS. The approach from the north——

The CHAIRMAN. Give the names of the highways, if you please, which are the approaches.

Gen. HARTS. I do not believe I can give you very definitely the names; but coming through that little village to the north, Bladensburg, you strike a turnpike that comes into the city along a streetcar line which divides the highway, making a narrow street on each side with real estate development in the shape of greenhouses

and things of that kind, which makes the northern approach to the city narrow and inadequate. It seems perfectly reasonable to expect that Maryland Avenue can be extended to connect with avenues in the proposed gardens on the Mount Hamilton tract and connect with the Reform School property. This would give a very worthy and magnificent entrance to the city.

Mr. MOORE. There is one short stretch to connect Anacostia Park with the Bladensburg road beyond the Reform School property. The commission has secured from the private owners of that tract a roadway skirting the Anacostia from the District line to connect with the Bladensburg road. That will be added to the Maryland highway system because it is in Maryland; but we wanted an outlet from the upper end of Anacostia Park, and have secured it.

Senator KNOX. As I understand it, the entrance to the south is a very dignified entrance over the Long Bridge and through the park system.

Gen. HARTS. Yes, sir; as soon as you get into the District of Columbia from the south you are immediately in a park area; that is, a very handsome and dignified approach; and, of course, when we get the Memorial Bridge it will add to the dignity and beauty of the approach from the south.

Senator KNOX. Similarly to the west there is an excellent approach, is there not?

Mr. MOORE. Senator, we are working on a plan now—Sixteenth Street has become the great central avenue of the District of Columbia. We are consulting with the Maryland authorities to get an extension of Sixteenth Street out into Maryland so as to connect with the highway to Baltimore. At the present time when you want to go to Baltimore from say Meridian Hill, you have to come into the city and go over to the other side of the Capitol and out Maryland Avenue. There should be a direct road from the end of Sixteenth Street to Baltimore. The Commission of Fine Arts has suggested to the Roosevelt Memorial Committee that they locate the memorial to Theodore Roosevelt at the entrance to the District of Columbia on Sixteenth Street.

Senator KNOX. Will that Baltimore road be by way of the Frederick Pike?

Mr. MOORE. Very nearly: there would be two roads, one going to Frederick and the other going to Baltimore.

Senator KNOX. Now, we have had the entrance on the north, south, and west. The east entrance, I suppose, is the one over the hill across the river at the end of Pennsylvania Avenue, is it not?

Mr. MOORE. Yes.

Senator KNOX. That is a good entrance, except for a little way, is it not?

Mr. MOORE. The Maryland roads generally are good. Speaking of the entrance from the south, of course there should be a boulevard from Washington to Mount Vernon. The road from the end of the Highway Bridge to Alexandria and to Mount Vernon is not adequate; it should be much wider.

Senator KNOX. I was not speaking so much of the highways as the general environment: it is fine, from the south, as I understand it.

Mr. MOORE. Certainly.

Now, I would like to have Dr. Coville address the committee.

STATEMENT OF MR. FREDERICK V. COVILLE, BOTANIST, DEPARTMENT OF AGRICULTURE.

Mr. COVILLE. Mr. Chairman, a botanical garden has its use in the recreation and education of the public, but its greatest use, to my mind, is in relation to plant breeding. I believe that in the next 50 or 100 years we shall make more advance in the development of new plants of use to man by plant breeding than we have made in the whole history of civilization. Scientific men, practical men, are both enormously interested in it. We have found out some of the laws of heredity and we are rapidly putting them into use.

The CHAIRMAN. In what bureau of the Department of Agriculture are you located?

Mr. COVILLE. In the Bureau of Plant Industry.

The CHAIRMAN. Are you head of it?

Mr. COVILLE. No: I am the botanist.

The CHAIRMAN Who is the head of it?

Mr. COVILLE. Dr. W. A. Taylor.

We have in the Botanical Society of Washington, which consists of professional botanists, about 200 members, men who are engaged in the advancement of civilization by the discovery and application of botanical facts. One of the instruments which we ought to have is a botanical garden. We do not have it at the present time. We have on the grounds of the Department of Agriculture certain greenhouses which we are allowed by law to use temporarily. How soon these will be taken away from us we do not know. Ultimately some public building will be placed on the east side of the Mall opposite the Department of Agriculture and then, of course, the greenhouses will have to go. If the greenhouses in which we work are not in immediate proximity to our offices, our efficiency suffers. One of the things that I have been able to do personally while attending to extensive duties of other sorts has been to breed certain plants of agricultural interest. The plant to which I have devoted most attention is the blueberry. We have changed the blueberry from a small wild fruit about the size of a pea to a fruit that looks like a Concord grape. The new plants which we have developed will grow in soils which are not used for any other purpose; soils which are sterile to other plants will grow these improved blueberries. The point I wish to make, Mr. Chairman, is that if I had not had the use of these greenhouses I should never have been able to do this work. These blueberries have yielded at the rate of nearly a thousand dollars an acre, and while the investigation is only a very small item in our scientific work the industry that will grow out of the investigation will be worth millions of dollars.

The CHAIRMAN. Do these berries preserve their taste and qualities?

Mr. COVILLE. They do: and by selection we are getting berries that are even superior in flavor to the wild ones.

This is simply one example of the work we are doing. If there were in Washington a botanical garden of proper equipment, it is inevitable that a great deal of the work of the Department of Agriculture will ultimately be moved to it or to its neighborhood. It is a question of being intimately associated with the tools with which you are working.

There is one feature of a botanical garden in Washington to which I should like to call your special attention. If it is of adequate size and is located where the Washington botanists can work with it, it not only will cost you nothing in the long run, but for every dollar you put into it you will take many dollars out. I do not mean that this garden will declare dividends, but through the information it will disseminate and the new industries it will create it will vastly increase the tax returns to the Government.

Mr. MOORE. Will you please tell the committee what you think of the availability of Mount Hamilton as a site for the purposes of a botanical garden.

Mr. COVILLE. The Mount Hamilton site has a large variety of soils,[1] from gravels on the higher slopes, in which wild blueberries are growing, with trailing arbutus, azaleas, and laurel, to the wild rice marshes which constitute the eastern part of the site, and the fertile alluvial soils along the river. In its variety of soils and exposure it is admirably adapted to botanical garden purposes; it could hardly be improved. I should like to say also that parts of this area have been very severely injured in past years by ground fires. I was on the site recently and found areas in which the underbrush had been killed by fire within two weeks. In the large forest area some of the trees have been killed and some have been injured. These fires could be stopped at once by an adequate patrol. If fires are kept out of this tract, the larger part of which is forested, it will become a natural botanical garden without the use of any instrument except an ax, to trim out occasional dead and undesirable trees. Even now it is used extensively by the people of that part of the city as a place for Sunday and holiday strolls. The strip which constitutes one part of the site, along the Anacostia River, known as Hickey Hill, is a great bird resort, one of the most remarkable of the District. It is full of all sorts of nesting birds, which feed in the marshes.

I have here some pictures that were taken in that locality recently through the courtesy of Mr. Fairchild. They will give you some idea of the attractiveness of portions of this area.

The CHAIRMAN. Speaking of the experiments you are conducting I would like to know if the Department of Agriculture has any lands out in the country near the city of Washington where such experiments could be conducted?

Mr. COVILLE. No. I breed these hybrid blueberries in the greenhouse and keep them there until they are a year old. Then I ship them to a place down in the fine barrens of New Jersey, about 40 miles east of Philadelphia, where the soil is acid and sandy. When they come to maturity we select those bearing fruit of the largest size, best color, most productive, of the best flavor. That is the way my work has been done.

The CHAIRMAN. What I am seeking information about is whether proper lands—cheaper lands than those in the Mount Hamilton tract—could not be secured farther out for the purposes of the Department of Agriculture?

Mr. COVILLE. For the extensive field work yes, but for the breeding work no. It would be undesirable for this reason: This work is a side line, one might say, done in our spare time as we can take it from our office duties. We have administrative work to perform,

[1] See map 41, end of vol. 2.

and unless we can have greenhouse facilities within easy reach of us, within a few minutes' walk, we do not do the greenhouse work. The effectiveness of the bureau would be enormously increased by this additional facility.

Mr. PELL. Just what route do you take to get out to the Mount Hamilton property?

Mr. COVILLE. You go down Maryland Avenue to Fifteenth and H Streets NE., and then out the Bladensburg Pike.

Mr. PELL. Is the Anacostia Park in existence at the present time?

Mr. COVILLE. Yes; the Government is developing it.

Mr. PELL. And that belongs to the Government?

Mr. COVILLE. It belongs to the Government. With the purchase of Mount Hamilton you can get the use also of all this Government land along the Anacostia River. You can not use the Anacostia flats alone for the botanical gardens, because it is all below the 10-foot level and all practically one type of soil. This is tidewater here [pointing to map], and it is only 10 feet above mean low water.

Mr. PELL. I did not realize that the lands were as low as that.

Mr. COVILLE. Maryland Avenue is to be opened by prolonging it to the base of Mount Hamilton, but if Maryland Avenue went beyond that point it would cost the Government more to grade the streets than Mount Hamilton would cost.

Mr. Coville submitted the following communication supplementing his statement:

STATEMENT ON THE REQUIREMENTS OF A BOTANICAL GARDEN SITE IN WASHINGTON ADDRESSED TO THE CONGRESSIONAL JOINT COMMITTEE ON THE LIBRARY.

[By Frederick V. Coville, Botanist, Department of Agriculture.]

MAY 21, 1920.

GENTLEMEN: The old National Botanic Garden which now occupies a site of about 12 acres of land at the foot of the Capitol Grounds is to be moved, because it stands in the way of certain park improvements that have already been determined upon by congressional action.

I understand that the superintendent of the garden had at one time recommended as a new site a tract of about 20 acres of level ground in the Mall, immediately west of the present garden.

The Fine Arts Commission has recommended a tract of some 400 acres lying at the northeast edge of the city of Washington and comprising a wide variety of soils and exposure, from a tidal wild-rice marsh, suitable for water gardens, to extensive oak hills 200 feet or more in height.

I speak in favor of the site recommended by the Fine Arts Commission.

The man who made the present garden, the late William R. Smith, was a friend of mine, and I was a friend of his. I have the highest respect for that Scotchman, for his sterling character, for the garden that he built, and for the pleasure he gave the public in it. But now it is necessary to move this garden. It would be easy to transfer it to a more convenient position and to increase somewhat its size, but these changes alone will not meet the needs of the present or the future.

In selecting the new site your committee has a duty to perform of far greater importance than appears upon the surface. If you choose wisely and in the interest of the whole American public, you will make provision for a line of activity that will stimulate the scientific and horticultural progress of the Nation for many generations.

The new garden should preserve the objects of the old garden, the first and most important of which is to provide a place in which the public, especially the man who works, can find rest and enjoyment and refreshment of mind out of doors surrounded by the atmosphere of beauty and dignity and curious interest of nature that pervades a well-planned garden of trees and flowers.

But there are other and still more important services that a National Botanical Garden can render. It should contain plantings of all the native trees and shrubs of the various States, that can be grown out of doors in this climate in a condition of health and beauty. The garden should be a great public educator in the art of landscape gardening. It should be so located and so conducted that visitors from every part of the United States will carry home with them an impression of what they may do, in their own communities, and largely with their own native materials, to make life more natural and more enjoyable, and consequently more effective.

Our nursery catalogues are in a condition of great confusion as to the names and the varieties of ornamental plants. The new garden should contain authentic examples of these varieties, so that nurserymen may be sure that the things they are selling are accurately named in their catalogues. The purchasing public would then buy with greater confidence and with great freedom.

These and other useful purposes the new garden can be made to serve if it is located on the admirable site recommended by the Fine Arts Commission, with its large area, its varied topography, and its many types of soil.

The new garden can be made to perform one function, however, more important than any of those I have mentioned, more important indeed, in my opinion, than all the others put together. To this use of the garden I should like to call the special attention of the committee. I refer to the relation of the garden to the breeding of new plants useful to man.

It is my opinion that in the next 50 or 100 years we shall make greater advance in the development of useful plants than has been made in the whole history of the human race up to the present generation. All the conditions are ripe for that development. Science and practice are united in the enterprise. The State agricultural experiment stations, the biological research laboratories of our universities and other institutions, and many individual experimenters, are pushing forward with this work. The Department of Agriculture is bringing together, little by little, from distant parts of the world the wild relatives of cultivated plants. There is no place in or near Washington, however, in which they can be perpetuated. Some of them find use in other places, but many need a recognized situation here where they can be kept for observation, study, and experiment. Such a place would be afforded by a National Botanical Garden located on the site recommended by the Fine Arts Commission. If a properly equipped garden is established there, it is inevitable that it would be a center about which would ultimately focus much of the plant-breeding work of the Department of Agriculture.

The Smithsonian Institution is the custodian of an immensely valuable botanical collection of more than a million specimens from all parts of the world. Practically all the plants of the world will ultimately be represented in that collection, which is known as the United States National Herbarium. When a properly equipped botanical garden is established in Washington the Smithsonian Institution will undoubtedly find that the most useful location for the National Herbarium is in or near that garden.

We have no botanical library in Washington. The two or three hundred professional botanists working here use the botanical books belonging to various public libraries, including those of the Department of Agriculture, the Smithsonian Institution, the National Museum, the Library of Congress, and the Library of the Surgeon General's Office. Some day a wise person, or a wise institution of great wealth, will found a botanical library in Washington, for it will be more useful here than anywhere else in the world; and that library, when founded, will, like the National Herbarium, find its most useful location in or near the garden I have described.

Washington will then have the following equipment: A botanical garden containing the world's most interesting plants, a library containing the world's botanical literature, a herbarium containing specimens of practically all the kinds of plants in the world—and these things will be utilized by hundreds of active botanical workers in Washington and elsewhere.

As an illustration of the value of easily accessible greenhouses, let me cite a piece of work of my own on the blueberry. For several years we have been engaged at the Department of Agriculture in an attempt to domesticate this wild fruit, and after prolonged experimentation our object has been accomplished. Our hybrid bushes have yielded such an abundance of berries, so large and so delicious, that they have brought returns to the grower at the rate of nearly a thousand dollars an acre. We have changed the blueberry from a

small wild fruit the size of a pea to a fruit the size of a Concord grape, and we have made its culture a profitable industry. This one small piece of scientific work has an industrial value of millions of dollars. These results I should never have been able to accomplish without greenhouse facilities situated close to my office. Many new things had to be found out about blueberry plants, and by daily contact with them I became as familiar with their behavior and their needs as a dairy farmer with the behavior and needs of his cattle.

Some day the space occupied by our temporary greenhouses at the Department of Agriculture will be needed for a public building. Where then shall we go? To do the most effective work, we must follow our greenhouses. If your committee chooses wisely to-day, we shall go to the new botanical garden; for among the opportunities to be found there our work is bound to become most useful to the Nation.

I urge upon the members of this committee as strongly as my command of language permits that in deciding between the two proposed sites you choose the one recommended by the Fine Arts Commission. If the present Congress shall authorize that site, it will not only have reached a wise solution of a present problem, but it will confer a lasting benefit on the whole country. On and about that site can be brought together in future years such related activities as future Congresses may decide to be wise and prudent. The botanical, horticultural, and agricultural activities that would find their natural location about this site would constitute an agency of human progress the value of which is beyond calculation in money.

In closing permit me to call your attention to one very important feature of this proposal. If you select such a site as shall inevitably bring about the grouping of activities that I have outlined, you will not be spending money on a place of mere recreation, with only an intangible return of benefits, but you will be making an investment which will yield to the Nation dividends of many dollars for every dollar you put in.

STATEMENT OF MR. WALTER T. SWINGLE, IN CHARGE OF THE CROP PHYSIOLOGY AND BREEDING, BUREAU OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

Mr. SWINGLE. Mr. Chairman, I am in charge of the chief office of plant breeding in the Department of Agriculture, and have seen the work grow from a very small beginning 25 years ago until now 20 offices are carrying on work in plant breeding. One of the most important phases of the work that our department is doing is represented by the office. We are the only people whose home country is of continental extent. The European countries, like England, France, and Germany are, after all, only small in extent, and have only a limited range of climate. In America, in our home country, we have every range of climate, from tropical Florida to the glacial regions of Arctic Alaska. The European methods and plants our forefathers brought over with them did very well in the eastern part of the country, but as the pioneers penetrated westward until they reached Arizona and California they found themselves vastly outstripped in effectiveness by the Mexicans, who used Spanish crops and Spanish methods, developed partly by the Moors during their long occupation of Spain. In other words, we are forced in our country of continental extent to carefully consider whether or not the agricultural practices that our ancestors brought from northwestern Europe are best adapted to our climatic conditions. I am prepared to say that we have pretty conclusively proven that they are not, and that we can vastly increase the yield and the profit of agricultural production of foods, of fiber plants, and of medicinal plants by the use of the proper choice of strains and by the proper breeding of new types. I might give one or two instances to show the almost miraculous

creation of wealth that comes in this way. Ten years ago five members of our bureau took up the problem of finding a satisfactory method of growing Egyptian cotton in this country. Up to that time no Egyptian cotton had been grown in this country successfully; and in 1910 the first bale of Egyptian cotton was laboriously harvested and baled in Arizona, the very first one ever grown in America. Remember that there is no tariff protection on cotton and that the freight rates from Arizona to the New England mills are about the same as those from Alexandria to the same mills, and that the labor charges are ten times as high in Arizona as in Egypt. Nevertheless, by scientific investigation of cultural methods, and by the breeding of better types of Egyptian cotton, and by the close organization of the farmers this industry has grown from nothing 10 years ago until in 1919 the cotton crop from the Salt River Valley of Arizona was worth over $20,000,000. This is almost entirely new wealth; it is not merely the substitution of other crops by cotton, but immense new areas—in one case 10,000 acres in one field—were reclaimed from the desert, irrigated, and planted to Egyptian cotton.

The CHAIRMAN. You mean our southern cotton would not have grown out there in Arizona?

Mr. SWINGLE. Our Egyptian cotton does not grow where the southern cotton does, and it is used for a different purpose; it is used largely in the manufacture of automobile-tire fabric.

The CHAIRMAN. You could not grow our southern cotton in Arizona?

Mr. SWINGLE. It can be grown only at very great disadvantage.

The CHAIRMAN. It is not profitable to raise it?

Mr. SWINGLE. It is not profitable to raise it.

I have made a calculation which shows that the income tax returned to the Federal Government from the Egyptian cotton industry in Arizona and California is about twenty times what this investigation cost, to say nothing about the benefits to the States and counties and individuals themselves. In other words, the chief end of these investigations by the Department of Agriculture is the securing of useful crop plants and the breeding of varieties properly adapted to the soil and climatic conditions; and having, as we do, every range of soil and climate, it is hopeless to expect the old-time crops of northwestern Europe to be satisfactory; and I believe it is a matter of the most vital importance for the future that there be maintained in Washington a suitable central place where plants can be grown and flowered, which will be afforded under the new project.

The CHAIRMAN. What other instance did you have in mind besides Egyptian cotton? You said you were going to give us several instances.

Mr. SWINGLE. Take the case of the navel orange. In 1871 Mr. Saunders, in charge of the greenhouses of the Department of Agriculture, brought from Bahia, Brazil, a famous orange known as the Bahia navel orange. It was then merely a curiosity, and a few plants were brought back by Mr. Saunders, which resulted in the establishment of an industry in which there is now nearly $200,000,000 invested; it is one of the most scientific and highly organized horticultural industries. The income from that investment is simply prodigious.

Another important study we are making is that of the Chinese pear. Ten years ago they dug up some Asiatic pear trees on the grounds of the Department of Agriculture which were in the way of some road. Nobody could foresee the importance of maintaining these fine Chinese pears. They are indispensable to the modern pear industry, in which there is invested probably $50,000,000 or more, because the pear blight rots the root; we must have the Chinese pear, with a blight-resistant root system, and we must have the right kind of Chinese pear.

Mr. MOORE. Now please tell us about the dates.

Mr. SWINGLE. About 20 years ago Mr. Fairchild and I and some others were sent to Africa and Asia to investigate the date industry with the view to possibly establishing that industry in the southwestern part of the United States. It was found difficult to get information, because, while the Arabs had grown dates for a thousand years, they had kept no records; but after a lot of investigation and hard labor we have within the last 20 years moved the center of the date industry from the Sahara Desert to California, and we now produce the best dates in the world.

Senator KNOX. How high do date palms grow?

Mr. SWINGLE. Seventy-five to 100 feet.

Mr. PELL. Will they grow in Florida?

Mr. SWINGLE. Yes; but not so well as they do in California.

Mr. PELL. Are those California dates marketed?

Mr. SWINGLE. They are sold in the Pacific coast cities, San Francisco and Los Angeles, but are not yet produced in sufficient quantities to reach the eastern markets, but about $500,000 is being invested annually in the extension of the date industry, in which ultimately between $20,000,000 and $50,000,000 will be invested. In a quarter of a century I look for the date as one of the best and cheapest human foods produced. It has advanced to such a point that we can advise the farmer with absolute certainty that a certain date will succeed. If an untested variety be planted and it fails to succeed it means a great loss to him, because, if after 8 or 10 years, when the date begins to bear full crops, it turns out to be the wrong variety, the farmer has to dig it up, and it is a total loss, because the date palm can not be budded or grafted. For this reason it is necessary to study all the principal varieties of dates to learn which ones are suited to our climatic, soil, and market conditions.

Mr. JOHNSON. Since these two institutions are under different managements, the Agricultural Department, and the Botanic Garden, will there not be a conflict or a duplication of work?

Mr. SWINGLE. I do not think so.

Mr. JOHNSON. How will you obviate it?

Mr. SWINGLE. The only question is to have some place where these many parent trees can be grown. It takes 10 or 15 years for a tree like the Chinese pear to produce fruit in large quantity.

Mr. JOHNSON. If the Mount Hamilton tract could be secured for a botanic garden, what authority would the Department of Agriculture have to use it?

Mr. SWINGLE. The Agriculture Department would merely have cooperative authority, just as we cooperate with the Smithsonian Institution, and many other scientific institutions. The Department

of Agriculture must cooperate with at least 100 institutions in the United States.

Mr. JOHNSON. Do you think they cooperate in plans better than one conducted entirely by the Agricultural Department?

Mr. SWINGLE. I am inclined to think so.

Mr. JOHNSON. You have not been dealing with the future without looking toward the necessity of more land?

Mr. SWINGLE. Yes; but I merely say that as Mr. Coville did, it is necessary to have land near by.

Mr. JOHNSON. Where is your office?

Mr. SWINGLE. In the Department of Agriculture.

Mr. JOHNSON. How close to your office now are you doing this work?

Mr. SWINGLE. We have greenhouses a few blocks away, where I am doing some of this work, but some is being done elsewhere. It is necessary to have plant material as close to our office as possible.

Mr. JOHNSON. What is it that you can do at this proposed botanic garden that you can not do in the lands already owned or being operated by the Department of Agriculture?

Mr. SWINGLE. One is, for instance, the Chinese pear trees. We would not have to send expensive expeditions to the Orient if we could have these trees growing nearby. When they built the new buildings on the Agricultural grounds the pear trees had to be cut down.

Mr. JOHNSON. Where were they located?

Mr. SWINGLE. In the Department of Agriculture grounds.

Mr. JOHNSON. Has not the Department of Agriculture a lot of land over on the other side of the river?

Mr. SWINGLE. It has land at Arlington, but because of the Government's immense investment in the Lincoln Memorial and the National Cemetery at Arlington it makes it doubtful whether that is the best locality for such a large farm, and it may have to be abandoned some day.

Mr. MOORE. The enlargement of Arlington Cemetery is going to take that in some day, Mr. Johnson.

The CHAIRMAN. Are those lands occupied by the experiment station owned by the Government or simply leased?

Mr. SWINGLE. Yes: it is owned by the Government. We are only temporarily occupying Government land, from which we may be evicted next year; we do not know.

Mr. JOHNSON. It is your opinion that when Arlington is enlarged, and your present grounds, your present operations, are pushed back, you will not be pushed back farther into Virginia, but they will jump you over to Mount Hamilton; is that your theory about it?

Mr. SWINGLE. I would not say that; I am simply speaking of the advantage of Mount Hamilton and of planting these trees in grounds where we can see them without traveling 12,000 miles to go where they grow wild.

Mr. JOHNSON. If the Chinese pear trees were taken to the ground you have already, would you have to travel 12,000 miles to see them?

Mr. SWINGLE. No: provided that they could be planted permanently; we have no such place now.

Mr. JOHNSON. Do you mean to say that there is only one place, and that is Mount Hamilton?

Mr. SWINGLE. I do not; I merely say that the department does not now have a suitable place. I think I have not specifically mentioned in my testimony Mount Hamilton, although I believe Mount Hamilton is a good site. I believe the Government should have one place where a worthy botanical garden could be built ranking this country not twenty-fifth but first. The Kew garden has given to the world uncounted wealth.

The CHAIRMAN. Have you other speakers?

Senator KNOX. This is pretty much cumulative.

The CHAIRMAN. I hope you will be as brief as you can now. Unless you have some new points, the thing is simply cumulative; in the interest of time, I wish you would make your statements as brief as possible.

STATEMENT OF DR. C. STUART GAGER, DIRECTOR BROOKLYN BOTANIC GARDEN, BROOKLYN, N. Y.

Dr. GAGER. Mr. Chairman, I shall be very glad to be brief. In fact, there is little more to be said. It seems to me that the subject before us can be divided in three points. First, what is a botanic garden; second, should the United States Government maintain a botanic garden; and third, where should this botanic garden be located?

It would seem to me from what has been said by preceeding speakers that a botanic garden is something more than would be indicated by the name "Botanic Garden"; it does not mean that such a garden is a specialized kind of park merely; a botanic garden is not merely a spacious kind of park. Perhaps it would be an extreme saying to say that the park feature is incidental in the development of a botanical garden. That would perhaps be a little extreme, but a botanical garden is not merely a specialized kind of park. That is only one feature. Its distinct object from an educational and scientific standpoint is the advancement of definition and knowledge of plants: and that should be adequately provided for by the United States Government, and in order that it may be adequately provided for, it should have the Government behind it.

The United States, of course, has been backward and behind all other nations in the matter of botanic gardens. For over a hundred years botanic gardens have been regarded in many countries as an important government activity. Coming down on the train I counted up the number of botanic gardens in the United States, and I could only count 14, of which 7 have been established in the past 15 or 20 years: and those figures include this so-called pseudo botanic garden here in Washington at the present time and two or three very small developments at some of our small colleges, like Mount Holyoke, Mass., and institutions like that. Great Britain has 12, Austria 13, France 22, Italy 27, Germany 36, and all South American countries and the Asiatic countries have had botanic gardens for centuries. It seems to me that in that fact alone we may find that there is a fundamental reason why the Government should support and develop botanic gardens. Of course, we recognize that agriculture is the fundamental human industry and realize that every permanent advancement in agriculture has been made only on the basis of what botanical science has contributed. I need hardly go into the neces-

sity of fostering botanical investigation. It is fundamental and a matter second hardly to none in importance for a Government like the United States to undertake.

I am not endeavoring to speak upon the different sites which have been proposed, but I would like to see a botanical garden established here of size commensurate with the needs of the Nation. The development of a mere park in Washington is a local matter. It can be enjoyed only by persons who are in Washington as residents or persons in Washington as citizens; but a botanical garden has a national influence and a national importance. Its activities should extend throughout the entire country. It has got to be located in some place, and naturally the National Capital is the fitting place.

The CHAIRMAN. Is your botanical garden under the jurisdiction or control of your park commission?

Dr. GAGER. No, sir; we articulate with the Government of greater New York through the office of the park commissioner; but he has no jurisdiction whatever except to transmit communications from and to the Botanic Garden and the other departments.

The CHAIRMAN. Who controls its management?

Dr. GAGER. It is controlled by a board of trustees, a trustee organization which has entire power of administrative appointments and supplies and a large part of the funds for maintenance.

The CHAIRMAN. Have you finished your statement, Dr. Gager?

Dr. GAGER. Yes; thank you.

Mr. MOORE. Senator, I would like to have Mr. Hess to address the committee.

STATEMENT OF MR. GEORGE W. HESS, DIRECTOR UNITED STATES BOTANICAL GARDEN, WASHINGTON, D. C.

Mr. HESS. Mr. Chairman, the area occupied by the Botanic Garden at present, I admit, is entirely too small. It should be located on a site where it could have at least 300 or 400 acres in order to bring the United States Botanical Garden up to date. As far as experimenting on fruit, blueberries, and things of that sort, as connected with the Botanic Garden, I have always considered that entirely separate.

We have seen that botanic gardens, in their origin, were based on utility. This is perhaps the best distinction that can be made between their function and that of the public garden or park, where plants are grown primarily for purposes of ornament or shade. The essential difference is apt to become blurred, especially in the case of botanic gardens situated near to towns, and needs to be reemphasized from time to time. There is no reason why botanic gardens can not or should not be ornamental, but this should be strictly subsidiary to their main purpose.

What, then, are the proper functions of a botanic garden, large or small, in the neighborhood of a great city, or in a small tropical island? First, there is the scientific function. New plants are introduced from other climates and other lands, and these are grown and studied so as to discover whether they are capable of adaptation to their new surroundings and whether they are likely to be of value, economic or esthetic.

Second, only perhaps to plant introduction should be the maintenance, so far as it is possible, of a representative collection of the more interesting and useful plants of the surrounding country, and especially of species allied to those in cultivation. The latter are of great interest to the taxonomist, to the plant breeder, and to the pathologist, because of the likenesses and differences they exhibit in comparison with the species grown for use. In a cotton-growing

island, for example, nothing could be more appropriate or more useful, so far as botanic gardens go, than a representative collection of the native cottons, many types of which are in process of extermination owing to increasing strictness regarding close seasons. With them, it is quite conceivable, may be lost characters or qualities which would some day prove highly valuable.

Again, botanic gardens afford botanical students opportunity for research in plant biology and pathology. One can hardly place a limit to the benefits that agriculture and horticulture have derived and may derive from researches in this direction. Our modern science of genetics, for instance, is derived from the studies of Mendel in a monastery garden in the last century. By work on the lines indicated by his discovery, races of useful plants are being multiplied and modified so as to be more exactly suited to the variable conditions in which economic plants are grown an to produce far greater crops than their ancestors. Studies which lead to such results can best be carried on in botanic gardens, where there ought to be found a greater amount of material and more scientific appliances than are possible in most private establishments.

Besides the scientific function of botanic gardens, there is their educational aspect. In an article on this subject in Science it is well remarked that the notion that knowledge can be acquired from books is too prevalent; the idea that one can read about nature and thus acquire knowledge of nature is as misleading as to suppose that one can acquire knowledge of business by reading about business. We must distinguish between information and knowledge. Information may be obtained by reading, but knowledge can only be acquired by contact with and experience of realities. Hence, botanic gardens open to the public a source of real knowledge of plants, and there is no more pressing problem to-day than to learn how to grow plants and how to grow them in increasing quantities and of increased value in every possible situation. If made without insight into plant nature, efforts in this direction pass through a period in which knowledge is acquired through painful experience, very often with failure as the ultimate result.

The above is quoted from an article which appeared in the Agricultural News, a fortnightly review of the imperial department of agriculture for the West Indies.

I visited the Mount Hamilton tract with Mr. Moore, and my observation of it leads me to believe that it is very well suited for the purposes of a botanic garden, although I think we could select a better site. I would rather see it located in the northwest, if possible.

The CHAIRMAN. Are you in favor of having an extensive botanic garden?

Mr. HESS. Yes, Senator: I would like to see the Botanic Garden on a larger scale, of a size commensurate with the needs of the country.

The CHAIRMAN. You admit that the present location can not be enlarged and the improvement of the Mall carried out according to plans.

Mr. HESS. No; not if the improvement is carried out according to plans.

The CHAIRMAN. You heard what Senator Williams said about the greenhouses and what he called the flower gardens.

Mr. HESS. I did; yes, sir.

The CHAIRMAN. Do you agree with him?

Mr. HESS. I would not like to say, Senator, as I believe it is a matter to be decided by Congress.

The CHAIRMAN. All right; the greenhouses in your present location are entirely inadequate with the plans you have, are they not?

Mr. HESS. They are. We have a magnificent collection of plants, and it is too bad to have them crowded in as they are.

Senator KNOX. If they carry out the plans of the Fine Arts Commission to have the Mall extend from the Capitol down to the Lincoln Memorial, will not those greenhouses have to go?

Mr. HESS. I did not understand you.

Senator KNOX. Would not the greenhouses have to go eventually if the plan to extend the Mall from the Capitol down to the Lincoln Memorial is carried out?

Mr. HESS. Yes, sir; they would have to go, and it would destroy a valuable collection of plants, because some of those magnificent palms are 100 years old; they are not in tubs, but are planted in the ground of the conservatory, and I am afraid they would be destroyed; I do not think we could move them.[1]

The CHAIRMAN. Do you know of any other place which could be made available as a site for the Botanical Garden other than those that have been discussed, especially in the Northwest section?

Mr. HESS. No, Senator; I can not say that I do. I have thought that the land that was formerly occupied by Camp Meigs might make a splendid location, although I do not know what the acreage is.

Mr. MOORE. Would it have advantages over the Mount Hamilton tract?

Mr. HESS. Only that it would be more accessible. Less money would be required for grading purposes.

Another thing I want to mention is that I do not want to see the fence taken down until Congress has decided upon a permanent location where we can take care of the plants.

The CHAIRMAN. Do you think the provision in the sundry civil bill as passed by the House relating to the fence is a proper one?

Mr. HESS. Yes, sir; of course, it is necessary to remove part of the fence, but I do not want to see any more of the fence removed than is absolutely necessary until some provision is made to take care of our plants.

The CHAIRMAN. Now, is there anybody else, Mr. Moore?

Mr. MOORE. Yes, sir; Col. Ridley.

STATEMENT OF COL. C. S. RIDLEY, SUPERINTENDENT OF PUBLIC BUILDINGS AND GROUNDS; SECRETARY AND EXECUTIVE OFFICER OF THE COMMISSION OF FINE ARTS.

Col. RIDLEY. I have nothing to say in addition to what has been said except I would like to read some letters which have been received from various persons; or, if you desire, in the interest of saving time, I will insert them in the record.

The CHAIRMAN. You might just state the contents briefly and let them be inserted in their entirety in the record.

Col. RIDLEY. I have a letter here from Dr. George D. Moore, the director of the Missouri Botanical Garden, St. Louis, in which he expresses his regret at not being able to be present.

The CHAIRMAN. They all advocate the project, do they not?

Col. RIDLEY. Yes, sir.

The CHAIRMAN. Well, they speak for themselves.

Mr. JOHNSON. What project do you speak of?

Col. RIDLEY. The project of an enlarged botanical garden.

The CHAIRMAN. Does he advocate any particular location?

Col. RIDLEY. No, sir.

The CHAIRMAN. I will ask you to put those letters in the record. Are they all in favor of an enlarged botanical garden?

[1] Palms of this size have been moved.

Col. RIDLEY. They are all in favor of an enlarged botanical garden. Also I wish to say that I am in favor of the proposed site at Mount Hamilton.

The CHAIRMAN. Have you looked at any of the other proposed sites or suggested sites?

Col. RIDLEY. The only other site that has been proposed has been the project in Rock Creek Park, and that, I think, would be a very serious mistake. That is brought out very clearly in the report which you have asked to be printed. Some persons have advocated that, but it would be a great mistake because it would spoil Rock Creek Park by ruining its essential character.

The CHAIRMAN. What do you think of the location suggested by Mr. Hess?

Col. RIDLEY. Camp Meigs?

The CHAIRMAN. Yes; what do you think of that?

Col. RIDLEY. I do not think that would offer at all the variety of exposure and soil that would be necessary. I think we might put the greenhouses there, but even that would be bad.

The CHAIRMAN. You would have to change the character of a great deal of the soil at Mount Hamilton when you went to grade?

Col. RIDLEY. Of course, the plans for the development at Mount Hamilton have not been gone into in detail; but very little grading would have to be done there, only enough to adapt the road systems and the other development to the present contours. I think it would be very desirable to leave the present contours as far as beauty is concerned.

Mr. MOORE. Mr. Langdon's computations show that there are 40 acres of level land in the Mount Hamilton tract where greenhouses could be built.

(The letters submitted by Col. Ridley are as follows):

THE MISSOURI BOTANICAL GARDEN,
St. Louis, May 12, 1920.

Mr. CHARLES MOORE,
1729 New York Avenue, Washington, D. C.

DEAR MR. MOORE: It was a matter of deep regret to me that I was compelled to wire you that I would be unable to attend the hearing set for May 21. I have been away for 10 days and various important matters necessitate my staying in St. Louis until after the 22d. Practically any date after this would have suited me but it will be absolutely impossible for me to leave St. Louis next week.

I was anxious to appear before the committee, not only because of any information I might have been able to give concerning the local situation, but also that I might point out the need and scope of a truly national botanical garden. My feeling is that the Government has neglected a real opportunity here and that the benefits of a national garden, properly organized and administered, would reach far beyond any show place which might be maintained in Washington.

The Royal Botanic Garden with its headquarters at Kew, England, and the Imperial Garden of Berlin are two striking examples of what organizations of this kind can do and, with certain fundamental modifications, I hope very much that the proposed garden at Washington may ultimately develop along these lines. Some scheme of cooperation between existing gardens such as the New York Botanic Garden, the Arnold Arboretum, and the Missouri Botanical Garden, ought to be devised and in addition it would certainly be desirable to look forward to ultimately having other small gardens, closely affiliated with the national garden, established in other parts of the country. These would be selected chiefly on geographical lines to afford natural climatic conditions for certain kinds of plants.

A national bontanical garden, such as I have in mind, would not in any way conflict with the purpose and function of existing gardens. On the other hand, it would be of tremendous assistance to them and, with the resources of the Government behind it, be capable of performing an important service to the country at large, which could not be accomplished otherwise.

Again regretting my inability to be present at the hearing, and with best wishes, I am,

Yours, very truly,

GEORGE D. MOORE, *Director.*

DEPARTMENT OF AGRICULTURE,
Washington, May 18, 1920.

MR. CHARLES MOORE,
Chairman the Commission of Fine Arts.

DEAR MR. MOORE: Responding to your kind invitations of the 11th and 15th instant that I be present at the hearing before the Senate Committee on the Library on the 21st at 10 a. m., to discuss the question of the relocation of the Botanic Garden and the enlargement of that work, also that I attend a conference on the same subject at the office of the commission the 20th instant at 10.30 a. m., I regret that it will not be possible for me personally to attend. I shall take pleasure, however, in having this department represented both at the conference and the hearing, probably by the Chief of the Bureau of Plant Industry and Messrs. Fairchild, Coville, and Swingle, who will present a statement of the view of this department regarding the matter and be prepared to discuss such features as may be pertinent.

Very truly, yours,

E. MEREDITH, *Secretary.*

AMERICAN CIVIC ASSOCIATION,
Harrisburg, Pa., May 14, 1920.

MR. CHARLES MOORE,
Chairman Commission of Fine Arts,
1729 New York Avenue, Washington, D. C.

DEAR MR. MOORE: Yours of May 12 is at hand this morning, telling me of the hearing before the Joint Committee on the Library in reference to the relocation and enlargement of the Botanic Garden, on Friday, May 21.

I would be very glad to be present on this occasion if I had not made a definite engagement for the same day near Philadelphia—an engagement which it would be exceedingly difficult to break or postpone, because of the impending departure for California of the business friend I am to meet.

I am in very hearty sympathy with the plan for a national botanic garden, and I have had some consultation with those interested as to the Mount Hamilton site, which appeals to me as a very excellent place at which to begin this great enterprise.

I have a slight acquaintance with other important national gardens, particularly Kew Gardens at London, and more especially with the Arnold Arboretum at Boston. I would be glad, if in my absence, you felt inclined to quote me not only on behalf of the American Civic Association but on behalf of the American Association of Nurserymen (of the arboretum committee, of which I am a member) and of the American Rose Society, as most earnestly favoring the enterprise itself and the place of its location as thus suggested.

Handled as a broadly conceived enterprise, such a garden can be of immense value to the people of the United States. The recently imposed quarantine No. 37, operated by the Federal Horticultural Board, which cuts off completely the ordinary amateur and scientific investigation of the flora of the world outside America, save under restrictions and regulations which are tantamount to complete exclusion, makes more definitely essential a well-conducted botanic garden and arboretum to which may be brought for trial, study, and eventual dissemination, if found worth while, the plants of other climates desirable both for food and for ornament. In fact, without some such action, or in its absence

without a relaxation of the rigors of the quarantine referred to, the progress of horticulture in the United States as related to other countries is now definitely suspended.

I appreciate the honor of the invitation and regret my inability to accept it for the date given, and sincerely trust the Senate committee may put this enterprise in process of creation without any delay.

Yours truly,

J. HORACE MCFARLAND, *President.*

HARRISBURG, PA., *May 18, 1920.*

Mr. CHARLES MOORE,
Chairman the Commission of Fine Arts,
1729 New York Avenue, Washington, D. C.

DEAR MR. MOORE: I inclose a letter from Mr. J. Edward Moon, president of the American Association of Nurserymen, in which he renews the pledge of support of that organization to the botanic garden proposition.

I have thought that this letter might be of possible use to you at the hearing on Friday, absence from which is a real grief to me.

The American Association of Nurserymen is an organization of widespread membership and large influence.

Yours, truly,

J. HORACE MCFARLAND.

MORRISVILLE, PA., *May 17, 1920.*

J. HORACE MCFARLAND,
Harrisburg, Pa.

DEAR MR. MCFARLAND: I am very much indebted to you for the correspondence with Chairman Moore, of the Commission of Fine Arts, Washington, D. C., re the botanical garden.

I am glad that you used the name of the association in this connection, for we stand definitely committed to this project. I only wish it were possible for Mr. Watson or myself to go to Washington Friday, to attend this hearing, to show by our presence our interest in the undertaking. We may do this even yet, but our funds are running so low that there are some things we should do that we can not do.

Be assured, however, of my appreciation of your efforts.

Very cordially,

J. EDWARD MOON.

The CHAIRMAN. Is there anybody else to be heard?

Mr. MOORE. The only other gentleman is Mr. J. Edward Moon, the President of the American Association of Nurserymen.

STATEMENT OF MR. J. EDWARD MOON, PRESIDENT OF THE AMERICAN ASSOCIATION OF NURSERYMEN, MORRISVILLE, PA.

Mr. MOON. Mr. Chairman, the American Association of Nurserymen is a national body, embracing the national organizations in nursery work including all the States, has adopted a resolution definitely committing itself to the establishment somewhere of a national botanical garden. The English have done wonderful work in their gardens at Kew, and we want similar opportunities in this country. Most of the advantages that accrue to us have been brought out. But one additional thought occurs to me, and that is that our work runs over a long period of years. When we start to growing trees we have to look for the market ahead, and if we had some gardens like this one, perhaps we could develop the plant and obtain some idea of the demand there may be for it before we invest our money

in its growth. Such an assurance is necessary in investing money over a long period of time.

Another idea on which I think there is some confusion as I have listened to the testimony this morning and about which the Arnold Arboretum may help you is this: The botanic garden should perhaps be under this committee's jurisdiction with the Department of Agriculture cooperating. The nurserymen are especially desirous of the scientific information that such a place can acquire.

For your information the Arnold Arboretum is under a 999-year lease with the city of Boston. Such a lease, a long-term lease, is necessary in entering on work of this kind, because trees that last over a century must be insured of care, and I just wanted to inject the feature of permanency into this work.

I might just say in regard to the Camp Meigs site that until the electrification of the railroads it would be found, in my judgment, a very improper site for the growth of conifer, owing to the smoke there. The Mount Hamilton site is a place of which we are very much in favor.

The CHAIRMAN. Is there any other person present who desires to advocate the selection of any other site? Mr. Moore, you have had letters from several people who thought they had better sites and wanted a chance to be heard. Is there any person here who wants to speak in behalf of any other site than the Mount Hamilton site?

(There was no response.)

Mr. MOORE. No, Mr. Chairman. There are some gentlemen here who have asked to be heard; but so far as the commission is concerned, there is nothing further.

The CHAIRMAN. Is there any person here who desires to be heard in favor of this bill?

Mr. WOOD. Yes; I do, Mr. Chairman.

The CHAIRMAN. What is your full name?

Mr. WOOD. James M. Wood.

The CHAIRMAN. Where is your residence?

Mr. WOOD. 1107 Seventeenth Street.

The CHAIRMAN. What is your occupation?

Mr. WOOD. Attorney at law, representing the Northeast Washington Citizens' Association in this matter.

STATEMENT OF MR. JAMES M. WOOD, REPRESENTING THE NORTHEAST WASHINGTON CITIZENS' ASSOCIATION.

Mr. WOOD. Mr. Chairman, in view of a hearing that took place on Wednesday before the House Committee on the District of Columbia I desire to call the attention of this committee to one or two matters that I think will be of interest.

Congressman Zihlman, of Maryland, some six months ago introduced a bill in Congress for the extension of Maryland Avenue from Fifteenth and H Streets [indicating on a map the site of proposed botanic garden] to the Anacostia River. On the 1st day of December of last year the Commissioners of the District of Columbia made the following favorable report on that bill, stating that the extension would be highly desirable:

DECEMBER 1, 1919.

Hon. CARL E. MAPES,
Chairman Committee on the District of Columbia,
House of Representatives.

SIR: The Commissioners of the District of Columbia have the honor to submit the following on H. R. 10206, Sixty-sixth Congress, first session, entitled "A bill for the extension of Maryland Avenue east of Fifteenth Street to the Anacostia River," which you referred to them for report.

The object of the bill is to authorize the Commissioners of the District of Columbia to institute condemnation proceedings for the extension of Maryland Avenue east of Fifteenth Street to the Anacostia River in accordance with the highway plan, and it provides that one-half of the entire amount found to be due and awarded by the jury as damages, plus the costs and expenses of the proceedings, shall be assessed as benefits.

A plat is inclosed showing in red the proposed extension. The proposed highway, as laid down on the highway plan, has a width of 160 feet. The amount of land involved in the condemnation proceedings is about 750,000 feet, and the estimated cost is approximately $50,000.

There is a general law authorizing the commissioners to institute condemnation proceedings for the opening of streets in accordance with the highway plan (U. S. Stat., vol. 37, p. 950), which provides that the entire cost of acquiring the necessary land, plus the costs of the proceedings, shall be assessed as benefits. This general legislation, so far as it affects streets of a normal width—that is, 90 feet or less—is believed to be in accord with sound public policy, for, as a rule, property in the vicinity of such a new street is benefited by an amount equal to or in excess of the cost of opening the street.

However, in the case of very wide avenues, such as Maryland Avenue, the cost is in general out of proportion to the local benefits, and the commissioners believe it would be only equitable that the community as a whole should bear part of the cost.

The advisability of opening Maryland Avenue east of Fifteenth Street to the Anacostia River has been considered by the commissioners a number of times, but they have each time reached the conclusion that such action would be inequitable and unjustifiable under the general law, which would place the entire burden upon the property through which the avenue is to run. This bill provides that an amount equal to one-half of the cost of the land and proceedings shall be assessed as benefits. This proportion is believed to be approximately fair, but on the assumption that in the opening of a 90-foot street, which is the usual width of a street laid down on the highway plan, the entire cost should be assessed as benefits, a more equitable proportion would be to assess as benefit nine-sixteenths instead of one-half of the entire cost.

The proposed bill does not authorize the appropriation of funds that would be needed to pay the damages, costs, and expenses of the condemnation proceedings. The commissioners, therefore, recommend that the bill be amended by adding a new section, to read as follows:

"SEC. 2. That an amount sufficient to pay the necessary costs and expenses of the condemnation proceedings taken pursuant hereto, and for the payment of the amount awarded as damages, is hereby authorized, payable out of the revenues of the District of Columbia."

If amended as indicated above, the commissioners are of the opinion that the proposed legislation is highly desirable, as Maryland Avenue is one of the main avenues radiating from the Capitol and when improved will afford a direct route from the Capitol to Anacostia Park, which is being rapidly developed.

Very respectfully,

THE BOARD OF COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

I will state, further, that on the 17th of December the Washington Railway & Electric Co. filed, in writing, a request that they be allowed to be heard on this bill before any action was taken by the committee. I think in April, or possibly the first of this month, the committee granted them a hearing before the full Committee on the District of Columbia, and the hearing was held on Wednesday of this week. At that hearing it was developed by the testimony of the

president of the Washington Railway & Electric Co., at the request of which company the hearing was granted, that this land known as the Graceland Cemetery tract, the old abandoned Graceland Cemetery tract, which consists of about 25 acres, bounded on the west by Bladensburg Road and on the south by the Bennings Road and on the east and north by the present boundary lines of the old cemetery, that the title to the land had been taken by the Potomac Electric Power Co. in contemplation of the removal of the power house, etc., from their site south of the Avenue; that they had purchased this ground for the purpose of building their power house and other structures, with a view of abandoning their site out here[1] [indicating present site at Fourteenth and B Streets NW.], and Col. Kutz, who is here at the hearing, I believe, stated before the full committee on Wednesday—day before yesterday—that it was exceedingly desirable that action should be taken some way or other in reference to this proposed botanic garden site and the extension of Maryland Avenue, because in case the Potomac Electric Power Co. made application to the board of commissioners for the erection of buildings and power houses within the lines of the proposed extension of Maryland Avenue, that the commissioners were absolutely without authority to deny such a permit or to prevent them from making that construction. In other words, if they made application for a permit to build a power house right in the line of Maryland Avenue, that the commissioners, if the permit applied for complied with the building regulations, were without authority to deny them the right to erect the structure. But Col. Kutz is here, I believe, and can speak for himself in reference to that matter.

The hearings before the House committee was adjourned about half-past 12 pending the outcome of the hearing before this committee. In other words, it was decided at that hearing that if the Committee on the Library decided to purchase this tract for a national botanic garden and arboretum then the bill introduced by the Congressman from Maryland should be amended so as to provide for the extension of Maryland Avenue from Fifteenth and H Streets NE. to Twenty-fourth Street, which is the southern boundary line of the proposed Mount Hamilton Park site; and it was also decided that in the event this joint committee decided at the present time not to purchase this site that then the board of commissioners would recommend the extension of Maryland Avenue from Fifteenth and H Streets NE., in accordance with the terms of the bill as introduced, with an amendment that the eastern terminus should be at the western taking line of the Anacostia Park improvement.

The CHAIRMAN. Do you say that the Potomac Electric Power Co. has already purchased the land there?

Mr. WOOD. Purchased and own the old Graceland Cemetery tract.

Mr. WILSON. Not in their own name; in the name of another company.

Mr. WOOD. They purchased the tract of land, but the title is held in the name of Clarence F. Norment; he holds the deed in escrow. I do now say that it develops that the Washington Railway & Electric Co., which asked for the hearing, did not own a foot of ground affected by the proposed extension.

[1] See map 38, end of vol. 2.

The people situated and resident in all this territory are very anxious for the extension and opening of Maryland Avenue. We would do nothing, absolutely nothing, to interfere with this proposed park and we are perfectly willing that it should be extended to this point[1]—to Twenty-fourth Street—but, of course, Twenty-fourth Street is not a public street. Twenty-eighth Street is. But the feeling of the board of commissioners, as outlined by Engineer Commissioner Kutz before the Committee on the District of Columbia in the House, was that it is highly desirable that action be taken at once by Congress in order to prevent the absolute blockade of the extension of Maryland Avenue from Fifteenth Street eastward.

As you gentlemen are aware, and well aware without my telling you, the entire area of the District of Columbia as it exists to-day was taken from the State of Maryland, and there is no monument to the State of Maryland; there is no monument to perpetuate the name of the State of Maryland except Maryland Avenue, and Maryland Avenue, as you well know, begins at the Potomac River on the west and extends in a northeasterly direction to this point[1] [indicating on a map of the District of Columbia], where it is stopped by certain construction by a depot known as White House Station, by tracks, and other structures that have been put in the lines of Maryland Avenue.

We trust and very sincerely hope that the committee will decide this question as to site as soon as possible. With a view of getting the matter in some sort of shape to be acted upon, a bill has been prepared which I will submit to the committee; a bill for the acquisition of a site; and the only amendment, the only change in that proposed bill is to substitute the word "three" for the word "two." There is an area of something like 400 acres embraced in this territory which is assessed at $211,000; and there is no doubt but what it could be acquired for that sum. It is nearly all farm land; there is no development there to speak of and only a few houses. It could be purchased at a very advantageous price, I think, at the present time.

The CHAIRMAN. What is the significance of changing the word "two" to "three"; what do you mean?

Mr. WOOD. In that bill it is provided that an appropriation of so much should be made; it should have read "$340,000 for the acquisition of this site"; it reads in there "$200,000," and it should read "$340,000."

The CHAIRMAN. These are drafts of a proposed bill. Have they been introduced in either branch of Congress?

Mr. WOOD. No, sir; they have not; and I just suggest them to you.

The CHAIRMAN. Without objection one will be printed in the record.

(The draft of the proposed bill referred to is as follows:)

A bill to provide a national botanic garden and arboretum on the Mount Hamilton site in the District of Columbia, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to provide a national botanic garden and arboretum on the Mount Hamilton site situated between the Bladensburg

[1] See map 38, end of vol. 2.

Road and the new Anacostia reclamation project, as more particularly described in the annual report of the Commission of Fine Arts for the year ending January 1, 1918, the Secretary of the Treasury, the Librarian of Congress, and the Architect of the Capitol, acting as a board, be, and they are hereby, empowered and instructed to acquire, either by purchase or condemnation proceedings, as hereinafter provided, the land necessary, in their opinion, for the purpose aforesaid, and for the purpose stated the sum of $240,000, or so much thereof as shall be necessary, is hereby appropriated out of any money in the Treasury not otherwise appropriated.

SEC. 2. That in the event it shall be necessary, in order to carry out the purpose of the foregoing section, for the board, as above constituted, to acquire land, said board is empowered and directed to acquire the same by negotiation, where any such land may and can be so acquired and title secured at a price not above a fair relative value as to other lands which have been sold in the immediate vicinity; or if the said board hereby created shall be unable to purchase said land by agreement with any one or more of the respective owners at a reasonable price within ninety days after the passage of this act they are authorized and directed to make application to the Supreme Court of the District of Columbia, at any general or special term thereof, by petition for the condemnation of such land not so purchased, and for the ascertainment of its value. Such petition shall contain a particular description of the property not so purchased, and selected for the purpose aforesaid, with the name of the owner or owners thereof and their residences, so far as the same may be ascertained, together with a plan of the land proposed to be taken; and thereupon the said court is authorized and required to cite all such owners and all other persons interested to appear in said court at a time to be fixed by such court, on reasonable notice, to answer the said petition; and if it shall appear to the court that there are any owners or other persons interested who are under disability the court shall give public notice of the time at which the said court will proceed with the matter of condemnation; and at such time if it shall appear that there are any persons under disability either who have appeared or who have not appeared, the court shall appoint guardians ad litem for each such person, and the court shall thereupon proceed to appoint three capable and disinterested commissioners to appraise the respective interests of all persons concerned in such land, and under such regulations as to notice and hearing as to the court shall seem meet. Such commissioners shall thereupon, after being duly sworn for the proper performance of their duties, examine the premises and hear the persons in interest who may appear before them, and return their appraisement of the value of the interests of all persons respectively, in such land; and when such report shall have been confirmed by the court the President of the United States shall, if he thinks the public interest requires it, cause payment to be made to the respective persons entitled according to the judgment of the court, and in case any of such persons are under disability, or can not be found, or neglect to receive payment, the money to be paid to any of them shall be deposited in the Treasury to their credit, unless there shall be some person lawfully authorized to receive the same under the direction of the court, and when such payments are so made, or the amount belonging to the persons to whom payments shall not be made are so deposited, the said lands shall be deemed to be condemned and taken by the United States for the public use.

Mr. WOOD. That is the situation from the viewpoint of the people. I would like to say further, Mr. Chairman, that by reason of the barricade erected at this point[1] [indicating on map] it has been impossible to get one single street extended into this area, and here you have a bill opening a road into 1,800 acres of land without a single house on it, you might say. You have land there that is in its native state. You have Mount Hamilton here with the original trees, the age of which nobody knows. Upon this land the owners have been paying taxes for dozens and dozens of years, and it has never produced one single cent of revenue.

I want to say further to this committee that I, myself, as a member of the Northeast Washington Citizens' Association and acting

[1] See map 38, end of vol. 2.

in its behalf, secured dedications of land within this territory to the extent of about 1,200,000 square feet, and to say that if this site is selected you have that amount of land already dedicated forever to the public use. You secure the dedication here of N Street and R Street and of Twenty-eighth Street from M Street to R Street and R Street from Twenty-eighth Street over to Bladensburg Road.

The CHAIRMAN. What do you mean by "dedication?"

Mr. WOOD. I went to the owners of that land and presented to them a petition for signature which dedicated the land to the public use in order that the country might be opened for development; and if M Street and Twenty-eighth Street from M to R and R Streets had been improved, which could have been done at slight expense, it would have resulted in the upbuilding of that territory.

The CHAIRMAN. I understand that; but I do not understand how far your scheme for dedication of that land for highway purposes proceeded in law.

Mr. WOOD. It proceeded to this extent, Senator, that the owners there signed a dedication in language similar to this: "We, the undersigned owners of the land shown hereon, on this plat in red (the plat showed the length and width of the dedication) hereby dedicate the same to the public use to the United States forever." And that land and the title to that land is in the United States and can not be removed, and copies of those dedications are now on file in the engineer department of the District of Columbia.

Mr. JOHNSON. Have they been acted upon and recorded?

Mr. WOOD. Yes, sir.

The CHAIRMAN. I do not know anything about the laws of the District of Columbia as to an effective dedication, but were these attempted dedications on the part of the landowners for highway purposes ever accepted by the officials of the District of Columbia?

Mr. WOOD. Yes, sir. In the corner of each dedication as those plats were filed with the Commissioners of the District of Columbia is written the words "Approved and accepted" and signed by the full board of commissioners.

The CHAIRMAN. If that be so, then, if this tract be taken for botanical gardens, those highways, if they are legally existent, would have to be abandoned by official authority and proceeding, would they not?

Mr. WOOD. Of course the title is in the Government in any event, you see; that is land you would not have to acquire.

The CHAIRMAN. Did they dedicate the fee of the soil to the Government or only the use for highway purposes?

Mr. WOOD. They dedicated the land to the use of the public forever.

The CHAIRMAN. But for what purpose?

Mr. WOOD. For street and highway purposes.

The CHAIRMAN. The documents themselves, of course, will show what was done.

Mr. WOOD. Yes, sir. Now, I do not know what next to say, for there is so much to this—there is so much to it and the people are so deeply interested; it is quite impossible even to give the committee an outline. You understand, we have been working for more than 20 years upon these projects out here—the widening of Benning Road, the widening of Bladensburg Road, and all those projects—and we

have been interested in getting the extension of Maryland Avenue now for 11 solid years. Eleven years ago a bill was introduced providing for the extension of Maryland Avenue, and we have been trying to get it through, but have never succeeded in getting a favorable report by the commissioners until the 1st day of December, 1919; and I say to you, Mr. Chairman, that here are 80,000 or 90,000 people who are adversely affected by the present construction at that point. Mr. Johnson, sitting here, knows something of the difficulty subsisting at that point; anyone who has been there knows of the conditions; and it seems but a simple act of justice that an avenue, an important avenue, which is already a show point of the District, should be extended out to the boundary line of the State in whose honor it was named.

Mr. MOORE. I would like to ask the speaker if the residents of that region are in favor of the Mount Hamilton project?

Mr. WOOD. Why, certainly. There is not a soul opposed to it. I have in my possession here in this room now petitions signed by substantially all the residents there—a large number of residents—and addressed to the Senate Committee on the District of Columbia, and they are addressed to the House Committee on the District of Columbia, one being an original and the other a duplicate original, because the residents signed both; and they pray that it be done before further obstructions are placed in the way. Suppose this were Kentucky Avenue. If this were Kentucky Avenue, I know that this gentleman [indicating Mr. Johnson] would be interested in wiping out the situation there; I know he would be immensely interested.

Mr. JOHNSON. I am not so sentimental that I would be controlled by a name.

Mr. PELL. How much of the improvement that you are advocating would be paid for by the residents of that particular district, by the people who live down on Bladensburg Road and Benning Road?

Mr. WOOD. In the bill providing for the extension of Maryland Avenue it is provided that of the amount found to be due and awarded by the jury as damages for and in respect of the land taken for the opening and extension of Maryland Avenue 50 per cent thereof shall be assessed as benefits against abutting property owners, and that the other 50 per cent thereof shall be taken out of the general tax fund of the District of Columbia; so it will not cost the people of the United States outside of the District of Columbia one single penny; the cost was taken care of that way. If this committee decides upon the acquisition of this land for botanic-garden purposes, then the bill introduced in the House may at once be amended so as to stop the avenue at Twenty-fourth Street, because from that point on in that event we are quite willing to leave the extension and development of Maryland to the owners, or management, or superintendent of this proposed botanic garden. I have been all over this territory numbers and numbers of times. When you get to Twenty-eighth and M Street here[1] [indicating] Twenty-eighth Street is a perfect floor, almost like the top of this table, and I think Maryland Avenue should follow the contour of the land rather than run in a straight line.

We simply urge upon this committee to take action that will duly consider the fact that the Potomac Electric Power Co. owns this Grace-

[1] See map 38, end of vol. 2.

land Cemetery tract, the whole key to that situation. We hope you will take such steps here as will enable us to say definitely to the House committee, because the hearing was adjourned over until the action of this committee was known, whether we shall stop at Twenty-fourth Street or whether we shall go on to the river. The Engineer Commissioner of the District of Columbia stated positively as the policy of the Commissioners of the District of Columbia that in the event this Joint Committee on the Library did not see fit in its wisdom to purchase this tract for a botanic garden and arboretum, then the commissioners would insist upon the extension of Maryland Avenue to the west, taking line of the Anacostia Park improvement, because of the necessity of doing something to relieve the people from being bound hand and foot forever by a construction proposed in the line of Maryland Avenue. When the president of the Washington Railway & Electric Co. stated before the committee that the Potomac Electric Power Co. had spent several thousand dollars in the drafting of plans for buildings, etc., on that site you can get an idea as to the alarm felt by the engineer commissioner. I think he is here and can speak better for himself than I can.

Mr. PELL. When does this company propose to do this building? Are these plans a long distance ahead; when do they intend to start work?

Mr. WOOD. They are building there all the time now. They have put tracks and all sorts of construction in there; and I think it is their intention to erect buildings there that will take care of all the power-house project at Fourteenth and B, so that they can move——

Mr. WILSON. To control the whole railroad situation?

Mr. WOOD (continuing). Before that is condemned and taken by the Government, as it is probable that the Government intends soon to take the land between Pennsylvania Avenue and Maryland Avenue and the Capitol grounds and Fifteenth Street; that is, such portions as they do not already own.

Mr. JOHNSON. How many square feet did you say had been dedicated in the Mount Hamilton tract?

Mr. WOOD. I think it is about 1,200,000 square feet.

Mr. JOHNSON. If the Government should acquire the Mount Hamilton tract for a botanic garden, would it have to pay for those 1,200,000 feet?

Mr. WOOD. No, sir; I do not think so.

Mr. JOHNSON. You give that as your opinion as an attorney?

Mr. WOOD. Yes, sir. I do not think they would; the owners have given up the property.

Mr. JOHNSON. Who are the owners?

Mr. WOOD. The District of Columbia.

Mr. JOHNSON. I think you said that you got the owners to sign a paper dedicating it?

Mr. WOOD. I did; I know the names of several of the owners of property in there, but I could not tell probably more than half a dozen. I understand that Mr. Eustis owns this Mount Hamilton tract—I can not say that I know of my own positive knowledge—Mr. William H. Ernest owns probably half a square in there.

Mr. JOHNSON. Did the two parties whom you have just mentioned sign the paper to which you have referred?

Mr. WOOD. I think they did; yes, sir. I know Mr. Ernest did; yes, sir. I do not think Mr. Eustis did; I think he was out of the city.

The CHAIRMAN. To which Mr. Eustis do you refer?

Mr. WOOD. William C. Eustis.

Mr. WILSON. Mr. Corcoran owns some of that land.

The CHAIRMAN. I did not know whether you meant Mr. William Eustis or Mr. George Eustis.

If those dedications were made for highway purposes only and the land was not used for that, then it would revert to the owners. However, maybe, we can not decide that here.

Mr. WOOD. In talking with the engineer member of the Fine Arts Commission it was suggested that they could divert it along the lines of R Street, which is already a public street; it would then be used for highway purposes, you see.

The CHAIRMAN. But should that site be taken for botanical garden purposes and, for instance, greenhouses put on this land—dedicated land—it would be using it for a purpose different from that for which it was dedicated.

Mr. WOOD. I think so, undoubtedly.

The CHAIRMAN. A gentleman is here who says he is attorney or representative of the power company of which you spoke. He desires to make a statement in relation to the matter and if you have finished I will let him.

Mr. JOHNSON. Just a moment, Senator. I would like to ask a few questions. Have you any information as to whether or not the owners who dedicated for highway purposes would also dedicate for garden purposes?

Mr. WOOD. Well, I have been asked that question and on account of the high taxes and on account of the fact that it is practically all nonproductive land, I do not believe there is a soul in there who would dedicate for this purpose.

Mr. JOHNSON. For garden purposes?

Mr. WOOD. No, sir. There is only one owner in there in a position to dedicate to the public use for such a purpose—that is, dedicate his whole holdings—and that would be the owner of this tract[1] [indicating].

The CHAIRMAN. I suppose the chances are that the owners who dedicated the land for highway purposes did it with a view to improving the rest of the tract and making it accessible?

Mr. WOOD. Yes, sir.

The CHAIRMAN. And if their property were to be taken from them they might not be willing to make that dedication?

Mr. WOOD. I think not, but there is no expensive land in there at all.

The CHAIRMAN. Are you acquainted with the value of land over there?

Mr. WOOD. Well, I do not think I would qualify as an expert. It would depend entirely upon how the land is taken. When the land was taken for the Pennsylvania Railroad, the jury, of course, looking upon the railroad as a very rich corporation allowed, I think, more for the land than it was worth.

The CHAIRMAN. Would you be content to rely on your own judgment if you were purchasing land in that section?

[1] See map 38, end of vol. 2.

Mr. WOOD. Yes, sir; I would.

The CHAIRMAN. Where the botanical garden is proposed to be located?

Mr. WOOD. Yes, sir.

The CHAIRMAN. What, in your opinion, is that land worth?

Mr. JOHNSON. You mean the average value?

The CHAIRMAN. Yes; the average, by and large, of the 400 acres—$250,000; is that the price?

Mr. WOOD. That should read "300," instead of "200"; I think perhaps it was a mistake of the typewriter. It is proposed that the appropriation shall be $340,000.

The CHAIRMAN. Is that the price at which the property is held by the owners?

Mr. WOOD. I think it could be secured within those figures.

The CHAIRMAN. As it stands, what do you think is the value of the 400 acres of land?

Mr. WOOD. It is worth from $500 to $600 or $700 an acre; $700 an acre on an average, I should say, would buy the whole thing.

The CHAIRMAN. I do not mean taking a particular section of it, but taking the whole 400 acres as one parcel. Do you think it is worth $200,000?

Mr. WOOD. Yes; more than that.

The CHAIRMAN. Is it worth $300,000?

Mr. WOOD. Yes. It is assessed at $211,000, which is two-thirds of its value.

The CHAIRMAN. Or claimed to be?

Mr. WOOD. Yes; claimed to be.

Mr. JOHNSON. What civic society do you represent?

Mr. WOOD. The Northeast Washington Citizens' Association.

Mr. JOHNSON. Are you a member of it?

Mr. WOOD. Yes.

Mr. JOHNSON. Is your membership based upon residence out there or what?

Mr. WOOD. It is based upon residence and public spirit. The constitution of the association says that any public-spirited person or one interested in Northeast Washington may become a member.

Mr. JOHNSON. Do you own any land out there?

Mr. WOOD. No, sir; I do not own a foot of land. Mr. Tucker, the president of our association, is here, and I would like him to say a word.

The CHAIRMAN. Just a moment, so that this gentleman's testimony may be connected with yours as to the intentions of the power company——

Mr. WILSON (interposing). If you will allow me to interrupt——

The CHAIRMAN. I think we better have this other gentleman's testimony first.

Mr. WILSON. I just want to ask a question.

The CHAIRMAN. Oh, if you desire to ask a question right on this subject, you may.

Mr. MOORE. Mr. Chairman, in regard to the different prices, let me say that the land to be taken comprises an area of 367 acres; and the full valuation, based on the assessors' books, is $254,520.

The CHAIRMAN. Now, Mr. Wilson, you may ask your question.

STATEMENT OF MR. NATHANIEL WILSON.

Mr. WILSON. Mr. Chairman, I wish to remark that this particular locality east of the Capitol belongs to a great many people, quite a considerable population here and on the other side of the river. I am now and for years have been perfectly familiar with all that territory. In the District we have five or six associations of inhabitants for mutual protection and benefit, and they are actual residents and owners of property; and between the river and the bridge over the river and the Fifteenth and H Streets, along the line of the Government Printing Office, is quite thickly developed, not with expensive houses, but with a great many small houses and quite a large population, and many people have resided there for a great many years. All the population this side of the river and the other side of the river are very much interested in this present situation and the acquisition by the Government of this ground for a botanic garden, but primarily for the extension of Maryland Avenue from the Capitol to the eastern boundary of the District. They have been, in season and out of season, doing everything they could in regard to both of those propositions, both in respect to the botanic garden and the extension of Maryland Avenue.

I have to request, now that the occasion is opportune, that they may have an opportunity of presenting in print whatever they wish to say through the commissioners, saying in advance that they are willing to approve the conclusions that the commissioners make in regard to both of these propositions and desire to be considered as supporting the policy and the conclusions of the commissioners, who, on examination, shall recommend what shall be done in regard to one and the other, subject, of course, to the decision of Congress and of this Commission. There is no opposition on the part of anybody over in the project for the botanic gardens or the project in regard to the extension of Maryland Avenue, which is recognized as an absolute necessity. Every property owner there is in accord with it. You have before you the recommendation of the commissioners on the bill for the extension of Maryland Avenue, and you will see in the House bill which is before you, which has been recommended by the commissioners in a report which sets forth most distinctly and plainly the condition of that territory and the necessity—the absolute necessity—for the opening of Maryland Avenue. I hope you will get all the information you can from the people affected before the matter is finally closed, so that you will know distinctly, definitely, and promptly from them what the situation is there and what it is that is asked for by the plain owners of property and citizens in that district, not any rich interest, but just the plain property owners. I thank you, Mr. Chairman.

STATEMENT OF MR. WILLIAM L. CLARKE, ASSISTANT SECRETARY AND ASSISTANT TREASURER OF THE WASHINGTON RAILWAY & ELECTRIC CO. AND THE POTOMAC ELECTRIC POWER CO.

Mr. CLARKE. Mr. Chairman, we had no expectation of asking to be heard here at all, but I came merely to gain information as to the project: but from part of the testimony given it seems to me that

our company was, no doubt, unintentionally placed in rather a false position.

We do stand as the owners of the Graceland Cemetery tract, but from what was said I rather gathered that something improper or even suspicious seemed to turn upon our ownership which, I think, I can very easily convince your committee is not the case. About eight years ago the property came on the market and we bought it.

A company operating 175 miles of street railway has got to have the proper tools for its trade, and "tools" in that sense means sites for necessary conveniences in the District of Columbia. I hardly need suggest these are mighty scarce and there is none other like the Graceland Cemetery tract in the entire District on account of its being so near the center of the city, and of such great advantage for the needs of a street railway and electric light company. Since purchasing it we have put no improvements upon it whatever, except a little trackage above ground which simply rests on the ground for the temporary storage of old cars. Prior to that time, with the consent of the commissioners of the District, we had built a little loop there which stands slightly in the line of Maryland Avenue, and was placed there long before there was much talk about the extension of Maryland Avenue, and, as I say, with the consent of the commissioners. We built it to turn our cars back instead of running them out to the District line, which would have involved great waste in "dead" car mileage. As a matter of fact, all our improvements there, temporary tracks and all, can be removed in the space of 24 hours.

Long prior to the time of our purchase of the Graceland Cemetery tract a considerable purchase had been made at Fifteenth and H Streets NE. by the Washington, Baltimore & Annapolis Railway; a station was erected which was used as their Washington terminal. The White House Station does occupy part of Maryland Avenue, but only a small part, and it is my impression that it would not be very difficult for the railroad to remove it.

At the hearing last Wednesday, day before yesterday, our president spoke in regard to the extension of Maryland Avenue and said that our company could not afford, nor would it consider for a moment, antagonizing or hindering any important public improvement. The Maryland Avenue extension bisects our property on an angle of approximately 45°, but it leaves a tract of about 12 acres on the south side of the extension, which will be sufficient for our needs if we are met with a spirit of cooperation in the matter of closing two or three of the smaller streets within the tract. We have spent over $5,000 in preparation of plans, but not for a power station, as has been suggested; we have no intention whatever of putting a power station on the Graceland Cemetery tract. We have our splendid power plant out at Benning, farther out on the Anacostia River; but we have need of a great car barn and repair shops, and a substation for local distribution of current might be included. It will be remembered by this committee that about four years ago a bridge was placed across Rock Creek on Q Street, and that bridge and the extension of Q Street cut our present repair-shop property into two parts and destroyed its efficiency.

Mr. JOHNSON. That is in the northwest?

Mr. CLARKE. In the northwest. As a result, we had to move our paint shops to Eleventh and Florida Avenue NW. This makes it very expensive to repair cars in one place and then move them to another quite distant place to have them painted. So we have drawn up plans to have our great repair shops at this strategic point at Fifteenth and H Streets NE. There we have steam connections with the Baltimore & Ohio and Pennsylvania Railroads further out Benning way; so the Graceland Cemetery tract makes an ideal place for large repair shops. If the plans discussed to-day for the botanical gardens are carried out, our company would not for a moment oppose the extension of Maryland Avenue, but suggest that if it is done, some other little collateral things should be done to protect our interests. All we hope is that the District authorities will cooperate with us and see that we have space enough to the south of Maryland Avenue for the extensive improvements we have in mind. Thank you very much, Mr. Chairman.

The CHAIRMAN. Of course, the extension of Maryland Avenue does not come within the province of this committee, but of the District committee, and really, I suppose the only reason why we are considering it at all is because the decree of the extension of Maryland Avenue depends upon our action with relation to the Mount Hamilton site. Are there any other gentlemen who want to be heard?

Mr. WOOD. Mr. Chairman, I do not know whether I made it distinctly plain to you or not, but the point which was desired to be made plain was that the key to this whole situation is owned by a local corporation, and with the situation existing, the purchase of this site will be practically useless because you would have no entrance to it and would have to go up Bladensburg Road. I think you will all agree that Maryland Avenue should go to this site.

The CHAIRMAN. You have not said that before, as I understand it.

Mr. WOOD. No; I have not.

The CHAIRMAN. Do you think if the Government should take this Mount Hamilton site for botanic garden, that they should also take this property that you have pointed out there?

Mr. WOOD. It would be so highly desirable to extend Maryland Avenue from Fifteenth Street to that point——

The CHAIRMAN. I am not talking about the extension of Maryland Avenue alone, but do you think that the Government ought to take all the property owned by the railroad company?

Mr. WOOD. Oh, not at all; not at all.

The CHAIRMAN. As I say, I suppose it is the business of the District Commissioners to report on the advisability of the extension of Maryland Avenue, is it not?

Mr. WOOD. Yes.

The CHAIRMAN. And not the business of this committee.

Mr. WOOD. No.

The CHAIRMAN. But what you urge to this committee is prompt action as to whether or not the Mount Hamilton site will be purchased?

Mr. WOOD. Well, the engineer commissioner stated that if it was decided to purchase this tract, he would recommend an amendment to this bill stopping it at that point and that the commissioners would amend their report, you see.

The CHAIRMAN. I understand that.

Mr. JOHNSON. This property fronts on Bladensburg Road, does it not?

Mr. MOORE. It does.

Mr. JOHNSON. You could get into it from Bladensburg Road?

Mr. MOORE. Certainly. Of course, the natural approach will be along Maryland Avenue extended. Another thing, Mr. Chairman, there is a law already for the taking of all land needed for the Anacostia improvement. An amendment to that legislation would accomplish the results now sought.

The CHAIRMAN. The present law provides for taking lands below the tide lines.

Mr. MOORE. Below the 10-foot contour.

The CHAIRMAN. Is there anybody else who desires to speak either for or against this project? If not we will consider the hearing closed.

(Thereupon, at 1.15 o'clock p. m. the hearing was adjourned.)

BISMARCK, N. DAK., *May 27, 1920.*

Mr. CHARLES MOORE,
Chairman Fine Arts Commission, Washington, D. C.

DEAR SIR: I have heard something of the proposed creation of a new botanical garden in the vicinity of Washington. In this connection it occurs to me that it would afford an excellent opportunity for a living outdoor museum for the people, by which they might learn much of the native flora of America in distinction from the many introduced species now escaped and naturalized over much of our country. As the case now stands most people have no clear idea of the distinction between the native flora and the introduced forms.

Another service from such a native botanical garden would be the facility it would afford for study and experiment in domestication and amelioration of the native plants which were utilized in their wild state by the native tribes of America for various uses in their economic life, for food, dyestuff, fibers, perfumes, medicines, and various other uses.

A third use such a native botanical garden would serve is the demonstration of the several cultivated crops for which the world is indebted to the aboriginal American cultivators. Here could be brought together in a living exhibition a nation-wide collection of the varieties cultivated and adapted to the various area of differing conditions of climate and soil, as they were developed by the tribes resident in the several areas. For instance, it would be most interesting to the public from many points of view, to have growing near the National Capital plants of the agricultural crops of the very stock cultivated by the Mandans on the upper Missouri River which made possible the success of the Lewis and Clark expedition in 1804 and 1805. For it was the food supply obtained by that expedition from the Mandan Indians which made it possible for the expedition to remain on the upper Missouri through the winter and thus be that far forward on their journey next spring.

All these uses would serve as real factors in the process of Americanization, about which we hear so much in these days. And in my view a real and appreciative knowledge and understanding of physical America, and an appreciation of America's native distinctive character must be no slight factor in the establishment of Americanism.

For all these reasons I am intensely interested in the project and hope that it may be accomplished. I am specially interested in such a project, and as curator of the State Historical Society of North Dakota have planned such an outdoor museum as the planting scheme for development of the State capitol grounds and its execution has been authorized by act of the legislature.

Yours, truly,

MELVIN R. GILMORE,
Curator of the State Historical Society of North Dakota.

WASHINGTON, D. C., *May 21, 1920.*

Hon. FRANK B. BRANDEGEE,
Chairman Joint Committee on the Library,
United States Senate.

SIR: With further reference to the hearing before your committee held this day, and in order to complete the record (which seems to be incomplete in certain respects), for the benefit of members not able to attend the hearing, I have the honor to submit the following facts and conclusions and request they be made a part of my remarks.

LEGAL STATUS.

On May 17, 1910, by act of Congress, a permanent Commission of Fine Arts was created, to be composed of seven well-qualified judges of the fine arts, and said act provided:

"It shall be the duty of such commission to advise upon the location of statues, fountains, and monuments in the public squares, streets, and parks of the District of Columbia, and upon the selection of models for statues, fountains, and monuments erected under the authority of the United States, and upon the selection of artists for the execution of the same. * * * The commission shall also advise generally upon questions of art when required to do so by the President, or by any committee of either House of Congress."

On October 25, 1910, the President issued an Executive order, by the terms of which—

"It is hereby ordered that the plans for no public building to be erected in the District of Columbia for the General Government shall be hereafter approved by the officer duly authorized until after such officer shall have submitted the plans to the Commission of Fine Arts created under the act of Congress of May 17, 1910, for its comment and advice."

On February 2, 1912, the President directed the commission to advise the officer in charge of public buildings and grounds in regard to the improvement of any of the grounds in the city of Washington under his charge whenever such advice is asked for by that officer.

On November 28, 1913, the President issued the following Executive order:

"It is hereby ordered that whenever new structures are to be erected in the District of Columbia under the direction of the Federal Government which affect in any important way the appearance of the city, or whenever questions involving matters of art and with which the Federal Government is concerned are to be determined, final action shall not be taken until such plans and questions have been submitted to the Commission of Fine Arts designated under the act of Congress of May 17, 1910, for comment and advice."

The duties of the commission were thus enlarged to embrace the giving of advice upon the plans and designs for public structures and parks in the District of Columbia, as well as upon all questions involving matters of art with which the Federal Government is concerned.

RECOMMENDATIONS.

In 1914, in the matter of the restoration to the street and park systems of the grounds now occupied by the Botanic Garden, the officer in charge of public buildings and grounds, at the request of the Joint Committee on the Library, conferred with the commission regarding plans prepared under his direction, and later rendered a report to that committee as a result of the conference.

On August 16, 1916, the chairman of the Committee on the Library of the House of Representatives requested the commission to furnish data "with reference to the effect on the general plan for the development of the Mall and the ground around the Grant Monument of the bill recently passed by the Senate to continue the Botanic Garden on its present site." The bill adverted to (S. 6227, 64th Cong., 1st sess.) provided for the enlargement of the Botanic Garden by attaching thereto two parcels of land on the west, commonly known as East Seaton Park and West Seaton Park. The commission reported adversely on the bill on November 28, 1916.

On January 27, 1917, the chairman of the same committee asked for "a comprehensive report as to what the Commission of Fine Arts regard to be the best solution of the Botanic Garden problem, including a review of the sites available for the Botanic Garden itself; and what area in the vicinity of the Capitol may be had at a minimum or no expense for a Capitol flower garden,

together with such facts and figures as will assist the committee in its consideration of this subject."

In response to the above request the commission made a full and complete report which may be found on pages 28 to 38 of the annual report of the Commission of Fine Arts for the year ending January 1, 1918. In concluding their report the commission state:

"In point of physical availability, excellence of exposure, accessibility, distribution of essential parts and capacity for enlargement wthout increase of cost after the initial purchase, the Mount Hamilton location stands out preeminent among all the sites that have been examined. Should Congress decide to retain the Congress gardens in the vicinity of the Capitol, the Botanic Garden and arboretum ought in any case to be established at Mount Hamilton."

CONCLUSIONS.

In view of the above the conclusions naturally arrived at are:

1. That the Commission of Fine Arts has authority to designate a site for a national botanic garden and arboretum.
2. That they have been regularly requested to make such selection.
3. That the purchase of Mount Hamilton site has been recommended by the commission.
4. Authority to acquire by purchase or condemnation the site so selected and determined upon is the remaining and concluding act.

Very respectfully,

JAMES M. WOOD.

TRINIDAD CITIZENS ASSOCIATION,
Washington, D. C., June 13, 1920.

Senator F. B. BRANDEGEE,
Chairman Joint Committee on the Library,
Senate Office Building.

DEAR SIR AND GENTLEMEN OF THE COMMITTEE: We desired to lay before your committee at the hearing May 21 on the proposed national botanic garden argument favoring the project, but lacked opportunity. We therefore take this method of presenting for your consideration the following:

If there is one thing Americans agree upon it is that Washington should be the most beautiful city in the world. It was the dream of the fathers who gave us the right start and nature has provided every facility for its realization. All do not agree that it is, but all would like it to be, are willing to pay the price, and will have little patience with any opposing interest.

We may differ as to plans for making it so, but it should be apparent to all that steps must be taken toward improving the approaches to the city and to secure a more symmetrical development, so that visitors need not enter blindfolded and be piloted about from one beauty spot to another.

There is an unmistakable tendency here to neglect one section and adorn another. But, unfortunately, the neglected section of Washington is precisely that part which should present the best appearance.

First impressions are lasting, and first impressions of Washington are almost uniformly bad. Whether entering by train, trolley, or motor the main currents of travel are through the northeastern gateway, and it is just here that nothing, save the recent improvement of Maryland Avenue, has been done to please, not to say delight, the eye.

You do not arrange your home that way, nor your place of business, if you would invite success. Nor do you neglect your personal "front" in approaching or welcoming strangers. "Front" counts heavily in every individual or public enterprise. To neglect it is sheer affrontery. Yet Washington's front has been shamefully neglected and her fame has suffered accordingly. It is not too much to say that she can never hope to be accredited the world's most beautiful city until what can be done has been done to beautify the main entrance.

Unless there is conscious and intelligent effort to do this, based upon close cooperation and mutual willingness to pay for betterments on the part of the Congress and the residents of the neighborhood, it can not be done at all. In the natural, unguided course of municipal development this section is doomed to deteriorate and the chief approach to their Capital City remain a reproach to the American people.

It is a singular fact that nowhere and at no time have white men voluntarily extended municipal development eastward from the civic center. That this

racial peculiarity was overlooked by such competent designers as those who planned our National Capitol reflects not so much upon them as upon the poverty of statistical resources common to their time.

Different explanations have been offered for the phenomenon. Early European civilizations were swept westward from the ancestral cradle by successive waves of barbaric hoards from central Asia. These invasions could not be foreseen nor resisted, each generation living in dread of a recurrence. The instinct of self-preservation impelled them to put between themselves and the eastern terror such fortification as they were able to erect and such natural barriers as were available, the homes naturally being placed westward back of the defenses. The practice became instinctive and persists long after the real menace has ceased to exist.

Also limitless opportunity upon sparsely settled land to the west beckoned and crowded populations found avenues of easy expansion westward. So that while militarily the westward impulse was a retreat, economically it was a forward movement. "Westward the course of empire takes its way" became the conviction of a race.

This tendency to expand westerly is very marked in the District of Columbia. Improvement of the eastern reaches has loitered and values lagged, while the western have been favored with practically all notable expenditures for convenience and beautification.

It can only be checked and the eastern section given the necessary forward impetus by supplying an artificial stimulant. The establishment of the national botanic garden and arboretum on the Mount Hamilton tract and in the Anacostia Basin, with correlative improvements, will furnish the necessary element to turn the scale. The residents of the immediate neighborhood are keenly alive to the need and eager to play their part.

In 1919, as a measure of urgency, permission was granted a private contractor to erect at a point northeast, adjacent to Mount Olivet Cemetery, and only a few hundred feet from the Baltimore Pike and the base of Mount Hamilton, a plant for the disposal of city refuse.

The residents of the neighborhood were roused by this act as they had never been by years of accustomed neglect. They organized a citizens' association, determined to get rid of the nuisance and then work for the general upbuilding of the section in accord with the plan of the Commission of Fine Arts.

Under the auspices of the Federation of Citizens' Associations they defined the limits of their jurisdiction as shown by the accompanying map and gave it the name of Trinidad, that being the name of the addition nearest the refuse plant and the geographical center of the territory.

The present population is 18,318, all but 100 of whom reside west of the proposed park. A careful canvass disclosed the fact that 55 per cent of all own their homes, 79 per cent being white and 21 per cent colored. Under the inspiration of the big idea over 700 public-spirited citizens were enrolled within a few weeks.

Organized we feel a pride and responsibility we did not feel before. We feel in a large measure responsible to the American people for the care of the gateway to the National Capital. Everything comes and goes through Trinidad, and the visitor will base half his judgment of Washington upon the welcome he receives at the threshold. If the approach is untidy and neglected he will view all the rest with critical eye and suspect the presence of shame where there is none. We therefore mean to press our claims all of the time and pledge our own efforts in cooperation.

Our population is composed largely of home-owning working people, and the character of the population will not change materially even with the proposed garden. "Silk stockings" will continue to seek shelter northwest. Homes built here and on the several square miles surrounding the garden will be unpretentious and not in themselves ornate, however well kept. This is added reason why favor should be shown by National and District Governments in the matter of public improvements.

Respectfully submitted.

DON H. YORK, *Chairman*,
L. M. PATTERSON,
C. W. EDWARDS,
HARRY C. MURRAY,
O. N. KOLQUIST,
S. S. TOLSON,
W. E. RYAN,
LOUIS L. HOOPER.
VICTOR O. SKYBERG,
WILLIAM G. COLE,
J. D. ROSSER,

Executive Committee, Trinidad Citizens' Association.

Establishment of a National Botanic Garden

HEARING

BEFORE A

JOINT COMMITTEE ON THE LIBRARY

CONGRESS OF THE UNITED STATES

SIXTY-SIXTH CONGRESS

SECOND SESSION

ON

S. 497

A BILL TO INCREASE THE AREA OF THE UNITED STATES BOTANIC GARDEN IN THE CITY OF WASHINGTON, DISTRICT OF COLUMBIA

AND

S. RES. 165

DIRECTING THE COMMITTEE ON THE DISTRICT OF COLUMBIA TO REPORT PLANS FOR THE CREATION IN OR NEAR THE DISTRICT OF COLUMBIA OF A BOTANIC GARDEN COMPARABLE WITH THE BEST EXISTING GARDENS

PART 2

REPORT BY THE NATIONAL COMMISSION OF FINE ARTS ON THE BOTANIC GARDEN SITUATION IN THE DISTRICT OF COLUMBIA

Printed for the use of the Joint Committee on the Library

WASHINGTON
GOVERNMENT PRINTING OFFICE
186037 1920

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REPORT BY THE NATIONAL COMMISSION OF FINE ARTS ON THE BOTANIC GARDEN SITUATION IN THE DISTRICT OF COLUMBIA.

UNITED STATES SENATE,
COMMITTEE ON THE LIBRARY,
May 13, 1920.

The CHAIRMAN OF THE COMMISSION OF FINE ARTS.

DEAR SIR: Senate resolution 165, referred to this committee August 23, 1919, directs it to "consider and report to the Senate plans for the location and development in or near the District of Columbia of a botanic garden of a size and excellence comparable with the best existing botanic gardens." It would be of great assistance to the committee if it were provided with a comprehensive report as to what the Commission of Fine Arts regards as the best solution of the botanic garden problem, including a review of data available for the botanic garden itself, and what area in the vicinity of the Capitol may be had at a minimum or no expense for a Capitol flower garden, and such facts and figures as will assist the committee in the consideration of this subject.

Yours, very truly,

FRANK B. BRANDEGEE,
Chairman.

COMMISSION OF FINE ARTS,
Washington, May 18, 1920.

SIR: In your letter of May 7 last you ask the Commission of Fine Arts for a comprehensive report on the botanic garden problem in conformity with Senate resolution 165, referred to the Committee on the Library August 23, 1919. You call for a discussion of sites within the District of Columbia available for the Botanic Garden itself, and ask what area in the vicinity of the Capitol may be had for a Congress flower garden, together with such facts and figures as will assist your committee in its consideration of this subject. The commission herewith places before you the information desired by you.

STATEMENT OF THE PROBLEMS.

For reasons that will appear, the Botanic Garden must be removed from its present location. Congress, when it located the Grant Memorial in the garden area, forced the garden out. Such was the intention of Congress. The action was entirely logical. That space was designed by President Washington and Maj. L'Enfant as an

open approach to the Capitol, and is so shown on the original plan of the city. (See Exhibits 30 and 31.) It was proposed at that time that this area should be subject to ornamentation with memorials, fountains, and the like, but not shut off by walls and fences. Locating the Botanic Garden in this area was one of those serious mistakes made in the early part of the century whereby the great plan for the Nation's Capitol suffered damage that has continued to this day. The location of the Grant Memorial was the first step toward repairing this damage. The subsequent location of the Meade Memorial in the same area is a further advance in the restoration of the original plan.

In furtherance of its purpose to restore the Mall to its original status as a park connection between the legislative and executive departments, Congress paid the Pennsylvania Railroad $1,500,000 to remove its tracks from the Mall. The public plaza or square on the west front of the Capitol Grounds is a feature of this large plan. The new National Museum Building, the Agricultural Department buildings, and the gallery for the Freer collections all have been located with reference to the general plan. Slowly but steadily changes in conformity with that plan are now being carried out throughout the entire 2½ miles from the Capitol Grounds even to the Lincoln Memorial. The removal of the Botanic Garden is essential to the development of the great composition.

If Congress desires to continue a garden for the purpose of obtaining flowers for its Members and for growing shrubs to disseminate throughout the country, both of these purposes can be subserved quite as well by glass houses and gardens in other accessible locations.

The proposition to extend the present garden into the Mall to the west of its present location would be the perpetuation of an unfortunate condition of affairs which Congress has taken steps to end. Such an extension means continued confusion. To-day in a fenced-in area of less than 12 acres there are, first, the memorial to Gen. Grant, the base of which is arranged as a reviewing stand, and therefore requires an open space; second, the very large Bartholdi fountain; and, third, large greenhouses with shining high glass roofs, dominating and disturbing the appearance of both fountain and monument. In addition a residence for the superintendent and other like buildings are found in this inclosure. To all these will shortly be added the large memorial to Gen. Meade, contributed by the State of Pennsylvania. This array of incongruous structures is absurd, confusing, and wholly impossible for a permanent establishment.

Congress may readily bring order out of the present chaos by the removal of the iron fence and opening the entire area to the public; by removing the glass houses and superintendent's quarters to a new location and by transfering the fountain to another section of the District.

BRIEF HISTORY OF THE GARDEN.

The establishment of the present Botanic Garden and its relation to the Joint Committee on the Library was the outgrowth of the Wilkes exploring expedition of 1838–1842, although there had been a botanic garden on this site for nearly two decades under congressional permission granted the Columbian Institution for the Promotion of Arts

and Sciences, then extinct. The supposition is tenable that the primary reason for locating here was that there were still in existence some traces of the former garden.[1] The naval appropriation act of May 14, 1836, authorized the President to send a surveying and exploring expedition to the Pacific Ocean and the South Seas in Government vessels.

Congress granted $100,000 and authorized the use of any other moneys in the control of the Navy Department, not exceeding an expenditure of $150,000. After numerous delays the expedition, consisting of six Government ships under Lieut. Charles Wilkes, United States Navy, sailed from Hampton Roads August 18, 1838. The expedition returned to New York June 10, 1842, bringing a large collection of natural history specimens.

On August 26, 1842, the Committee on the Library requested Lieut. Wilkes to prepare a narrative of his voyage, and appointed the naturalist of the expedition "to arrange and class the various objects of natural history," later appropriating $20,000 for this purpose. The horticulturist and assistant botanist of the expedition were charged with the duty of preserving the horticultural and botanical specimens.[2] These objects were for a time on exhibition in that portion of the Patent Office Building then constructed and in greenhouses in the square behind the building, but upon the extension of the Patent Office Building, begun in 1849, were in 1850 removed to the present area.[3]

In May, 1850, Congress appropriated $5,000 for a new greenhouse and the removal thereto of the plants of the exploring expedition, and during the same month the present site, upon which the new greenhouse was built, was selected by the Joint Committee on the Library. This ground was thereafter commonly known as the Botanic Garden, but the term was not officially applied to the location until August 18, 1856, when its maintenance was specifically placed under the direction of the Joint Committee on the Library.

From 1851 to the present time approximately $387,977 has been appropriated for repairs and equipment of buildings and grounds. From 1857 to the present time there has been appropriated for trees,

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[1] The charter of the Columbian Institute established for the promotion of arts and sciences, approved by the President in 1820, was as follows:

"*Be it enacted,* etc., That there be granted, during the pleasure of Congress, to the Columbian Institute for the Promotion of Arts and Sciences, the use and improvement of a tract of public land in the city of Washington, not exceeding five acres, to be located under the direction of the President of the United States, for the purpose of enabling the said Columbian Institute to effect the object of their incorporation: *Provided,* That whenever the said institute shall be dissolved, or cease to exist, or to employ the said tract of land for the purposes aforesaid, all right, title, and interest, hereby granted to the same, shall revert to, and vest in, the United States, as completely as if such grant had never been made." (16th Cong., 1st sess. From Private Statutes at Large, United States of America, 1789–1845, vol. 6.)

Adverting to this institute and its connection with the then Botanic Garden, Richard Rathbun, Assistant Secretary of the Smithsonian Institution, in his monograph on the Columbian Institute for the Promotion of Arts and Sciences (Smithsonian Institution Bulletin 101, 1917) says: "Ceasing to exist as an active organization in 1837, the fact that it had established and maintained a botanic garden for nearly two decades seems almost immediately to have been forgotten, and the selection of the identical tract for the United States Botanic Garden 13 years later would, therefore, appear, so far as shown by any of the records now available, to have had no relation to its former occupation by the Columbian Institute."

[2] Up to 1852 sums amounting in all to $158,753 were appropriated for the salary of the scientific corps, caring for the collection and for preparing and publishing the works on the expedition. From 1844 to 1875 a series of appropriations for greenhouse and garden construction amounted to about $114,861 additional.

[3] For a detailed account of the beginnings of the Botanic Garden on this site see Bulletin 101 of Smithsonian Institution, by Richard Rathbun, Assistant Secretary of the Smithsonian Institution in charge of United States National Museum, Appendix, p. 136.

seeds, fertilizer, etc., approximately $228,550, and for salaries and labor from 1843 to 1916 approximately $426,607 more. Expense of lighting is included in that of the Capitol from 1876 to the present time. The total expenditure on the gardens from about 1842 to 1917, including the original appropriation for the expedition, amounts to about $1,416,748. The present structures and equipment are antiquated and inadequate for a real botanic garden. Most of that which has value can be removed.

THE NEED OF A REAL BOTANIC GARDEN.

When comparison is made with the gardens of other cities and countries, the fact is disclosed that the United States Government has no real botanic garden in Washington. The present so-called Botanic Garden does not compare favorably even with gardens established in other cities in this country. The name is a misnomer. A national Botanic Garden in Washington was conceived in the early days of the century by broad-minded and farseeing men. It was begun by the employment of Government vessels, and a large appropriation for those days. The work was handled by a body of scientists. This garden, so wisely and adequated begun, now serves mainly as a distributor of plants and flowers.

The present area of the entire establishment devoted to both Botanic Garden display and propagating purposes for congressional use is 12.47 acres. Of this 11.31 acres are included in the fenced area and 1.16 lie south of Maryland Avenue. Of the section lying south of Maryland Avenue a number of stables covering 0.10 acre are used for other purposes, and need not be included. Of the area within the inclosure 1.15 acres only are covered by palm houses and other structures, while the remainder of 10.16 acres is used for out-door display; this latter area has been diminished considerably by the location of the Grant Memorial, and when the construction of the Meade Memorial is begun, the available space will be still further decreased.

The famous Royal Botanic Gardens of Kew, formerly of 253 acres, of which 178 were in the arboretum and 75 in gardens devoted to economic and taxonomic work, had been increased to 288 acres in 1908. The 24 colonial botanical gardens of the British Empire are closely associated and identified with Kew. These associated gardens have opened up new industries in the British Colonies, thus creating an increased demand for capital and labor; have introduced quinine, cocoa, and rubber from South American countries to colonies where it was theretofore unknown in culture, and tea into South Africa where it had not been previously grown; and in many other ways have repaid a thousandfold by vastly increasing the trade of the Empire. This work became so pronounced as to have interested the German Empire to such an extent that Bismarck paid a special visit to Kew to ascertain just what influence this garden was having on the commerce of the British Empire. In this country economic work is done by the Agricultural Department, from whose activities those of a botanic garden should be distinctly separated.

Berlin has 1,325 acres in its botanic garden, which was established at a cost of $4,000,000. Paris has 75 acres, Edinburgh has 58 acres, Glasgow 40 acres, Petrograd 54 acres, and Rio de Janeiro has 2,000 acres. In the appendix will be found descriptions of botanic gardens

in various parts of the world. These gardens all are a source of pleasure as well as of profit to the nations in which they are located. Harvard University has given to the city of Boston the 220 acres comprised in the Arnold Arboretum, the maintenance of the roads being paid by the city and the teaching facilities being retained by the university. St. Louis has 80 acres in its Shaw Gardens. New York has 400 acres. Pittsburgh and some other cities have botanic gardens in connection with their park systems.

REMOVAL OF THE PRESENT GARDEN WILL BENEFIT THE PUBLIC.

The removal of the Botanic Garden by no means implies that the public which now enjoys the present garden is to be left without such enjoyment in the immediate neighborhood of the Capitol. The enlargement of the Capitol Grounds on the north affords an area for gardens of great beauty and distinction, through which will pass all visitors to Washington and a large proportion of those persons who daily go to the Capitol and the Library of Congress. The present Botanic Garden is seen by an insignificant fraction of visitors or residents. The contemplated Congress gardens will be a feature of the city and will take their place among the means of daily enjoyment by all who approach Capitol Hill. The removal of the garden features from the west side of the Capitol to the north side simply makes such features more available than they now are.

ALTERNATIVE SITE FOR TEMPORARY RELOCATION OF GARDEN.

If Congress desires to find a temporary location to accommodate the propagating structures and equipment lying within the fenced-in inclosure, comprising the palm house, the superintendent's quarters, and some glass houses (which in themselves cover an area of about 1.15 acres), there is available for their accommodation an old canal space, Government owned, of about 2.72 acres at Second Street and New Jersey Avenue, between M and N Streets SE. The space immediately adjoining it on the north at Second Street, between M and L Streets, of about 0.79 acre, is also available. Thus an area double the size of that now in use is available without land cost.

A REAL BOTANIC GARDEN.

The problem is only half solved when provision is made for flowers for Members of Congress and for the present limited output of shrubs and cuttings. There is a demand for a real Botanic Garden in which the public may examine living specimens of the enormous varieties of trees, shrubs, vines, and herbaceous plants native to this locality or capable of being grown here, freely, out of doors. These plants should be classified, and the public should be made free of the grounds for recreation and study. The people not only get direct enjoyment but also they benefit by reason of the help in making selection of trees, shrubs, and other plants for home grounds and for street planting.

A large area is required to grow well-developed specimens of the different kinds of trees which are native to the District alone, to say nothing of showing the very different aspects of those trees when

grouped as in a wood, and when grown singly as lawn or street trees. The great numbers of native shrubs, the equally important and interesting trees and shrubs which have been introduced and will be introduced from all over the world, require an outlying area running into some hundreds of acres. It presents a wholly different problem from that of a place limited primarily to the exhibition of garden flowers in the usual sense of the term. It calls not only for a large tract of land but for one of diversified soil and varied exposure.[1]

SITES FOR AN ADEQUATE BOTANIC GARDEN.

An exhaustive search has been made of areas available for garden purposes in the District of Columbia. The commission has sought a location on which a botanic garden might be established with such area and such diversity of soils as would enable it to take rank as a great institution. Examinations were made of tracts at Rock Creek Park, Brightwood,[2] Foundry Branch,[2] Mount Hamilton, on the eastern side of the Anacostia River,[2] and in Virginia.[2]

Rock Creek Park.—Of the sites suggested, the one at the head of Rock Creek Park is given first consideration, because it has been frequently mentioned as available at no cost for land.

The entire park comprises 1,606 acres, most of which is in steep wooded hillsides.

If Rock Creek Park shall be given up as a park and used solely for a National Botanic Garden and Arboretum, much can be said in favor of this area, in spite of the predominance of excessively steep slopes. There are scattered areas of moderate slopes on the uplands and strips of level land subject to overflow in the bottom of the valley. There is a considerable variety of soils and exposures, and if every piece of land in the park physically adaptable to botanic garden purposes were to be regarded as available for such use, the total area would be ample. It is a serious practical objection, however, that the most available areas are so scattered and so separated from each other by deep ravines and steep hills as to make the layout and administration of a great botanic garden and arboretum on this site inconvenient and in the long run unduly costly.

Again, it is not possible to disregard the value of the land for other purposes. Congress did not authorize the acquirement of Rock Creek Park simply in pursuance of a general theory that a growing capital city ought to have a large general reserve of land available for public recreation and for kindred uses, to be "improved" and made available from time to time as the need for various specific uses might become apparent.

The land was bought because the valley of Rock Creek within the District of Columbia had certain peculiar and extraordinary characteristics, which gave it a special value for one particular purpose, a value unattainable elsewhere, a value which would be destroyed

[1] Dr. N. L. Britton of the New York Botanic Garden very aptly terms botanic gardens museums of living plants which are treated as museum objects, labeled and installed to illustrate not only the objects themselves but their relation to other objects; highly specialized parks are immediate factors in public education, imparting visual information in a positive and direct manner while serving as places of public recreation.

For the practical application of the theory of a botanic garden, see also the list of courses of instruction by the Brooklyn Botanic Garden, in Appendix, pp. 114–119.

[2] See Appendix, pp. 67–68.

if Congress did not act to preserve it, a value which, if faithfully preserved, would give incalculable enjoyment and healthful recreation to the people of the District in future generations. This special value was and is dependent on the peculiar beauty of the natural scenery of Rock Creek Valley.

This is not the place to attempt any analysis of that beauty, but clearly it has its own distinctive qualities; very precious, very easily destroyed. It was primarily those qualities which justified the acquirement of the park, and nothing ought to be permitted within its borders that will tend to subordinate or sacrifice them.

The character of the native vegetation is one of the important factors in making this scenery what it is. In places the woods had been cleared before the park was acquired, the location of these clearings being wholly accidental as far as concerns their effect on the landscape. Some of these openings, left as simple green fields, are an advantage to the scenery. Others might better be restored in time to a woodland condition, but that woodland should be absolutely harmonious with the native forest.

If the attempt shall be made to create an arboretum here, even without the glittering glass houses and formal beds of a complete botanic garden, conflicts of purposes are certain to arise which will defeat in a measure the original purpose of Rock Creek Park. It is essential in any arboretum or botanical park worthy of the name to introduce many plants which not only are not native of the locality but which produce effects radically different from those which make the Rock Creek scenery what it is.

The danger is strikingly illustrated for anyone who has an appreciation of the qualities of natural landscape by the planting which has actually been done on certain open lands in Rock Creek Park, with the purpose of creating an arboretum. This planting, it is understood, was done by the Forestry Service, under permission from the Board of Control of Rock Creek Park. It can be seen near Camp Good Will. It does not now and it never will look like a part of the natural scenery. It is distinctly out of harmony with it. The sort of thing that has here been done on an open field is liable to be done almost anywhere in the park if the purpose of creating a varied botanical collection is placed side by side with that of preserving the natural scenery as one of the prime objects of the park.

A national botanic garden, arboretum or botanical park worthy of the United States Government can never be created unless those in charge are enthusiastically devoted to its special purposes and ready to serve those purposes at the expense of the peculiarities of the local natural scenery whenever the two purposes unavoidably conflict. If the botanic garden is established in Rock Creek Park, the inevitable result will be the gradual frittering away of a priceless and self-consistent piece of natural scenery.

It is not necessary to express an opinion as to whether the purposes of a national botanic garden are more or less important than those for which Rock Creek was acquired. The point is that both purposes can not dominate the management of one piece of ground without conflict, and this piece of ground was set apart by Congress for the preservation of its natural scenery. If the original intention of

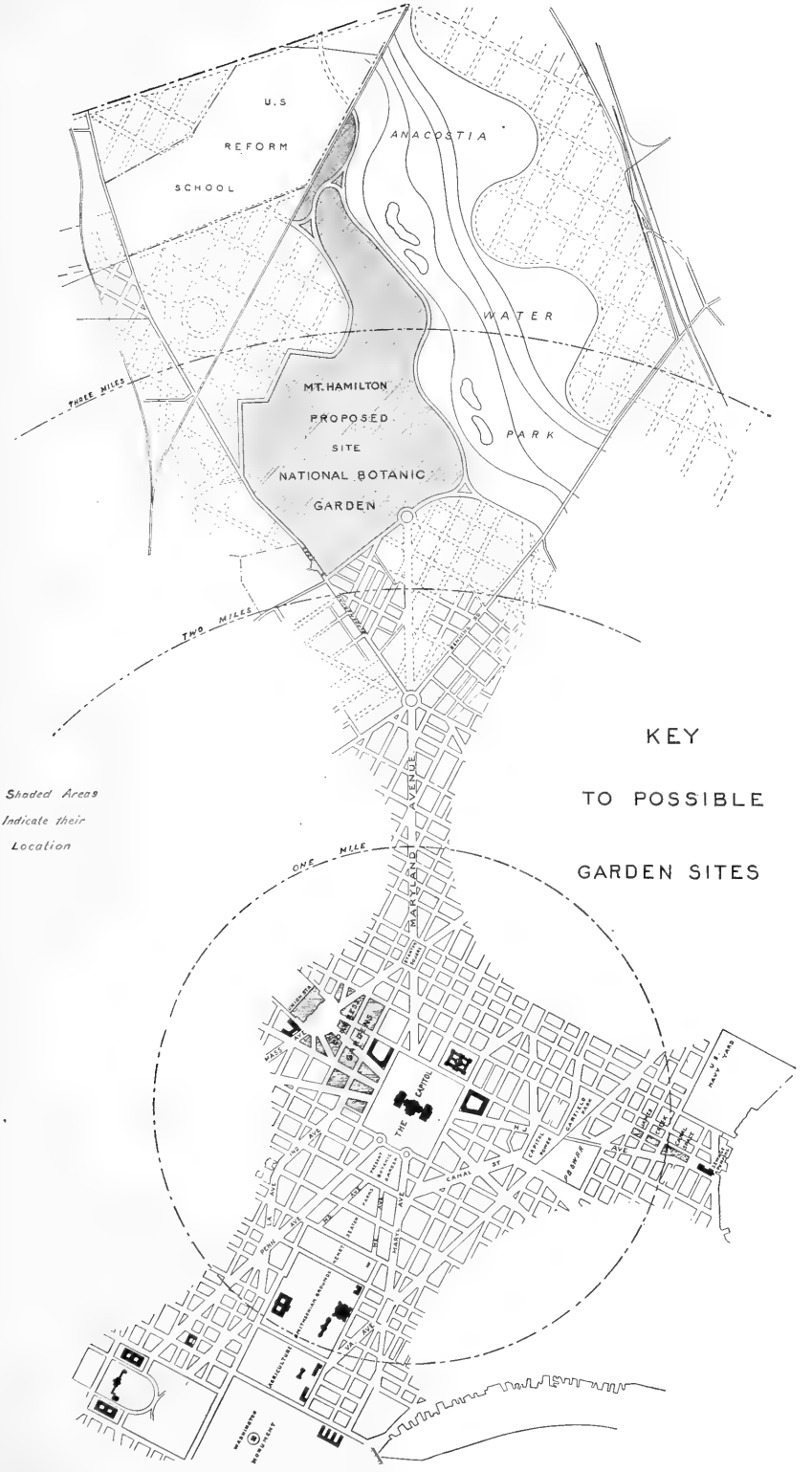
Congress in this instance is to be observed, the introduction of such a foreign element as a botanic garden is too dangerous to be ventured. Therefore, the use of Rock Creek Park for this purpose can not be recommended.

The Mount Hamilton site.—The Mount Hamilton site is situated between the Bladensburg Road and the new Anacostia reclamation project, just south of the National Training School for Boys. The larger hill itself is shown on the park plan of 1901 as a desirable addition to the park system. It is now privately owned. It has three round-top peaks immediately adjacent to the Bladensburg Road, which in themselves cover about 80 acres; nearly all wooded, mostly with oaks in good condition. The eastern slope of the hill has an outcrop of yellow sand, which supports a vigorous growth of pine. The hill itself is of a heavier gravel soil. Immediately north of this hill there is a comparatively level area extending to Hickey Road, which is of rich farming soil. Connecting these two areas with the National Training School for Boys is another small hill, densely wooded, whose precipitous sides drop abruptly to the bank of the Anacostia River.

The tract fronts on the Anacostia River for a distance of about 9,000 feet, and carries a large variety of soils in such condition that very little preparation for the uses of a botanic garden would be needed. Little grading other than that required for roads is required. It has north, south, east, and west slopes, and the level area between the hill and Hickey Road would work out well for greenhouses and herbaceous gardens; while the other areas would be ideal for shrub and small flowering-tree arboretum uses, especially as the northern and southeastern slopes of the hill form two amphitheaters which would display such exhibits on a large scale. An examination of the soil has been made by the Department of Agriculture and its report may be found in the appendix. Briefly summarized, the investigation by that department indicates that it will be possible to grow plants of even the most exacting soil requirements, the diverse types of soil affording almost every variation which can be secured in this section of the country. According to this report practically any plant which can thrive in this climate can be grown in this area.

The whole area contains about 476 acres. About 109 acres of it is to be acquired for the Anacostia Park reclamation, so that only about 367 acres need to be considered for purchase in connection with this project. It is on the main highway line between Baltimore and Washington. The Lincoln Highway, with little difficulty, could be brought along the shores of the Anacostia Park and thence by way of Maryland Avenue to the Capitol Building, affording an entrance to Washington of unequaled beauty. As to accessibility, there is already an electric car line along the Bladensburg Road, and the junction of the Pennsylvania and Baltimore & Ohio Railroads is only about 2,000 feet away, while the Pennsylvania Railroad is about 800 feet from the excellent possible sites for the greenhouses and the herbaceous gardens.

For extension of the gardens the Anacostia Park is available. That portion of the park between the Pennsylvania Railroad and Benning Bridge contains about 563 acres, lowland and water, thus


U.S
REFORM
SCHOOL
ANACOSTIA
WATER
PARK
MT. HAMILTON
PROPOSED
SITE
NATIONAL BOTANIC
GARDEN
THREE MILES
TWO MILES
ONE MILE
MARYLAND AVENUE
KEY
TO POSSIBLE
GARDEN SITES
Shaded Areas
Indicate their
Location
THE CAPITOL
BOTANIC GARDEN
AGRICULTURE
SMITHSONIAN INSTITUTION
WASHINGTON MONUMENT
NAVY YARD

furnishing ample opportunity for expansion on land not subject to overflow for lowland and fresh-water exhibits.

If in the future there should be added to this area that portion of the Anacostia Park between Benning Bridge and the Pennsylvania Bridge, there would be an addition of another 398 acres, including land and water, which could be used in connection with the proposed garden. This extension into the Anacostia Water Park would afford unlimited opportunity for beautiful aquatic gardens, with all the possibilities this implies.

It will thus be seen that by extension into the Anacostia Park this undertaking that has been begun purely as a necessary sanitary measure can be made to so serve the Nation doubly, thus paying large dividends on the capital invested. At the assessor's valuation, according to the latest available data, the cost of the 367 acres in this tract would amount to $254,520.50, which is at the rate of $693.50 per acre.

In point of physical availability, excellence of exposure, accessibility, distribution of essential parts, and capacity for enlargement without increase of cost after the initial purchase, the Mount Hamilton location stands out preeminent among all the sites that have been examined. Here both the Botanic Garden and the Congress propagating gardens can be adequately accommodated permanently without conflicting in any way with the city's development. On the contrary, they could contribute their important share harmoniously and effectively to the upbuilding of the Nation's Capital.

The Mount Hamilton tract, by reason of its location and topography, has been recommended in the plans for the development of the city as desirable in any event for park purposes and ultimately should be acquired. It affords vistas over the city comparable with those from the famous Pincian Hill over the city of Rome. Should Congress decide to retain the Congress Gardens in the vicinity of the Capitol, the Botanic Garden and arboretum ought in any case to be established at Mount Hamilton.

SUMMARY OF COSTS.

Comparative valuation of the three principal sites suggested for use as a botanic garden.

Location.	Acres.	Assessor's valuation.	Average cost per acre.	Remarks.
Mount Hamilton, northeast.	367	$254,520.50	$693.50	Reached by the Bladensburg electric line. Joins Anacostia River development and has eastern, western, southern, and northern exposure. Can expand in Anacostia Park to produce garden of over 1,400 acres.
Brightwood,[1] northeast..	312	185,885.00	595.00	B. & O. R. R. (Metropolitan Branch). Has all exposures. Can not expand in the future except at cost of additional purchase.
Foundry Branch,[1] northeast	189	197,912.00	1,047.00	Wisconsin Avenue electrics. East, west, and south exposures. Can not expand in the future except at cost of additional purchase.

[1] For a discussion of the availability of these sites see Appendix, pp. 67–68.

RECOMMENDATIONS.

The Commission of Fine Arts recommends:

First, that the Mount Hamilton tract be acquired for a national botanic garden and arboretum. By purchasing 367 acres of land at least 800 acres of Government-owned lands will be made available; also a park entrance to the city from the north will be provided.

Second, that the public features of the present Botanic Garden be transferred from the west side of the Capitol to the north side and to lands already owned by the Government. Also that the propagating gardens be accommodated temporarily on the James Creek Canal spaces owned by the Government, which spaces are of double the extent of the area now in use. Ultimately those features should become part of the new botanic garden.

By direction of the commission.

Respectfully,

CHARLES MOORE, *Chairman.*

Hon. FRANK B. BRANDEGEE,
Chairman Committee on the Library,
Senate of the United States.

NOTE:

MAY 24, 1920.

When the report was first prepared in 1917 the figures of area were given as 400 acres and the assessor's full valuation at a little over $221,000. Upon a more recent investigation the area becomes 367 acres and the assessor's full valuation becomes $254,520.50. Reasons for the difference are twofold: First, that three years have elapsed and a reassessment has taken place; second, and more important, that the boundaries between this area and the Anacostia Park have been definitely fixed by metes and bounds and show a little less taken for the Anacostia project and a little more for this project, so that what is added to the apparent expense for the Botanic Garden is deducted from the apparent expense for the Anacostia project.

APPENDIX.

[Compiled by James G. Langdon, member of American Society of Landscape Architects.]

Review of Brightwood Tract, Foundry Branch Tract, and East Capitol Street, Anacostia, and Virginia Sites.

The Brightwood tract.—There is a tract of some 312 acres of privately owned land, here designated the Brightwood tract, which lies between the District line and the Metropolitan branch of the Baltimore & Ohio Railroad at Stott and Terra Cotta Stations. It is rich market-garden property, and is used largely for that purpose. A small stream within this area is about 6 inches deep by 3 feet wide, and its surface is about 3½ feet on the average below the surrounding farm lands. The entire valley along its borders is under a high state of cultivation, as are various areas among the groves on the uplands. It is accessible by the Metropolitan branch of the Baltimore & Ohio Railroad, and the Brightwood extension of the Washington Street Railway is about 3,500 feet away. This area could not be increased in size, except at undue cost, and does not possess the variety of soils met with in some of the other tracts under consideration. It consists, for the most part, of a sandy loam, such as is generally used for raising strawberries, which are grown extensively in this region. It is probably the richest farm area in the District. The price per acre, assessor's valuation, averages $595. It is hotter in summer than is desirable in a botanic garden, owing to its inland position. Its distance is a disadvantage, and it lacks the variety of topography and soils that is desirable.

The Foundry Branch tract.—This tract, all private property, comprises about 189 acres. The portion available for greenhouse and herbaceous purposes lies adjacent to Tunlaw Road, and is probably about 20 acres in extent. It would require an undue amount of grading to fit it to the purpose required. From this tract there is a magnificent view over Georgetown and down the Potomac, and there is a greater variety of soils than in the case of the Brightwood tract. It has more ledge outcrop than either the Brightwood tract or Mount Hamilton, and is quite thickly covered with miscellaneous growth of trees and mountain laurel. The tract below it could be included in the project only at a prohibitive price. All in all, this tract is too steep and irregular to be of use for the purpose. Practically its sole advantage is the fine view and its accessibility by the Wisconsin Avenue branch of the street railway. The assessor's valuation is $197,912, which equals $1,047 per acre.

East Capitol Street site.—There is also an undeveloped area, priately owned, north of the old District Jail and between Nineteenth

Street NE. and the taking line of the Anacostia Park as far north as North Carolina Avenue, comprising some 50 acres of moderately high ground adjoining the taking line of the Anacostia Water Park. While this will be readily accessible later, when the street car lines are extended along East Capitol Street, and is capable of enlargement by extension into the Anacostia Water Park, its topography and lack of variety of soil make it comparatively unsuitable for consideration. After careful examiation it can not be recommended.

Anacostia and Virginia sites.—That area shown on the park report of 1901 lying across the Anacostia opposite the present termination of Massachusetts Avenue and extending eastwardly from the Anacostia up the slopes toward Bowen Road has many points of advantage for a tree arboretum but does not seem to be suitable for a botanic garden, there being too great a preponderance of steep topography. Although the soil is varied and well drained, the exposure is a northwestern one and open to the heavy winter winds. The examination made showed that it could not be recommended.

Search was also made on the Virginia side near the Aqueduct Bridge, especially in the region of Mackeys Hill. The entire area under consideration on the Virginia side did not seem to offer any particular advantages, either as to accessibility, exposure, or physical adaptability. Similar lands to those occupied by the United States farms of the Department of Agriculture are too low to give the variety of topography needed for this particular purpose and are too cold and foggy at certain seasons of the year. Besides, portions of these lands have an unfortunate way of baking very hard in the summer, probably owing to nearness of the ground water to the surface. Investigation along this side of the river indicated that there was no site which satisfies the conditions.

DEPARTMENT OF AGRICULTURE,
Washington, July 21, 1917.

Col. WILLIAM W. HARTS,
Office of Public Buildings and Grounds, War Department.

MY DEAR COL. HARTS: The tract of land to which you have called attention in your letter of April 26 has been examined and its suitability as a site for a botanical garden considered. I recognize the desirability of having a creditable garden at the National Capital, and the importance of botany to the development of agriculture in this country makes the establishment of a botanical garden a matter of practical importance to this department.

A botanical garden developed in the District of Columbia should provide sufficient space in which to arrange plantings for the proper park effect, and the tract suggested affords ample space for the development of a large garden, valuable both as a city park and for the permanent planting of native and exotic plants. The land of this area ranges from the tidal flat to an elevation of 239 feet at the top of Mount Hamilton, and while not presenting the rock ledges, such as are found in Rock Creek Park, still affords steep slopes, changes in elevation, and a general contour so desirable in the development of a botanical park. With this area suitably parked, the entrance into Washington from the northeast on the highland near Mount Hamilton with the broad avenue leading to the Capitol would

be most impressive and dignified. At the same time this land would serve a very practical purpose.

A report on the soils and some of the prominent features of the vegetation and a map of the soil area are attached to this letter. The soils of the area are very diverse. Over 30 different types are represented on the accompanying map. These afford almost every variation which can be secured in this section of the country. A large portion of the soil consists of a sandy loam with a light reddish, sandy clay subsoil and represents good agricultural land. The total area of poor soils is not so great as to hamper the development of these areas with species of plants especially suited to them. The colluvial type of soil, represented by only one small area on the map, is much more extensive than shown, and occurs in small deposits along many of the stream beds.

No better guide to the adaptability of the area for a botanic garden can be found than the existing natural plant cover. About 150 acres of the tract is in timber, very little of it scrub pine, most of it hardwood, especially oak, with a liberal sprinkling of hickory, tulip poplar, sweet and black gum, and many other of our native trees. Mount Hamilton, the most conspicuous topographic feature of the tract, is covered by an almost pure growth of oak. In a long strip of timber running down from the northeast foot of Mount Hamilton the trees approach in dimensions those of a primeval forest, and toward the south foot of Mount Hamilton, where the trees are scattered in open groves with wide and low branches, some of the individual oaks, with trunks 4 feet or more in diameter, are beautiful and impressive examples of pasture trees. Laurel, blueberry, and other acid-soil plants also occur. On the low colluvial soils such trees as pawpaw represent a bottom-land flora.

It is obvious, therefore, that practically any plants which can thrive in this climate can be grown in this area. The absence of rock masses is to be regretted, but such masses can be produced artificially if they are deemed essential at some later period.

The natural vegetation of this tract as it stands will furnish a good basis from which to develop a botanical garden, since most of the native plants of this section are growing in the area. Judging from the natural plant cover, it will be possible to grow plants of even the most exacting soil requirements. The acid-soil plants, such as laurel, are here well represented. The marsh lands along the river afford opportunity for the development of water and swamp gardens, which would be unusual and at the same time a most desirable feature. Here can be grown, not only many of the most beautiful lilies, but many important agricultural plants seldom seen in botanical gardens.

In case the present tract can be secured it would seem that it could be so developed as to form a part of the great park system, and at the same time to make a valuable institution in the development of science in the National Capital.

The site which you propose is admirable in location, topography, present plant cover, and in capabilities of future development. It is doubtful if any tract in the District can be secured which is as suitable for this purpose.

Respectfully,

DAVID HOUSTON, *Secretary.*

The Soils of the Proposed Botanic Garden Site on Anacostia River, D. C.

[By Hugh H. Bennett, Bureau of Soils.]

The tract of land included in the soil survey lies on the west side of Anacostia River, between the Bladensburg Road and the river, and between the Pennsylvania Railroad on the north and M Street on the south. The topography ranges from level to rolling, with steep slopes on Mount Hamilton, Hickey Hill, Licking Banks, and along the deep ravines that have cut into the southeastern side of Mount Hamilton and from the Anacostia marsh back into the uplands of the northeastern part of the tract. The range of elevation is from tide level to about 239 feet at the peak of Mount Hamilton.

The boundaries between the several classes of soil shown on the map were not traced out in detail in all cases, but they are sufficiently accurate to show the essential soil features of the tract. Some unimportant small patches of soil have been ignored in this survey.

The soils of the tract vary widely in the character of both the soil and subsoil material, in depth of soil, and in topography and drainage. There is a range from good sandy loam soil of easy working quality to the most intractable clay and stony sandy land of low productivity. The principal upland soils consist of: (1) Sandy loam, with stiff red clay subsoil, constituting a medium good grade of agricultural land; (2) sandy loam, with light reddish to red sandy clay subsoil, representing good agricultural land; (3) stiff red clay and clay loam, partly steep and stony, representing land of low productivity; (4) droughty sandy slopes and stony hilltop land of poor to fair agricultural value. The stream bottoms are subject to overflow, and in present condition are permanently wet, with the exception of the relatively high flat (or low second bottom) area near the mouth of the stream crossing the tract about its center, which is occupied by good well-drained sandy loam and loam. The marshes include (1) silty clay of fairly firm consistency and (2) boggy material underlain by peat.

The material forming the upland soils consists of water-laid or marine sediments (Coastal Plain material). The sandstone rock occurring on the hills and slopes was locally formed by cementation of sand with iron oxide, apparently in the same manner some of the more consolidated "hardpan" layers of the West are formed. Some of the rock resembles bogiron ore.

The soils represented on the tract are common to eastern and southern Maryland, Delaware, and southern New Jersey. The better grades of land represented here are extensively farmed through this region, being used for vegetables, the general farm crops, tree fruits, and berries. Commercial fertilizers are in common use and applications of lime are frequently made with good results. The soils are deficient in humus and probably most of them are much in need of lime.

UPLAND SOILS.

Soils with stiff red clay subsoils—Susquehanna group.—These soils have heavy, plastic, red-clay subsoils, which frequently are mottled with gray, white, yellow, and shades of red. The sandy loam (24)

has a yellowish to reddish sandy loam or sand passing beneath into sandy loam varying from 6 or 8 to about 20 inches deep over the stiff clay. This occupies much of the smoother eastern slopes of Mount Hamilton and also occurs on the western slope of Hickey Hill. It is a moderately good vegetable, corn, oat, and berry soil. Oak is the principal tree. There is some hickory, tulip poplar, and, in the eastern part, pine. The soil is easy to handle. The gravelly sandy loam (21) differs from the sandy loam chiefly in the presence of an abundance of quartz gravel.

The fine sandy loam (8) has a shallower depth to clay, is more compact, and in the flat areas is poorer drained than the sandy loam. It is best suited to small grain. On the flat areas crops make slow growth, especially during cool or wet seasons.

The coarse sandy loam (57) consists of grayish coarse sand and gravel in the surface few inches, with yellowish coarse sandy loam beneath, extending to depths of about 12 to 24 inches before the red clay is reached. The principal area is on Hickey Hill. There is much pine and some oak. This is not a very good type of soil. It is thoroughly drained and warm natured and consequently could be used for early plants, such as early vegetables and flowers.

Along the slopes just south of the Pennsylvania Railway, in the eastern part of the tract, there is some deep, loose Susquehanna sand, representing a droughty soil. Pine is one of the principal trees on this type.

The Susquehanna clay (39) is an unwieldy soil. On drying it hardens and can not be satisfactorily tilled; when wet it is extremely plastic and sticky. It is a soil of very undesirable characteristics from the standpoint of crop production, but oak trees succeed on it. Grass can be grown, and with proper tillage and good seasons some wheat could be grown. Sweet clover also will succeed, at least in some places. It is being used for the manufacture of flower pots. In the lower depths nodules of lime (calcium carbonate) are found in places, as, for example, in the excavations made for the sewer line in the central part of the tract. The stony areas of the clay (29) are still less valuable.

The clay loam (2) can be worked easier than the clay, since there is a surface covering of 5 to 10 inches of red clay loam or reddish sandy clay loam. Wheat and grass can be grown on land of this kind with a fair degree of success.

The classification, clay, clay loam, and loam (56), occurs on steep slopes in the eastern part of the tract. In places there are some fragments and outcrops of sandstone. On these steep slopes beech, oak, and black gum, and some laurel and fern were seen.

The silt loam (58) is a grayish silt loam overlying the red, heavy clay at shallow depth. It is a fair soil for wheat and grass. The loam (17) and gravelly loam (11) are not extensive types. They are fairly well suited to grass and small grain.

Brownish to yellowish soils with yellow or mottled yellowish, reddish, and grayish compact subsoils—Leonardtown group.—These soils are not so extensive as the Susquehanna. The sandy loam and fine sandy loam classification (6) comprises the largest area. This occurs chiefly on the upper slopes of Mount Hamilton. There are fragments of the locally formed sandstone on the surface in places, and this rock is frequently found in the subsoil, but there is less of it

than in the unproductive stony sandy loam type (14) capping Mount Hamilton. There is much oak, and on the lower slopes where the soil is deeper, owing to accumulation of material washed down from above, some tulip poplar and sweet gum are found. Huckleberries are abundant. The soil is decidedly acid to litmus paper. It is an open leachy soil of low to medium productivity, the lower slopes of deeper soil where the leaf mold has not been burned off so often representing the best grade of this land. This deeper and more loamy soil would make good crops of vegetables and berries.

The Leonardtown loam (51) occurs in only a few small bodies. The lower-lying areas are imperfectly drained, and sweet gum is the most abundant tree, as, for example, in the area opposite Mount Olivet Cemetery. Wheat and grass are the crops usually grown on land of this kind.

Brownish soils with yellowish red to red friable clay subsoils, coarser texture in the lower subsoil—Sassafras group.—These soils predominate over the smoother portion of the tract—that between Mount Hamilton and Hickey Hill. They are well drained, hold moisture well, and are easy to work. From an agricultural standpoint they constitute the best soils on the tract. (The sassafras soils are the chief farming soils in southern New Jersey, in Delaware, and in eastern and southern Maryland. They rank as the best agricultural lands of the middle Atlantic coast.) The sandy loam (60) is the principal type on this tract. This soil is extensively and successfully used in the production of early vegetables, sweet potatoes, cantaloupes, corn, oats, clover and timothy, peaches, pears, strawberries, briarberries, and apples. Applications of commercial fertilizers and lime are generally made. Oak is the principal tree on the Anacostia tract. The deep phase of the sandy loam (3) is not so productive: crops suffer more from the effects of droughts. The loam (9) type is less extensive here. It is a good wheat, corn, grass, and late vegetable soil.

The sassafras sand (42) and gravelly loamy sand (20) are thoroughly drained, early soils peculiarly adapted to extra early vegetables. They are not extensive on the tract.

Yellowish soils with stiff yellow or mottled clay subsoils—Keyport group.—These soils resemble the Leonardtown soils in the surface and upper sections, but they have stiffer, heavier lower subsoils, such as retard underdrainage. They occupy flat, low areas, as a rule, and have only fair drainage. They are rather cold-natured late soils, adapted to grass, wheat, and late vegetables. The total area of all of these is not large. The fine sandy loam (32) and loam (27) are the principal types. Only a small body of the sandy loam (10) was found.

Mottled grayish and brownish soil with gray clay subsoil—Elkton group.—Only one type of the Elkton soils was mapped—a single area of the loam (54). This soil occurs in a poorly drained depression. It is best suited to grass and wheat. In eastern Maryland and in Delaware land of this kind is styled "white oak land."

STREAM BOTTOM SOILS.

The principal alluvial soil on the Anacostia tract is the strip of reddish silty clay (14) occurring along the stream crossing the area

near its center. This is a poorly drained soil, which would require ditching or tiling for successful use for ordinary farm crops. Overflows could be prevented only by enlarging the channel or constructing levees, or doing both. Some reddish and yellowish sandy alluvium (18) was mapped along the short streamlets emerging from the uplands in the eastern part of the tract.

Good agricultural soil is represented in the reddish Wickham gravelly loamy sand (30) and brownish loam (47) occurring on the high bottom or second bottom near the mouth of the principal drainage way crossing the tract. These soils are successfully used for vegetables. Corn, oats, grass, and wheat would succeed on them.

COLLUVIAL FAN SOILS.

Several small bodies of colluvial material occur along the foot of the uplands bordering the tidal marshes. One small body of reddish loam was mapped in the eastern part of the tract. This represents material that has washed down from the adjacent slopes. A thrifty little grove of young pawpaw was seen on this.

TIDAL MARSH.

Three classes of tidal marsh were found as follows: (1) Timbered marsh consisting of bluish to brownish silty material, underlain at about 6 to 15 inches by brown peat (12a); (2) timbered marsh consisting of reddish and bluish silty clay, with sandy clay in the subsoil in places (12b); and (3) open marsh (14) consisting of reddish and bluish silty clay with some sandy clay in the sub soil in places. The timbered marsh is covered with a thick growth of alder, ash, and other small trees, while the open marsh is covered with water lillies, marsh grass, etc. That with peat in the subsoil is very boggy. All this marsh is subject to tidal inundation. The material shows a low content of water-soluble salts and is acid to litmus paper.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Washington, May 26, 1917.

Col. WILLIAM W. HARTS, U. S. A.,
Secretary Commission of Fine Arts,
1729 New York Avenue, Washington, D. C.

DEAR COL. HARTS: In compliance with your request of April 26, for a geological survey of the area of the proposed botanic garden, and in acknowledgment of your letter of May 11:

There is sent you under separate cover a map showing the principal features. A cross section shows the underground relations which are relatively uniform under the entire area. The section shows that the beds have a very gentle slope to the east and lie on a floor of granite gneiss which also slopes east. The work was done by N. H. Darton, the geologist who prepared the coastal plain part of the Washington folio.

While the character of the formations is given in the map legend, the following details regarding them may be useful:

The predominating materials in the region are the sands and clays of the Patapsco and Arundel formations, which comprise the medical portion of the Potomac group. The clay in the lower part of Hickey Valley may represent the top of the Patuxent formation or lower member of the group. These sands and clays are in irregular bodies, not only alternating one above the other, but also intergrading laterally. Owing to this relation it is not possible to map the individual bodies of each material. In general, the Patapsco beds consist mostly of sand and parts of this are cemented by oxide of iron into layers of brown "iron stone" which are conspicuous on Mount Hamilton and Hickey Hill. Detached fragments of this rock also occur in many of the lower slopes and in the terrace deposits. The latter are thin at most places and not everywhere distinguishable from the underlying clay or sand. In part also they consist of disintegrated local material.

The granite gneiss bedrock is from 300 to 350 feet below the surface under most of the region. In the overlying Patuxent formation are sands and gravels which contain artesian water of excellent quality and generally in large volume. This water is utilized by deep wells at the Reform School and at many other places in the District.

Very truly, yours,

GEO. OTIS SMITH, *Director.*

UNITED STATES SENATE,
Washington, March 5, 1914.

DEAR MR. OLMSTED: I am strongly opposed to putting the Botanic Garden in Rock Creek Park because I am perfectly certain that the disposition of the ground for the purposes of the Botanic Garden would destroy the peculiar beauty of the park, which has been preserved in the admirable self-restraint exercised in the treatment of the park up to this time, and because many years of conflict for the preservation of Central Park against all sorts of incursions have shown me that the only safety is in beating back every invasion.

We have had one serious weakness in New York, arising from the fact that the Metropolitan Museum of Art was allowed to build in the park. I think that was a mistake, although I have long been a trustee of the museum and am deeply interested in it.

In my view, we can afford to go without the Botanic Garden but we can not afford to destroy the park for the purpose of having one.

Very sincerely, yours,

ELIHU ROOT.

FREDERICK LAW OLMSTED, Esq.,
Brookline, Mass.

BOTANIC GARDENS IN THE UNITED STATES.

[Extract from an article by Prof. N. L. Britton, in Science, Vol. IV. No. 88, 1896.]

The first botanical garden established in America was begun by John Bartram in Philadelphia in 1728. In it he placed a consider-

able 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 20 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 10 years, a very large and valuable collection of plants. The institution was transferred to the State of New York, through an act of 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 $30,000; and several individuals have evinced their liberality and love of science by voluntary subscriptions to the amount of $15,000 toward 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 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."

Relations of Botanic Gardens to the Public.

[Extract from an article by Prof. N. L. Britton, in Science, vol. 31, April, 1910.]

ILLUSTRATING THE VALUE OF AN ADEQUATE BOTANIC GARDEN.

Botanic gardens are immediate factors in public education and at the same time places for public recreation and enjoyment. They could be called highly specialized parks, in which the plantations are formed and arranged primarily with regard to botanic facts and theories. Botanic gardens are museums of living plants which are treated as museum objects, suitably labeled, and are installed to illustrate not only the objects themselves but their relation to other objects. This museum feature, therefore, becomes a direct and immediate function in imparting information to the public.

The grouping of plants in botanic gardens is susceptible of widely different treatments, depending upon the character and area of the land available, the expense involved, and the facts and theories selected for illustration; also in the temperate zones, at least, upon the amount of greenhouse space available; also on the relative importance given to landscape considerations and upon the areas retained as natural forest, thicket, or meadow. The facts and theories capable of demonstration may be grouped in a general way, first, as biological relationships; second, as morphological and physiological features; third, economic applications; fourth, geographical distribution; fifth, esthetic and landscape features. Practical considerations also enter largely in the groupings of any kind.

1. BIOLOGICAL RELATIONSHIPS.

In this instance it is sought to illustrate species of various plant families in juxtaposition, the groupings thus formed being located in relation to each other in some predetermined sequence. There are practical considerations, such as certain orders of plants having both members which require sunshine and shade that renders a rigid sequence of this grouping not always possible.

Collections of trees (arboretum), of shrubs (fruiticetum), of vines (viticetum), and of herbaceous plants, for the most part, at least, in separate areas. Plants depending on different climates for growth are usually put in glass houses. There is unually required in addition to this a museum of prepared plants, of fruits, seeds, etc., of photographs and drawings to complete the biological sequence. By indicating on the labels the native regions of plants biologically grouped information on geographic distribution may be given.

2. MORPHOLOGICAL AND PHYSIOLOGICAL FEATURES.

The demonstration and illustration of structure and functions presupposes some acquaintance with elementary botany. The rapid development of nature study in schools will render grouping of plants, arranged, from these standpoints, much more understandable. This grouping is much more likely to be for the use of students than for the public.

3. ECONOMIC APPLICATIONS.

Plants grouped and labeled with reference to their uses, or the uses of their products, are of direct interest to the public, coming closer to ordinary lines of thought than any other features of the vegetable world, except those of beauty. The arboretum illustrates the subject of forest products. Economic features of shrubs and herbaceous plants are usually brought out by special classification as food plants, drug plants, fiber plants, etc. These subjects can be very thoroughly illustrated by the formation of museums of economic plant products, which is usually done in highly developed botanic gardens.

4. GEOGRAPHICAL DISTRIBUTION.

Groups of plants illustrating the botanical features of regions other than those of the local botanic gardens may be installed, and this feature is usually given more or less prominence in the collections of many gardens. This feature is of immediate interest to the public. It has its limits on account of soil and climate and is usually not complete. There are difficulties of growing trees and shrubs and herbaceous plants in a small area where it is sought to group them together on account of the trees casting too much shade for the lower plants. With greenhouses large enough some of these groups may be installed quite satisfactorily. Where funds are available it will be found advisable to install both the biological and geological systems.

5. ESTHETIC AND LANDSCAPE FEATURES.

"The general public is more interested in landscape effects and in plants from a standpoint of beauty than any other features of botanic gardens. Well-built and well-kept grounds appeal to the people as attractive places to visit. They are thus brought in contact with the means intended to instruct them in some of the branches of exhibition in a well-kept botanic garden. The residents of cities are particularly attracted to woodlands, thickets, and meadows, particu-

larly as these exhibits carry instruction in the beautification of home grounds. Developed flower gardens, as such, are generally located separately from the botanic garden plantations, for in them esthetic considerations are predominant. A comprehensive system of paths is essential because botanic gardens oftentimes become overcrowded on pleasant days in the spring. While many people keep to the paths, it is undesirable in large gardens to actually restrict visitors to the paths, for if this is done they would only come in contact with a relatively small number of plants unless the path system was developed wholly out of keeping with the size of the garden. The indirect relation of botanic gardens to the public lies in their function of adding to the knowledge of plants and plant products and the diffusion of this knowledge by publication and otherwise. This feature is contributed by laboratories, herbaria, and the library, and through annual reports and pamphlets.

THE DATES OF THE ESTABLISHMENT OF SOME BOTANIC GARDENS IN EUROPE.

[From Oxford Gardens, 1912.]

1309. Salerno. The Medical Garden of Mathaeus Sylvaticus.
1333. Venice. A Medical Garden.
1533. Padua. The First Botanic Garden.
1544. Pisa. Founded by Cosmo de Medici.
1577. Leyden.
Montpelier, Breslau, and Heidelberg, established before 1600.
1597. Paris. Established to supply the bouquets worn at court, but known after 1635 as the Garden of Plants.
1621. Oxford. The oldest in England. Started with an area of five acres.
1677. Chelsea.
1680. Edinburgh.
1760. Kew.

AREA OF SOME BOTANIC GARDENS OF THE WORLD, 1917.

	Acres.
Adelaide, South Australia	40
Brisbane, Queensland, Australia	40
Melbourne, Victoria	97
Sidney, New South Wales	44
Ballarat, Victoria	83
Buenos Aires	20
Brussels	10
Rio de Janeiro	2,000
Montreal	75
Nuwera Eliya and Hakgala	550
Ceylon	
Hongkong	20
Paris, France	75
The Royal Society Botanic Garden	18
Kew, London, England	288
Gardens at home and abroad in correspondence with Kew are 111 in number.	
Dublin, Ireland	40
Glasgow, Scotland	40
Edinburgh, Scotland	58
Lahore, India	169
Lucknow	40
Calcutta	272
Jeypore, India	70
Saharunpur	200
Buitenzorg, Java, 200; 90; 50	340
South African Botanic Garden	400
Singapore	66
Penang, India	55

	Acres.
Brooklyn, N. Y	48
Arnold Arboretum, of Harvard, Mass	220
Missouri Botanic Garden, in St. Louis	125
New York City, The Bronx	400
Hope Gardens, Jamaica	200
Trinidad	63
Mount Hamilton, 400 acres, will, when joined with Anacostia Park, now authorized, equal	1,400

Botanic Gardens of the World.

[Enlarged from the list by Prof. Penhallow, published in 1886 in the first annual report of the Montreal Botanic Garden.]

It is intended to include in this list only such gardens as may be regarded as established upon a scientific basis, but owing to wartime conditions the list is necessarily faulty in this respect and incomplete as to the number of gardens.

[Note.—Those gardens marked with an asterisk (*) are described in pages 82–127.]

ALGERIA—1: Alger, Jardin d'Acclimatation du Hamma.

AUSTRALIA—5: *Adelaide (South Australia), Botanic Gardens; *Brisbane (Queensland), Government Botanic Gardens; *Melbourne (Victoria), Botanic Garden; *Sydney (New South Wales), Botanic Gardens; *Ballerat (Victoria), Botanic Gardens.

AUSTRO-HUNGARY—13: Budapest (Transylvania), University Botanic Garden; Szernowitz (Bukovia), University Botanic Garden; Gratz (Styria), University Botanic Garden; Innsbruck (Tyrol), University Botanic Garden; Klagenfurt (Carinthia); Kolozsvar (Transylvania); Krakau (Galicia), University Botanic Garden; Lemberg (Galicia), University Botanic Garden; Prague (Bohemia), University Botanic Garden; Selmeebanya (Transylvania); Trieste (Istria); *Vienna, University Botanic Garden; Vienna, Imperial Hort. Gardens of Hofburg.

ARGENTINE REPUBLIC—1: *Buenos Aires, Botanic Garden.

BELGIUM—5: Antwerp; *Brussels, Royal Botanic Garden; Ghent, University Botanic Garden; Gembloux, Botanic Garden of the Agricultural Institute; Liege, University Botanic Garden.

BRAZIL—1: *Rio de Janeiro, Botanic Gardens of the Agricultural Institute at Corrigez.

CANADA—3: *Montreal (P. Q.), Montreal Botanic Garden; *Ottawa, Botanic Garden; *Montreal, McGill University.

CANARY ISLANDS—1: Orotava (Teneriffe), Jardin d'Acclimation.

CAPE COLONY—6: Cape Town, Botanic Garden; Graaf Reinet; Grahams Town, Albany Museum; Port Elizabeth; King Williamstown; Uitenhage.

CEYLON—1: *Peradenia, Royal Botanic Garden and Hakgala Garden.

CHILI—1: *Santiago, Quinta Normal.

CHINA—1: *Hongkong, Botanic Garden.

COCHIN CHINA—1: Saigon, Colonial Botanic Garden.

DENMARK—2: Copenhagen, University Botanic Gardens; Copenhagen, Royal Gardens of Rosenberg.

EAST AFRICA—1: Nairobi.

ECUADOR—1: Quito.

EGYPT—1: Cairo, Department of Agriculture.

FRANCE—20: Angers; Besancon; Caen; Cannes; Clermont-Ferrand; Dijon; Hyleres; Lille; Lyon; Montpellier; Nancy; Nantes; Orleans; * Paris, Garden of Plants; Rochefort; Rouen; St. Quentin; Toulon; Toulouse; Tours.

GERMANY—36: Aix la Chapelle; Bamberg (Bavaria); *Berlin, Berlin Botanic Gardens; *Berlin, University Botanic Gardens; Bonn (Rhenish Prussia), University Botanic Gardens; Breslau (Silesia); Brunswick (Brunswick), Botanic Garden of the Polytechnic School; Carlsruhe (Baden); Cologne (Rhenish Prussia); Darmstadt (Hesse); *Dresden (Saxony), Royal Botanic Garden; Erlangen (Bavaria); Frankfort on the Main (Hesse-Nassau); Fribourg (Baden); Giessen (Hesse); Goerlitz (Silesia); Griefswald (Pomerania); Halle upon Salle; *Dahlen, Royal Botanic Garden; Hamburg; Heidelberg (Baden); Jena (Saxe-Coburg); Kiel (Schleswig-Holstein); Konigsberg; Leipzig (Saxony); Marbourg (Hesse-Nassau); Munden (Hanover); Munich (Bavaria); Munster (Westphalia); Potsdam; Rostock (Mecklenburg); Strassburg (Alsace-Lorraine); Tharand (Saxony); Tubingen (Wurttemberg); Wurzburg (Bavaria).

GREAT BRITAIN and IRELAND—14: Birmingham (England); Cambridge (England); University Botanical Department; *London (England), Chelsea Botanic Gardens; London (England), Royal Botanic Gardens, Kew; *London (England), Royal Botanic Society Gardens, Regent's Park; London (England), Royal Horticultural Society Gardens, South Kensington; Manchester (England); Oxford (England), University Botanic Gardens; *Dublin (Ireland), Royal Botanic Gardens of Glasnevin; Dublin (Ireland), Trinity College; Belfast (Ireland), Royal Belfast Botanic Gardens; *Edinburgh (Scotland), Royal Botanic Gardens; *Glasgow (Scotland), Botanic Gardens; Aberdeen (Scotland), University Botanic Gardens.

GREECE—1: Athens.

GUATEMALA—1: *Guatemala, Experimental Gardens.

GUIANA—1: Georgetown, Department of Science and Agriculture.

DUTCH GUIANA—1: Surinam.

HOLLAND—4: Amsterdam, Groningen, Leyden, Utrecht.

INDIAN EMPIRE—15: Ghorpuri, Botanic Gardens; Bangalore (Madras); Lahore (Bengal), Government Gardens; Allahabad (Bengal), Government Gardens; *Lucknow (Bengal), Wingfield Park and Horticultural Garden; *Poona (Bombay), Empress and Bund Gardens; Baroda (Bombay), *Bombay, Victoria Garden; *Calcutta (Bengal), Royal Botanic Gardens, Sibpur; Ganish Kind (Poona); Ootacamund (Madras), Government Gardens and Parks; Pondichery; *Saharanpur (Bengal), Government Botanic Gardens; Darjeeling (Bengal), Lloyd Botanic Garden; *Japour, Public Garden.

ITALY—23: Bologne, Cagliari, Caserta, Catania, Ferrara, Florence, Genoa, Lucca, Messina, Milan, Modina, Naples, Padova, Palermo, Parma, Pavia, Perouse, Pisa, Portici, Rome, Siena, Turin, Venice.

JAPAN—1: *Tokyo, Koiskekowa Botanic Gardens.

JAVA—1: *Buitenzorg, Botanic Gardens.

MALTA—1: La Valette, Public Gardens.

MAURITIUS—1: Port Louis, Botanic Gardens.
NATAL—1: D'Urban.
NEW ZEALAND—1: Christchurch, Botanic Garden.
NORWAY—1: Christiania.
PERU—1: *Lima, Botanic Garden.
PHILIPPINE ISLANDS—1: Manila (Luzon).
PARAGUAY—1: *Trinidad, Botanical and Zoological Gardens.
PORTUGAL—3: Coimbra, Lisbon, Oporto.
REUNION, ISLAND OF—1: St. Denis.
ROUMANIA—2: Bucharest, Yassy.
RHODESIA—3: *Grotte Shur, South African National Botanic Garden; Bulawayo, Rhodes Matopos Park; Salisbury.
RUSSIA—16: Dorpat (Livonia); Helsingfors (Finland); Kazan (Kazan); Kharkoff; Kiev; Moscow; Nikita (Crimea); Odessa; Orel; Ouman (Kiev); Penza (Penza); *St. Petersburg, Imperial Botanic Gardens; St. Petersburg, University Botanic Gardens; Tiflis; Woronesh; Warsaw.
SWEDEN—6: Goeteborg, Horticultural Society Botanic Gardens; Lund; Stockholm, Gardens of the Royal Academy of Agriculture; Stockholm, Royal Gardens of Haga; Stockholm, Swedish Society of Horticulture Botanic Gardens; Upsala.
SERBIA—1: Belgrade.
SIBERIA—1: Tomsk.
SIERRA LEONE—1: Freetown.
SPAIN—2: Madrid, Valencia.
STRAITS SETTLEMENTS—2: *Singapore, Botanic Gardens; *Georgetown (Penang).
SWITZERLAND—4: Basel, Berne, Zurich, *Geneva.
TRANSVAAL—1: Pretoria, Department of Agriculture.
TASMANIA—1: Hobart Town.
UNITED STATES—12: *Brooklyn, N. Y., the Brooklyn Botanic Garden; *Philadelphia, Pa.; University of Pennsylvania; *Brookline, Mass., Arnold Arboretum of Harvard; *Cambridge, Mass., Harvard College of Botany Gardens; *Lansing, Mich., Botanic Garden of State Agriculture College; *St. Louis, Mo., the Missouri Botanical Garden; *Washington, D. C., United States Department of Agriculture Gardens; New Haven, Conn., Yale College; *New York City, New York Botanical Garden; *Berkeley, Calif.; *North Hampton, Mass., Smith College; *Buffalo, N. Y., South Park.
WEST INDIES—7: Castleton, Jamaica; *Habana, Cuba; King's House, Jamaica, King's House Gardens; *Kingston, Hope Gardens; *Port of Spain, Trinidad, Royal Botanic Gardens; St. Pierre, Martinique, Colonial Botanic Gardens; Grenada (Island of) Botanic Garden.
WEST AFRICA—2: Gold Coast: Botanic Garden; Lagos.

Total number of gardens, 236.

A classification of the countries of the world, according to the number of gardens they support, would give us the following:

Algeria, 1.
Australia, 5.
Austro-Hungary, 13.
Argentine Republic, 1.
Belgium, 5.
Brazil, 1.
Canada, 3.
Canary Islands, 1.
Cape Colony, 6.
Ceylon, 1.
Chile, 1.
China, 1.
Cochin China, 1.
Denmark, 2.

East Africa, 1.
Ecuador, 1.
Egypt, 1.
France, 20.
Germany, 36.
Great Britain and Ireland, 14.
Greece, 1.
Guatemala, 1.
Guiana, 1.
Dutch Guiana, 1.
Holland, 4.
Indian Empire, 15.
Italy, 23.
Japan, 1.
Java, 1.
Malta, 1.
Mauritius, 1.
Natal, 1.
New Zealand, 1.
Norway, 1.
Peru, 1.
Philippine Islands, 1.
Paraguay, 1.
Portugal, 3.
Island of Reunion, 1.
Roumania, 2.
Rhodesia, 3.
Russia, 16.
Sweden, 6.
Servia, 1.
Siberia, 1.
Sierra Leone, 1.
Spain, 2.
Straits Settlements, 2.
Switzerland, 4.
Transvaal, 1.
Tasmania, 1.
United States, 12.
West Africa, 2.
West Indies, 7.

It will also be interesting to see from the following classification how far each of the nations of the world is responsible for these gardens:

England and colonies	65
Germany	35
France and colonies	25
Italy	23
Russia and Siberia	17
United States	12
Austro-Hungary	13
Scandinavia	7
Holland and colonies	6
Belgium, Spain and colonies, 5 each	10
Portugal	3
Switzerland	4
Denmark, Roumania, 2 each	4
Brazil, Chile, Ecuador, Egypt, Greece, Guatemala, Japan, Peru, Servia, Norway, Paraguay, and Argentine Republic, 1 each	12
Total	236

In 1886 Prof. Penhallow wrote as follows concerning the then 197 gardens:

With reference to the information concerning endowment and other details, so far received, enough gardens have not yet been heard from to enable us to draw precise conclusions as to the general practice among them, but the information, so far as obtained directly for the directors themselves, may be tabulated as follows:

State	55.5
University	5.5
State and university	11.1
State University and city	2.7
City	11.0
City or State, and private donations	8.3
Private donations	5.5
Admission:	
Free	94.5
Charge	5.5
Sundays:	
Closed	27.8
Open	72.2
Publications: Annual Reports and Scientific Research	73.3

It thus appears that gardens are generally supported by the State—an undoubted recognition of their national importance in all the numerous direc-

tions of their usefulness. Next to the State, the city appears to be the chief supporter, doubtless for much the same reasons.

It is a noteworthy fact that such institutions are in most cases so supported as to make them free to the public use, but in any case this freedom is subject to certain limitations as necessitated by proper care of property. In only two cases so far ahead is a charge exacted from, but the fee does not appear to exceed 25 cents per capita. Practice varies widely as to admission on Sundays, even in the same country, it being determined, apparently, by each community in which the garden is located. The custom, however, seems to be in favor of keeping the grounds open on Sunday. In one case the pleasure garden only is open on Sunday; in another all the grounds are free but the plant houses are closed; while, at Madrid, it is the custom to open the garden on Sunday from May to November only.

A few gardens issue no publications, but this appears contrary to the general practice. Many issue annual reports of the director, or seed catalogues for purposes of exchange only. In England, however, as in all the more important gardens of France and Germany, these publications are supplemented by valuable contributions to science, as the result of original investigations conducted in the laboratories, herbariums, or plant houses of these institutions, and no better idea of the character and value of this could be obtained than from an examination of the annual reports issued by the director of the Royal Gardens at Kew. It indicates the great scope which such an institution properly endowed, ably directed, and allowed healthy growth, may ultimately have.

DESCRIPTION OF SOME OF THE BOTANIC GARDENS IN THE FOREGOING LIST.

1. Botanic Gardens at Adelaide, South Australia.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

40 acres in area: laid out in 1858.

The main entrance to the garden is but a few minutes' walk from the center of the city. The lower end adjoins the Botanic Garden Park, a planted area, 80 acres in extent, for the recreation of the people.

There are four small lakes in the garden, connected by a winding creek. These are filled in winter, but required to be fed from the waterworks during the remaining months.

Prior to their present uses these gardens served for zoological purposes also.

There is a museum of economic botany said to one of the best in Australia. Erected at a cost of £3,000.

One of the finest items in the museum is a collection sent by the Japanese Government of seeds, oils, starches, dyes, vegetables, and animal manures, fodder, and agricultural produce generally, etc.

The herbarium is located at one of the museums, and contains 18,000 specimens.

There is a palm house constructed at cost of £4,000.

There are 10 glass houses and 3 shade houses.

There is a very complete collection of cacti.

A great deal of attention is given in this garden to the question of fruit culture.

The cost of water is 1s. per 1,000 gallons, reaches on occasions £1,200 per annum.

2. Government Botanic Gardens, Brisbane, Queensland, Australia.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

40 acres in area.

They are but a few hundred yards from the head of Queen Street, Brisbane's leading thoroughfare, are triangular in shape.

The Brisbane River runs along one side.

These gardens are largely patronized by the public.

They contain a fair-sized cricket field and a lawn-tennis court.

There is only £52 (sterling) a year available for the garden.

All is under grass except the beds and asphalt paths.

This garden is scarcely in accordance with the popular idea of a garden, although the plants are well kept and thrifty.

The heat in this garden is very great. The thermometer ranges from 94° to 99° Fahrenheit, with the nights but little cooler.

In January the nights are but a few degrees cooler.

3. Botanic Garden at Melbourne, Victoria.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

97 acres in area, including lake of 8 acres.

Rich grassy undulating slopes, winding walks, and bold sweeping beds in pure English style—as fine a general landscape effect as is to be met anywhere.

Some beds are devoted to natural orders, others are reserved for the flora of various countries or continents, and others arranged from a gardener's point of view.

Lawns are of Buffalo grass and English rye grass.

The paths are from 10 to 20 feet wide.

The system of labeling plants is very complete. It includes the botanic name, the name of the author, the popular name, the habitat, order, and in some instances the economic or medicinal value of the plant legibly inscribed.

There is a director's house and a museum of economic botany.

4. Botanic Gardens, Sydney, New South Wales.

[Extracts from A Guide to the Botanic Gardens, by J. H. Maiden (director and Government botanist), with the assistance of members of the staff, 1903.]

43⅔ acres in area.

The botanic gardens proper front on Farm Cove, Port Jackson. They are made up as follow:

The upper garden, 7⅓ acres.

The middle garden, 8⅓ acres.

The lower or northern garden, 26 acres.

About 6 acres have recently been added to the garden from the Inner Domain. The middle garden was the original garden, and other portions have been added at different times.

These gardens, with the exception of the water frontage, are everywhere encircled by park lands, which are the Inner Domain of the west (including the Government House grounds and the Garden Palace grounds) and the Outer Domain on the south and east.

THE OUTER DOMAIN.

This garden consists of 90 acres of park grounds, incircling the botanic gardens on the east and south sides.

THE INNER DOMAIN OR GOVERNMENT HOUSE GROUNDS.

This contains 35 acres, of which 4 acres consists of a garden in the immediate vicinity of the house. The rest is park ground in the exclusive occupation of the governor general. These lands bound the western portion of the lower botanic garden.

THE GARDEN PALACE GROUNDS.

These are 19 acres in extent and technically form a part of the Inner Domain. They form the western boundary of the upper and middle gardens.

UPPER GARDEN.

A. Director's residence and grounds.
B. Offices, museum, herbarium, etc.
C. 1, 2, 3, 4, and 5: Propagating and plant houses.
D. 1, 2, and 3: Orchid and plant houses.
E. Bush houses.
F. Frame and nursery grounds.
G. Carpenter's shop and stable yard.
H. Superintendent's residence.
I. Levy Memorial Fountain.
No. 1. Lawn in front of residence.
No. 2. Collections of cactæ and euphorbiaceæ.
No. 2-a. Collection of euphorbias.
No. 2-b. Collection of strelitzias.
No. 2–c. Collection of mammillarias.
No. 2–d. Collection of cereus and pilocereus.
No. 2–e. Collection of pereskia and rhipsalis.
No. 2–f. Collection of echinocactus.
No. 2–g. Collection of phyllocactus.
No. 2–h. Collection of echinopsis.
No. 2–i. Collection of opuntias.
No. 2–k. Border of various shrubs.
Nos. 3 to 7. Lawns and borders variously planted, trees, shrubs, climbers, flower beds, etc.
8. Contains a series of geometrical beds containing good collections of bulbous plants, also bouvardias, carnations, penstemons, etc., and on the lawn some fine specimen trees.
9 and 10. Propagating grounds.

NOTE.—See map.

The upper garden contains all the glass houses, the administrative building (museum, office, etc.), and the official residences of the director and superintendent. It originally comprised the kitchen garden of the early governors (now used as a propagating ground), but the greater part was taken in from the outer domain.

MIDDLE GARDEN.

The middle garden is the old garden. It is entirely under plantations, without grassy lawns; has mostly straight walks and rectangular beds, except a portion west of the creek, which is treated more freely. In the middle garden, on the eastern side, are situated the aviary sheds and paddocks. It has a dense arcade or pergola formed by various climbing plants, all of which flower in profusion.

THE LOWER GARDEN.

The lower garden is laid out in irregular sweeping lawns and winding paths. The lawns are all laid down with couch grass or buffalo grass, both of which, by frequent use of the machine, make a splendid turf. Each of these lawns is numbered consecutively; there are 36 in all. Each is bounded by a walk on all sides and occupied by flower beds, rockeries, plant collections, and plantation clumps of native or exotic plants.

It should be borne in mind that the present beautiful condition of these gardens, with their diversified surface and charming views, which many term an earthly paradise, is not the work of nature. The greater part of the site for the botanic gardens was originally a barren, rocky, sandy place, such as may be seen in the scores of gulfs and gullies of other parts of Port Jackson to-day.

The garden palace grounds were set apart as a public pleasure place in 1882. They form an appanage to the botanic gardens, but only the rarer plants are labeled in this garden, attention being chiefly devoted to lawns and florists' flowers in this section.

5. Botanic Gardens of Ballarat, Victoria.

[Extracts from A Traveler's Notes, James H. Veitch, published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

83 acres in area. 33 only are under cultivation.

These gardens are not strictly botanic gardens, but more show gardens for the public.

The paths are laid out in rectangles, as are the streets of the city.

There is a collection of statuary, purchased at great cost in Italy, larger than in any other known botanical garden.

There is a very fine collection of tree ferns in very good condition.

6. The Botanical Garden of the University of Vienna, Austria-Hungary.

[Extract from article by Prof. N. L. Britton in Science, vol. 4, No. 88, 1896.]

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.

7. A Botanical Garden in Buenos Aires.

[Extracts from Bulletin of International Union of American Republics, June, 1909, p. 1055.]

20 acres in area; founded, 1892.

It is divided into 14 sections, each of which is devoted to the flora of a district region.

Of the three styles of garden development, i. e., French, English, and South American, the English seems to draw the most attention.

The tipa tree, a species of acacia, which will thrive in any soil, is seen to perfection here. Its bark contains a poison which renders it invulnerable to insect enemies.

There is a large collection of ferns, cactus, water lilies, orchids, and trees, and there are two conservatories.

8. The Belgian State Botanical Garden, Brussels.

[Extracts from publication of the Department of Agriculture, Brussels, Fred Tilbury, English printer, 16 Rue d'Edinbourg, 16.]

10 acres in area; established in 1826.

These gardens came into possession of the State on the 1st of July, 1870. Since that time, instead of remaining an almost exclusively horticultural establishment, the garden has risen to the dignity of of a scientific institution, devoted to botany, and the headquarters of the Botanical Society of Belgium.

The garden now comprises four sections: The herbaria, museums and vegetable paleontology, experimental section, cryptogamy and vegetable pathology.

The greenhouses are connected with section I; the departments and temperate houses with section III. Special areas are devoted to ornamental and economic plants.

9. Botanical Garden at Rio de Janeiro.

[Extracts from The New Brazil, by Marie Robinson Wright, 1907.]

2,000 acres in area; founded, 1808.

Located on the border of Lake Rodrigode.

Has a magnificent avenue of royal palms extending from the main entrance for nearly one-half a mile, consisting of 150 trees nearly 100 feet high, an alley 2,000 feet long, consisting of 142 trees 75 feet high, crossing it at right angles.

Has nearly 3,000 specimens, aside from the miscellaneous collection of trees and plants.

Has a library, museum, national herbarium, aquarian, hothouse, and other accessories.

In charge of the agricultural society since 1860, and has a school of agriculture.

One hundred thousand people visit the garden annually.

Montreal Botanic Garden.

[Extracts from first annual report, 1885. Gazette Printing Co., Montreal. Published 1886.]

75 acres in area.

They are located in Mount Royal Park.

The surface is broken and much diversified in character, and there is much admirable landscape work which can be effected.

There is a difference in elevation of 195 feet.

The soil in the lower parts is rich and of sufficient depth for the growing of trees.

There are about 3 acres admirably adapted to nursery purposes, on the site of an old market garden.

Of the 75 acres in the garden, only 18 will be inclosed in such a way as to permit of exclusion on occasions which demand it for the proper care of the property, while the balance, 57 acres, will always remain as free and open to the public as it is to-day, with the additional advantage of enhanced surroundings for enjoyment and study.

Within the limits of the garden proper, there is a two-story stone building of very substantial construction and ample dimensions. It will contain the herbarium, working library, economic museum, directors' office, and lecture room, and for this purpose it is well adapted, permitting of future extension if necessary.

Around this building, and directly connected with it, the plant houses will be secured through the lecture room, which will directly open into a range of houses specially designed for the growth of plants to be used in the lecture room, and to which they may be transferred without difficulty.

11. The Botanical Garden of McGill University, Montreal, Quebec.

[Extract from article by Prof. N. L. Britton in Science, vol. 4, No. 88, 1896.]

McGill University, at Montreal, Quebec, carries on a small botanical garden in connection with its laboratories.

12. The Botanical Gardens of Ceylon.

[Extracts from Popular Science Monthly, vol. 73, September, 1908. The Science Press, Lancaster, Pa., p. 193.]

Located at Peradeniya in the center of Ceylon, about 70 miles by rail from Colombo, the capital of the island. There is no town here, but only a post office and a few scattered huts. The city of Kandy, however, is only 3 miles distant.

Some have described this as "an English glass house glorified," because the climate produces such brilliant foliage and strange plants in such luxuriant condition.

The offices of the director of the gardens are located at Peradeniya, whose duties correspond to those of a government secretary of agriculture.

Other gardens and experiment stations, five in number, are established in parts of the island where differences in climate furnish altered conditions for plant life.

The Peradeniya garden is in the wet zone, at an altitude of 1,600 feet above the sea, with an annual precipitation of about 90 inches, and a mean temperature of 75° Fahrenheit.

13. Nuwera Eliya and Hakgala.

[Extracts from A Traveler's Notes, James H. Veitch. Published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

550 acres, only 8 acres of which are really kept up.

Nuwera Eliya is about 6,200 feet above sea level.

Hakgala a few hundred feet lower.

The former is about five hours by train from Kandy.

The gardens at Hakgala are attached to the main garden at Peradeniya, and are used for the cultivation of plants requiring less heat and moisture.

14. The Botanical Gardens of Santiago, Chile.

[From "Visitor's Guide to Santiago."]

The Quinta Normal, as the Botanical Gardens of Santiago, Chile, are known, is an exceptionally pretty park, located on the extreme western edge of the city. Its chief object is the Agricultural College, but there are also within its confines the Natural History Museum, the Astronomical Observatory, the Art Gallery, the Zoological Gardens. It was founded in 1845 by President Don Manuel Bulnes, with the object of giving practical education in agricultural subjects to Chilean subjects.

15. Botanic Garden at Hongkong.

[From notes furnished by Mr. W. T. Swingle.]

20 acres in area; established 1862. Because of the limited space on the island of Hongkong the gardens are small. They are, however, remarkably beautiful, and have many fine specimens of tropical and subtropical trees and shrubs, either of economic interest or interesting because of beauty of the flowers or foliage. Many local Hongkong plants, some of them of great beauty, have been preserved from destruction by being planted in the botanic garden. The climate of Hongkong is cold and cloudy during the winter months, so that strictly tropical plants do not thrive. It has been found that many of the species that thrive in Hongkong do well in south Florida. The botanic garden has a good library and herbarium, the best in the south Chinese region.

Except for two artificial terraces, they are on the side of a somewhat steep hill.

These terraces are used for the smaller plants and for tanks for aquatic plants.

16. The Garden of Plants, Paris, France.

75 acres in area; founded in 1626.

In this garden are concentrated most of the Parisian institutions connected with natural science. Besides the zoological and botanical gardens, it comprises natural history collections, laboratories, and a library.

Lectures on natural science, to which the public are admitted gratuitously, are also given here in the amphitheater, a hall capable of containing 1,200 persons.

The botanical gardens are open daily from an early hour until dark, but the menagerie, collections, hothouses, and library are open at certain hours daily.

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. Many valuable contributions to botanical literature have emanated from this grand institution in the past 100 years.

The botanical garden is divided into quadrangular beds by a number of handsome avenues. The red labels indicate the classes to which the plants belong, the yellow labels the families, and other labels the genera and species. The edible herbs are denoted by green bands on the labels showing the species, medicinal plants by red, poisonous plants by black, industrial plants used in arts by blue, and ornamental plants by yellow.

In addition to the facilities it offers for study on the spot the botanic garden distributes seeds, plants, and specimens to educational establishments and other botanical gardens and societies, and also to students, botanists, artists, and workmen.

17. The Berlin Botanic Garden.

[Extracts from Rundgang durch den Koniglichen Botanischen Garten zu Berlin. Herausgegeben im Auftrage der Direction Zweite, durchgesehene Auflage. Mit einem Plane des Gartens. Berlin, 1895. Gebruder Borntraeger.]

It is in the first place a university institute, and as such has the primary obligation of furnishing material for botanical instruction in the university, and, secondly, as far as is possible in that climate, to cultivate the most important forms of plant species in so far as they are of the slightest use or service to mankind or illustrate extent of plant life.

Furthermore, the garden has to furnish material for the scientific investigations of advanced botanists as far as this can be accomplished without affecting the supply of their plant stock.

Aside from the scientific worth of botanic gardens, lately the greatest efforts have been made to so conduct them that the layman can find useful information and instruction in them. All consideration of their maintenance for the convenience and recreation of the masses take last place. The administration has endeavored so to arrange and

conduct the garden that whosoever desires education and instruction would find not only ample material but also its systematic comprehensive grouping, so that the varieties of the various species of the entire plant world may be easily ascertainable.

The "Systematic Divison" is divided into—

K. I. The pteridophytes.

G. I. Gymnospermæ.

DI. DXX. Angiospermae-Dicotyledoneae-Archichlamydeae, Angiospermae-Diocotyledoneae-Sympetalae, Angiospermae-Monocotyledoneae.

The morphological-biological division.

The division of useful plants.

The geographical plant section.

AI–A13. North and Middle Europe, including Central Asia.

BI–B2. The Mediterranean section.

CI–C2. Japan (2), extra tropical East Asia.

DI–D2. North America.

EI–E2. The Mexican group (2), South African section.

G. Asiatic group.

HI–H2. South American group.

JI–J2. Australian group.

K. New Zealand group.

L. Individual specimens of certain species.

M. Abyssinian group.

The main buildings propagating houses and conservatories are:

V. Victoria house, water plants—best time June to August.

P. Palm house, containing the four families of that plant species.

O. Orchid house.

A. Aracean house.

K. Camelia house (rhododendron, camelia, azaleas, etc.)

N. House for useful plants (cocoa, betel nut, coffee, vanilla, cinamon, pepper, quinine, rubber, campeche wood, mahogany, sandalwood, vegetable ivory, etc.

Colonial house, tropical, not open to public.

W. Winter house, containing plants that have to be brought in during the winter but are put out in the summer.

M. Museum. S. Succulent house.

GROUPING OF THE ARBORETUM.

1. Conifers.
2. Paenoies.
3. Plantens.
4. Barberries.
5. Mock oranges.
6. Deutzias.
7. Plums and apples.
8. Roses.
9. Magnolias and Ligurris.
10. Linderis.
11. Horse chestnuts and maples.
12. Buckthorns and bittersweet vines.
13. Elaeagnus.
14. Heaths.
15. Ashes.
16. Elders and forsythia.
17. Privets.
18. Matrimony vines.
19. Honeysuckles.

RI–RII. Reserve stock.

HISTORY OF THE DEVELOPMENT OF THE COLLECTIONS AT THE BERLIN GARDEN.

The greater part of the botanic garden located on the Potsdamer Strasse was covered during the middle of the seventeenth century with hops for the Elector brewery. In 1679 Frederick William, the Great Elector, razed the brewery and planted in the space fruit trees and garden truck. For this purpose he imported from Holland, England, and France seeds, living plants, and young trees. The garden developed under the guidance of the original gardener in charge, Michel Mann, and the Great Elector's avocation was to spend his spare hours going over it. Through his intense interest in this garden it soon became a model for the whole country. Under King Frederick I, however, the whole internal arrangement was changed. Conservatories and propagating garden were installed and a small orangerie was created. Out of the original adjunct to the royal kitchen grew an imperial amusement park. About 1700, under Frederick William I, a king noted for his saving qualities, the administration and upkeep of the garden was turned over to his body physician, who also was a botanist and was a companion of the famous French botanist Tournefort on a visit of the latter to the Orient during that year. Under the administration of this excellent official the institution grew by leaps and bounds by the accumulation of seeds and living plants from different sections of Europe. This man died about 1715, and at that time the King transferred its jurisdiction to a scientific society, which was supposed to maintain it out of its own funds. Until 1893 there was a gradual expansion of the garden. In 1893 the question of the transfer of the garden to a place permitting more expansion was taken up seriously. On the basis of a detailed expert opinion regarding the transfer or reorganization of the imperial botanic garden and botanic museum, prepared by the director of the gardens and a number of expert collaborators, in July, 1895, the ministry of ecclesiastical affairs and public instruction and the ministry of public works made arrangements for the relocation of the gardens at Dahlem. The new buildings were erected under the supervision of the inspector of buildings who was a competent architect and the director of the garden. It seems that the old botanic garden was not razed, but kept as it was, and the information given is that since 1897 the propagating houses were subjected to only the most essential repairs. It evidently is kept up in conjunction with the new gardens at Dahlem. In 1899 to 1901 residences for the director, instructor, and other assistants were erected at the new botanic garden at Dahlem; in 1900 to 1901, smaller propagating houses; in 1902, a large colonial house and cultured cultured cultivation houses and a number of other smaller houses; in 1903, the winter house; construction of the exhibition houses began in 1902 and was completed in 1909.

18. The Dresden Botanic Garden.

[Extracts from Fuhrer durch den Koniglich Botanischen Garten in Dresden.]

Established 1889.

The present botanic garden in Dresden was added in September, 1889, to the "Great Garden," and its planting was begun in 1890.

Botanic gardens are not ornamental gardens in the sense of landscape gardening. They stand solely on the basis of scientific investigation, and they change their forms as well as their contents with the progress and the needs of the various natural sciences represented in them. As, however, those who carry on the work of their development under the guidance of scientists should be capable gardeners, a function of the botanic garden is therefore to aid in the development of landscape gardening and in its form and layout by planting along landscape architectural lines. Botanic gardens represent a most intimate combining of botanic and landscape gardening, to the gain of both. Of first importance is the arrangement of the component parts of the garden and the exhibition of the flowers is their culture and propagation, and to do this successfully recourse must be had to the manifold accessories. Where rock juts or water or a sandy field can be found, or a dry rubble stone hill to vary with border beds and lawns, you have natural aids and natural artistic accessories of landscape gardening.

These are aids in using the desirable soil and exposure for certain species. While tropical and subtropical plants are provided in special buildings for the necessary climatic conditions, isolated spots throughout the garden will also be invaluable for small propagating beds and houses.

It is through this diversity of appearance and the multifarious views that a botanic garden reaches its highest charm. Everywhere one looks something different is in bloom, something strange and unknown is seen combining with plants that are better known. As in every well-kept and well-stocked museum a visitor finds here material to meet his own special hobby and prediliction. For the connoisseur are supplied the manifold botanic characters, the combination of plants from the different sections of the earth in scientific arrangement. In another place are the choicest examples of local plant life. In a third place is material for the study of plant life as it appears in various changes of the seasons. In the fourth place, again, the whole garden is an exposition to him who cares to saunter through and make selections for his house garden for the beautification of his home life. The whole garden, however, combines for everyone the highest enjoyment and appreciation of what nature furnishes in the botanic field.

It is only natural that the scientific arrangement of the plant species in the botanic garden is in accordance with the fundamental requirements of the plant life itself as it may be affected by climatic conditions and requirements of soil. The period is past, however, in which systematic grouping of plants is solely or primarily done for this purpose in the garden: that is a function of the herbarium. The botanic garden is not a museum. It works solely with living plants. Therefore, the exposition in the Dresden Garden follows the great groups of flora of the earth, combining the tropical plants with the connecting propagating house, the subtropical plants in the winter house or in the open during the summer time. The frost-inured northern species are combined for the most part on rocky or marshy places with the central European groups, but also with the border beds of the system according to their natural proclivities.

A difficulty that is encountered in places where more than 6,000 plant varieties have to be labeled for the visitor is met with in the

fugitive qualities of the lettering. Of all the different experiments made names that were burnt into porcelain alone survived, and this system of marking is gradually being adopted throughout the garden for shrubs and plants. In the various flora groups patented labels and smaller written tickets of various kinds have been placed which are inconspicuous and do not disturb the impressions given by the plants. The smaller tickets are naturally more difficult to be read and can not offer much more than the botanic name in Latin. This is a condition which does not please the many visitors since the great demand is for labels giving the German names of the plants, but these people forget that even those plants which are indigenuous to Germany contain for only the smallest part clear descriptions with names in common use. In the Germanizing of different plant names no purpose in landscape gardening is served. The main point is that the visitor will understand that these labels with their oft-almost unpronounceable names are primarily the indispensable identification marks for official use and not intended to be memorized by the thousands who visit the garden.

NOTE.—The height of the roof of the Palm House is more than 12 meters; of the two wings 3½ meters, and of the corner pavilions almost 5½ meters.

EXHIBITION SECTION OF THE BOTANIC GARDEN.

A. First service building, containing laboratories, the botanic collections of fruits, woods, products, etc. Also living quarters for help.
B. Second service station, containing administrative office and cashier's room, seed market, service and living quarters for the help.
C. Large cold house.
D. Victoria-regia house.
E. Palm house with living quarters for foreman and auxiliary quarters, with—
(*a*) Central structure for palms.
(*b*) Wing with adjusted temperature for ferns.
(*c*) Tropical and subtropical useful plants.
(*d*) Hothouse.
(*e*) House for succulents.

SECTIONS.

1. Border beds at the entrance and for screening of buildings A and B. Ornamental shrubs and high conifers.
2. Exhibition place 1, of the southern flora of the Capeland, Australia, New Zealand, and South America.
3. Exhibition place 2, for the flora of eastern Asia.
4. Exhibition place 3, of subtropical flora and location of Antarctic plants.
5. Trees and shrubs from Amurland, China, Japan.
6. East Asiatic flora from the Himalayas to Japan, with location of cold-house plants.
7. Conifers and deciduous trees.
8. North American tree and shrub section.
9. (Northern section.) Conifers of the Rocky Mountains and California to Pennsylvania in North America.

(Southern section.) Mixed flora groups of the United States of America, with marshland.

10. Four ray-shaped outer fields for beds for plant assortments suitable for decorative landscape gardening, and places for two large groups of southern cold-house plants.

11. Characteristic overgreen groups of flora from southern Europe and the Orient, in particular cold-house plants.

12. Southern Europe, flora group 2.

13. Flora group 3, of the Mediterranean countries and the Orient, with conifers, rocky hills, etc.

15. Border planting of deciduous material from southern central Europe and the Caucasus.

15. Mountain and Alps flora of central Europe.

16. Hill and wood flora of central Europe.

17. Field and marsh flora of central Europe.

18. Central European deciduous material (conclusion); containing on its southern extremity a special section of the hill flora of Saxony and Thuringia.

19–27. Collection of plants which occur wild in Europe, northern Asia, and America.

28. Annual and biannuals in systematic arrangement.

29. Plants suitable for commercial and food uses, and those having curative properties; also poison plants.

30. Beds of the biological section.

II. PHYSIOLOGICAL EXPERIMENT STATION.

I, small iron cold house; II, hot; III, temperature culture house; IV and V, smaller cooler culture houses.

F, G, and H, domestic establishment and warehouses and granaries.

Border beds for cultivation of fruit and small garden and agricultural beds and experiment sections.

19. The Botanic Garden at Dahlem.

[Extracts from Der Konigliche Botanische Garten und das Konigliche Botanische Museum zu Dahlem.]

1. "The functions of large botanic gardens and museums, with particular reference to the botanic garden and museums at Dahlem." By A. Engler.

A. FUNCTIONS OF A BOTANIC GARDEN.

At first botanic gardens were established to collect as much plant material as possible for instruction purposes, scientific study, and for the edification of plant lovers. In this respect the Berlin Botanic Garden early took a prominent place among the gardens of the Continent, particularly since the beginning of the administration of Director Prof. Willdenow in 1801.

That the functions of the Dahlem garden, firstly to gather material for scientific study, are continued, and that they do not, as many a formerly valuable garden did (from a scientific standpoint), degenerate merely to the level of an amusement part, is due to its

and the museum's steady connection with the university and the scientific personnel engaged in the latter. May it be granted that in the future the Government and the university provide with the same care that, by the employment of proper scholars and professional men who have feeling and sympathy with this requisite of scientific relation, the institution be maintained on this high plane, and that, while they constantly keep in mind the related demands of applied botany, they do not give this feature first place.

Less stress is laid upon the number of the varieties increasing in culture, and the endeavor is to have as many plant families, characteristic species, and biologically interesting specimens as possible represented: and care is taken that in the arrangement of plant groups for study purposes as complete a representation as possible is attained. But this is governed by available areas and funds, as well as by the inclinations and connections of those in charge. For this reason the local garden possesses, perhaps, the largest collection of perennial woods of central Europe, of the plants found in high mountain areas, one of the most complete collections of cacti, and aracæ and palms. Constant effort is made that as many plant families as possible are represented; because, even if many tropical and subtropical plants do not attain bloom in our conservatories, their cultivation has nevertheless a scientific value for comparative anatomical study, which nowadays in the economic utilization of the plant systems can not be neglected. Cultivation of high-mountain plants by us in the lowlands has scientific value in the ascertainment of the facts as to how such varieties are affected and modified by changed conditions, and despite the fact that the gardener has his pride in so taking care of the plant so that it changes and modifies as little as possible.

Not only does the local botanic garden serve the studies being prosecuted by the University of Berlin, but specimens are requested and furnished botanists from other universities in Prussia, Germany proper, and foreign institutions.

As time went on, however, other functions had to be added, which necessitated fourfold expansion. To the original ordinary garden and arboretum and the economic and medicinal division there had to be added a tropical economical division. The expansion of German influences into foreign colonies necessitated this, and yearly hundreds of valuable plants are furnished the colonies for propagation and cultivation due to the research work that has gone on in the mother station at home.

But with such an institution as a botanic garden not only must the gathering of a vast supply of material for instruction purposes and scientific investigation, as well as the material interests of the people, be recognized, but the garden must be so arranged that the various exhibits give pleasure and delight to the visitors. This is achieved in many ways. While originally only the form of a plant was exhibited, lately the development of the plant, its functions and uses, and its modifications under varying conditions has been more especially noticed, and this branch of botany, called plant biology, has been, therefore, especially recognized in this garden. Certain plant groups are arranged which show how various plants assimilate food and feed themselves; others how they will protect themselves under

certain climatic conditions; again others show in what manner they strive to reach the light, etc. In other sections again changes in a plant through internal influences, natural and artificial, are exhibited. Some plants are grouped according to sex relationship; their relations with and influence on the insects that are attracted by them as well as the influence of hybridization and bastardizing. For plant physiology experiments and other experiment cultivations on a smaller scale certain portions of land are reserved.

Very few of the older and standard functions of the garden have created as much interest as the grouping of plants according to geographical location.

In the exhibition of plant life in countries outside of Europe special effort has been made to represent the natural plant associations and connections. This has been of big value, since in the propagation and transplanting of these plants from one place to another great thought had to be given to the original conditions covering a healthful existence of the plants, and to anticipate any detrimental effects varying climatic conditions would have on plants so transposed.

Plant groups of subtropical countries can naturally only be exhibited in the open during the summer months; during the winter they have to be stored in separate conservatories.

B. FUNCTIONS OF A BOTANIC MUSEUM.

While botanic gardens have for centuries been considered a necessary attribute to universities, and ofttimes also metropoles have installed them as interesting and educative establishments, botanical museums did not come into existence until comparatively recent times. Although originally the administrative officials of botanic gardens and students in botany had recognized the necessity of having an herbarium and continuing its enlargement as one of their most important obligations, very few ever carried it forward to a sufficient degree. The most that could be expected in the early days was the gathering of indigenous woods, of seeds, and fruits, and perhaps reproductions in wax of various varieties of fruit, edible and poisonous fungi, etc. These exhibits were augmented from time to time by travelers and sailors bringing with them from tropical and other foreign countries particularly conspicuous fruits and seeds which were gradually combined with the other exhibits. In this manner the botanic museum developed. Alexander Von Humboldt was particularly active in the gathering of botanic and herbaria material.

In general the functions of a botanic museum are three, namely: First, it should contain as complete as possible all available plant varieties suitably arranged for scientific study. It should strive to expand the availability of the natural plant system as well as be corelated to plant geography, morphology, anatomy, physiology, and palæo botany. It should contain, in particular, material for investigation of such varieties as are not locally cultivated or even in the best-equipped botanic garden can not generally be cultivated with success. This might be considered 90 per cent of the higher order of plants and nearly all of the lower. Second, it should contain as complete material as possible for the purpose of applied and eco-

nomic botany. Third, it should give the student and any other investigator in properly arranged exhibition an oversight over the most important characteristics of plant life, plant form, plant expansion, and the uses of the plant.

THE COST OF THE NEW ESTABLISHMENTS OF THE BOTANIC GARDEN AND MUSEUM.

[By the imperial chief architect, A. Koerner.]

After the removal of the botanic garden to Dahlem had been advanced in 1888, a detailed program covering the extent of the new establishments, the area of the ground, the propagating houses and conservatories, and incidental establishments was prepared. In 1893 a rough estimate of cost without detailed plans was submitted. On the basis of this, the first plan was prepared by the above architect, and an estimate of 4,640,000 marks figured for the cost of the work.

The value of the old garden was figured at 16,000,000 marks. Out of the proceeds of the sale of this old establishment all the costs of the new botanic buildings as well as other university structures—extensions of the charity hospitals, institute for infectious diseases, the hygienical institute, pharmaceutical-chemical institute—were to be defrayed. Funds for these new establishments had to be procurred at first, however, by a Government loan.

In the progress of the work on the construction of the buildings, some additional structures and establishments were found necessary and the costs were correspondingly increased. Out of the Government loan, 4,977,625 marks were made available and out of the emergency fund 473,100 marks, making a total of 5,450,725 marks. Of this amount 4,286,625 marks may be allotted to the new construction in the garden, and 1,164,100 marks for the museum with its internal arrangements.

Construction work proceeded under the supervision of a special construction commission composed of—

On the part of the imperial ministry of ecclesiastical affairs, public instruction and medicine, two directors of the ministry and one imperial councillor.

On the part of the imperial ministry of public works, the chief advisory architect.

As representative of the imperial ministerial, military, and construction commission, one advisory architect.

Representing the local construction officials of the garden, one advisory architect.

Officials engaged in the administration of the garden in 1909 were: One director, who is privy councilor, professor at the University of Berlin, and a member of the Imperial Academy of Sciences; 1 assistant director, also a professor and privy councilor; 9 custodians, of which 6 are professors, 2 technical men, and 1 an academical lecturer; 4 assistant custodians, all technical men; 2 secretaries, having charge of office and accounts; 1 chief inspector; 1 inspector; 1 head gardener; 2 preparers; 1 clerk in the office; 3 assistants for the gardener; 1 machinist; 2 watchmen; 3 servants; 22 laborers.

20. The Chelsea Physic Garden.

[Extracts from London Botanic Gardens, by Pierre Elie Felix Perredes, B. Sc., F. L. S., pharmaceutical chemist, corresponding member of the Philadelphia College of Pharmacy.]

Chelsea Physic Garden was esablished in the year 1673 by the Society of Apothecaries of London, by whom it was first held on lease, but in 1722 it was conveyed to the Society for the Encouragement of Botany. The garden was managed and maintained by the Apothecaries' Society until the 21st of January, 1899, when, by a scheme of the charity commissioners for England and Wales, the parochial charities were appointed to be the trustees of this garden in place of the society. Provision was then made for its management by a committee appointed by the trustees of the garden, the treasury, the lords president of the council, the technical education board of the London County Council, the Royal Society, the Society of Apothecaries, the Royal College of Physicians, and the Pharmaceutical Society, the senate of the University of London, and the representatives of Sir Hans Slone.

There is also a curator garden. This is a work garden, not for recreation, but for teachers and students. Admission to the garden is by ticket, issued on week days, 9.30 a. m. to 5 p. m., except during the months of May, June, and July, when it is open until sunset. The work garden is educational in a wider sense, and the teaching of botany as a pure science has gradually replaced the study of drug-yielding plants. (See map.)

21. The Royal Botanic Society's Garden.

[Extracts from London Botanic Gardens, by Pierre Elie Felix Perredes, B. Sc., F. L. S., pharmaceutical chemist, corresponding member of the Philadelphia College of Pharmacy.]

18 acres in area.

The Royal Botanic Society's Gardens, in Regent Park, were opened in 1812 and occupy a circular area of land.

Its management is in the hands of a council elected by a vote of the fellows: President, secretary, chief instructor of practical gardening school in charge of garden staff, curator of museum.

Ground is leased from the Crown, and the institution is supported by contributions of the fellows.

About 700 student tickets are issued annually. It is chiefly an educational institution. (See map.)

22. The Royal Botanic Gardens, Kew

[Extracts from a historical and descriptive work by W. J. Bean, assistant curator; introduction by Sir William Thiselton-Dyer, K. C. M. G., LL. D., F. R. S.]

288 acres in area; founded in 1760.

The Royal Botanic Gardens at Kew are made up of a union of the Kew Gardens and the Royal Gardens of Richmond. They originated in the Exotic Garden of Lord Capel, in 1760; they were adopted as a national establishment in 1840. They were said by Mr. V. J. Lipsky, a Russian savant, to be better than all the other gardens put together that he had ever visited or worked in.

There are formal gardens, wild gardens, three botanical museums and a museum hall, a laboratory, and a scientific building. The herbarium and library are the largest and most complete of their kind in the world.

Plant collection includes those of tropical and warm temperature, economic and medicinal, herbarium and cactuses. (See map.)

The palm house, 362 feet long and 66 feet high, was added in 1848; the temperature house, 580 feet long and covering 1½ acres, was added in 1899. There were 14 other houses in 1908, including the Himalayan house, the Mexican house, and other small houses, such as the Alpine house and the orangery. Then there are the bamboo gardens, the rose gardens, rhododendron dells, lily ponds, and arboretums, boggy and seaside plants, rock gardens, shrubs, lilies, flower meadows, azalea gardens, and ferns.

The museum shows evolution of products manufactured from plants grown. The herb garden is about 630 by 240 feet in dimensions. The wild garden covers an area of about 2 acres, completely surrounded by gravel walks.

Bamboos grow 20 to 25 feet here, although there are some tropical species that grow a hundred feet high or more. They require shelter and root moisture.

Museum (127). To give an idea of the character of the exhibits, opium is selected as an example. The drug is obtained from a species of poppy (*Papaver somniferum*) by incising the young seed pods and collecting the milky juice which exudes. There is a picture of the plant and an exhibit of the dried poppy heads; also pictures illustrating the field operations connected with the cultivation of the poppy from the preparation of the ground for seeding to the puncture of the poppy head and the harvest. Then comes specimens of the utensils used and the manufacture of the raw materials; samples of various forms in which opium is taken to market in different countries; a smoking apparatus; models of opium smokers. Various narcotics of great importance to medicine are derived from it, such as laudanum and morphia, and samples of these are also exhibits.

As illustration of certain other articles we have cotton, jute, tobacco, Japanese lacquer, oils, essences, perfumes, etc., illustrated by raw materials and finished articles.

In the willow family various stages in the manufacture of cricket bats are shown, and there are exhibited some interesting exchequer tallies formerly used for receipts as payments made. Curious facts connected with the various products are brought out, such as the packing of Paraguay tea by South Americans in the skins of animals. Ravages by insects are shown by specimens of the insects themselves, life work, and an estimate of the damage done.

Another example is the coconut palm. Pictures of the tree as it grows near the sea in tropical countries, also a portion of the trunk and a bunch of nuts in their husks. The examples of the innumerable things made from this most valuable of all palm are next: The coconut oil, with soap and candles made of it; sugar and vinegar made from the sap of the tree; walking sticks and ornamental articles from the wood, various toys and utensils, such as teapots, cups, and ladles from the shell of the nut, and samples of the kernels, now largely used in confectionery. Many articles made from the strong

fiber of the husk, such as mats and matting, ropes and rough cord, handbags and brushes. Various articles of dress made by the native races in these climes are shown.

Ever since this institution has been a national garden Kew has been engaged in the propagation of plants useful as food, in medicine, in manufacture, and in the arts and in their distribution to those British colonies and possessions in which they are most likely to succeed. This works for the good of the Empire in two ways. In the first place, it opens up new industries in the colonies, giving employment to capital and creating a demand for labor; and, secondly, by increasing the supply of the various products it brings them within the means of a much larger proportion of the home population than could otherwise obtain them.

Quinine from Peru and the hill countries of India to Ceylon and other colonies. Rubber was introduced from the forests of Brazil to Ceylon and subsequently to the other eastern possessions of Britain. Bananas have been distributed to the colonies. Natal tea plants were obtained through Kew. Cocoa was introduced from South America to Ceylon.

KEW TO-DAY.

Organization of Kew staff.—The organization of Kew may be described in a few words. At the head of the establishment, but subject in matters of administration to the board of agriculture and fisheries, is the director. In him is vested the supreme control of the gardens, museums, herbarium, and police. His principal officers are an assistant director and three chiefs of departments—the keeper of the herbarium, the curator of the gardens, and the keeper of the museums. His office is the center of the establishment. Here he meets every morning the heads of departments, discusses with them work and correspondence, collates information from the respective branches, and distributes to those concerned with such work, inquiries, etc., as have accumulated since the previous day. His office may be described as the clearing house of Kew. The keeper of the herbarium is assisted by two principal assistants and seven assistants. The curator has one assistant curator and an office assistant. Besides being the center controlling purely garden matters, his office is the place where accounts are kept and financial business conducted. The immediate control of the garden work is vested in five foremen, who have for sectional charges subforemen and gangers. The keeper for the museums, who has one assistant, is concerned chiefly with economic questions; and the keeper of the laboratory with physiological ones. The total regular staff of Kew is as follows: Director's office, 4; herbarium and library, 16; museums and laboratory, 10; gardens, 140; constables and police, 25.

As a public garden.—To nine-tenths of the people who visit Kew the institution is not the headquarters of botany in the British Empire, nor the site on which a greater variety of plants is to be seen than anywhere else on the globe, nor a great center and training school in horticulture; it is simply a beautiful garden—a place in which to spend a few pleasant hours. And whilst this is the most popular aspect of Kew we can not say that it is the least important one. In 1907 nearly 3,000,000 visitors entered its gates—a fact more

eloquent, perhaps, of its value to the community than any other that could be adduced. Kew has one peculiar charm which appeals to and draws all classes alike. Without regarding it as the home of the richest plant collections in the world, and looking upon it as a public garden merely, it has an air of detachment from the great city whose tentacles are rapidly encircling it, that no public garden or park so near Charing Cross possesses in like degree. In no other such place can one rid one's self so readily of the feeling that London is all around one. Kew has always tried to preserve as much as possible the amenities of the private garden—that is to say, the least possible restraint on the freedom of visitors is exercised. For this reason the rich people who ride down from town in motor cars or carriages can, on any but the crowded days, wander over its lawns and examine its treasures without losing entirely that sense of restfulness and freedom which they prize in their own domains.

Types of visitors.—For this reason, too, it appeals with peculiar force to those whose lot is cast in shop or office or factory. No one feels the delight of Kew more than the tired worker with scanty leisure, who finds himself free for a summer afternoon, and comes here with wife and child. Botany in itself interests him probably not more than Greek, yet he admires the trees and lawns, the flower groups and beds please him, the strange and unfamiliar types of flower and leaf in the glasshouse arrest his attention. Still, the time of enjoyment comes when, having wandered off to some shady spot, he stretches himself on the soft turf, and for an hour or two does nothing more arduous than watch the smoke from his pipe, whilst his spouse, in an attitude of less abandon, keeps an eye on the youngsters. Even then it would not be right to assume that he and those who have given still less notice to individual plant and flower are indifferent to the peculiar charm of Kew. They may not express it in so many words, but they breathe the free air with a keener relish and their mood is happier because they have surrounding them smooth, well-kept lawns, beds of rare flowers, an unrivaled variety of vegetable forms—in a word, that combination of beauty and order which gardening implies.

Professional visitors.—Both amateur and professional gardeners visit Kew in large numbers with a view to gaining a knowledge of the most suitable plants for their own gardens, to find out the names of those they already possess, and to become acquainted with the latest additions to cultivated plants. Every effort is made to acquire for Kew the best and newest things, whether they be introductions from foreign countries or the fruit of the plant-raiser's skill at home. It is not always possible, under the many disadvantages that an unsuitable environment entails, to bring plants at Kew to the same perfection that is attained in gardens where the general conditions are specially suited for one class of plants, and where all the thought, skill, and money are devoted to it alone. At Kew the cultivation of plants most ill adapted to the climate and conditions has to be carried on. Therefore orchids may be healthier in gardens where the winter days are less gloomy and foggy; Alpine plants finer where the alternate thawing and freezing in winter and spring do not occur; conifers better grown where the rainfall is greater and soot a less prominent ingredient of the atmosphere. But it is

generally admitted that the level of cultivation is high. On the whole, one is justified in saying that there is no one place in the world where ornamental gardening in all its phases can be so thoroughly, conveniently, and usefully studied as at Kew.

Botanical students.—A certain class of visitor always characteristic of Kew from its early days has in recent years become much more abundant. This is the young man or woman going from plant to plant with a book of botany or plant lore in hand, and trying to get to the bottom of the mystery of leaf and flower arrangement, or to fix the plant's identity in mind. Some of these visitors come alone, some in classes; some are teachers in elementary schools; many probably are their pupils; but whoever they may be, their increasing numbers is very gratifying. It is largely due, no doubt, to the encouragement of nature study by educational authorities and to the many associations which have this object in view.

Artists.—The pictorial or landscape aspect of Kew attracts a large and increasing body of painters, photographers, and picture makers of all kinds. It is now a usual thing for artists to spend the whole of the spring and summer months working here alone. That Kew is worthy of this homage is, I think, proved by the work of the well-known and talented artist whose pictures illustrate this volume.

A training school.—Kew has many functions, but none is more far-reaching in its effect than the training of young men for the various careers open to those whose special knowledge is of plant life in one or other of its phases. At the present time Kew employs more than a hundred botanists and skilled gardeners. The former are mostly permanent employees, but the great majority of the latter stay for a short time only—usually about two years. They enter Kew after having had at least four years' experience in other gardens. Their object usually is to acquire such knowledge as will fit them for posts in the botanic gardens or commercial plantations in the colonies and India, as managers and superintendents of public parks and private gardens in Great Britain, as county council lecturers, and for positions in the various trades connected with horticulture.

Its alumni.—Since Kew became a public institution many hundreds of such men have passed through it. Most of them are, of course, natives of Great Britain, but a certain number of places are reserved for foreigners. Those are eagerly sought after by men of nearly all civilized nationalities, but more especially, perhaps, by the Teutonic and Scandinavian races. The Kew staff, however, besides Europeans and Americans, has at times included Japanese and Negroes. At the present time over 700 of its alumni are scattered over the world, spreading its teaching and providing the efficacy of its methods. Kew, in relation to the personnel of horticulture, holds, as has frequently been pointed out, a position analogous to that of the university in the ordinary field of education. It not only supplies material and unrivaled opportunities for the study of advanced horticulture and botany: it brings together at a receptive and impressionable age a considerable body of men. By bringing into force that stimulating element of competition and emulation which is the salt of young man's life it helps to mould his character as no previous part of his professional career can have done.

Besides the experience and teaching that employment among the plant collections give, a fine horticultural library is provided, and several courses of lectures on botany and allied subjects are given annually. A debating society and a field club are admirable and important institutions, bringing into the curriculum a social element that is very valuable. The mere contact with a large number of men engaged in similar pursuits, which a term at Kew involves, has many advantages, especially to one who may have in the future the management of labor.

Kew Guild.—Not unnaturally the general desire of men of all ranks who had passed through Kew to keep in touch with each other and the parent establishment led to the foundation of the Kew Guild. This association issues a journal which constitutes a connecting link between all its members. This journal records changes and events at Kew, publishes news from members at home and abroad, and gives the names and addresses of all its members. As an example of the cosmopolitan character of its membership, the following figures are interesting: Asia, 46; Africa, 34; America, 60; Australasia, 18; and Europe 63, exclusive of those in the British Isles. In the industrial development of British colonies and possessions the Kew man has always been among the earliest workers. As soon as the pax Britannica has been established, and often before, he appears. He founds botanic stations where useful plants are grown for distribution and he gives demonstrations of the best methods of cultivating them. He fostered the tea industry in India and Ceylon; he also started the cultivation of cinchona there; he has helped largely in the regeneration of the West Indian Islands; and at the present time Africa is dotted over with the stations he is managing, each one a nucleus of what will probably develop into the most important industries of the Continent. Often he suffers the fate common to pioneers—he sows that others may reap. Many a Kew man has laid down his life in the conscientious performance of his duty—as genuine a sacrifice to the cause of empire and of humanity as any soldier or missionary has ever made.

MISCELLANEOUS INFORMATION, 1913.

List of staffs of the Royal Botanic Gardens, Kew, and of botanical departments, establishments, and officers at home, and in India, and the colonies in correspondence with Kew.

Royal Botanic Gardens, Kew: Director, assistant director, two second-class assistants, keeper of herbarium and library, three first-class assistants, six second-class assistants, assistant for tropical Africa, assistant for India, assistant keeper, Jodrell laboratory, keeper of museums, two second-class assistants, preparer, curator of the gardens, assistant curator; foreman for each of the following: Herbaceous department, arboretum, greenhouse and ornamental department, tropical department, temperate house; storekeeper and official guide.

Aberdeen University Botanic Garden: Professor.

Cambridge University Botanical Department: Professor; curator, university herbarium; curator, university museum; curator of garden.

Dublin, Royal Botanic Gardens, Glasnevin: Keeper and assistant.
Trinity College Botanic Gardens: Professor.
Edinburgh, Royal Botanic Garden: Regius keeper, assistant to regius keeper, assistant (museum), assistant (herbarium), head gardener, assistant gardener.
Glasgow Botanic Gardens: University professor.
Oxford University Botanic Garden: Professor and curator.
Africa, British East Africa Protectorate, Nairobi: Director of agriculture, mycologist, chief of economic plant division, conservator of forests.
Cape Colony, Cape Town Botanic Garden: Director and professor of botany, South African College; curator; curator, Bolus herbarium; conservator of forests; superintendent gardens and public parks.
Grahamstown, Albany Museum: Superintendent of herbarium; curator, gardens and public parks.
Port Elizabeth: Superintendent.
King Williamstown: Curator.
Graaff-Reinet: Curator.
Uitenhage: Curator.
Egypt, Cairo, Department of Agriculture: Director general, botanist, mycologist, assistant botanist, director of horticulture, assistant director.
Gold Coast, Agricultural Department: Director of agriculture, traveling instructor, senior curator, five curators, conservator of forests.
Natal, Durban: Director, Natal herbarium; curator, municipal gardens.
Northern Nigeria, agricultural and forestry department: Director of agriculture, four assistant superintendents, assistant conservator of forests.
Nyasaland Protectorate, Zomba, agricultural and forestry department: Director of agriculture, agriculturist, assistant agriculturist, chief forest officer.
Orange River Colony, Department of Agriculture: Botanist, chief of forestry division.
Rhodesia, Bulawayo Rhodes Matopos Park: Curator.
Salisbury, Department of Agriculture: Director, agriculturist and botanist.
Sierra Leone, Agricultural Department: Director of agriculture, two assistant directors, conservator of forests.
Soudan, Khartoum: Director of woods and forests, superintendent of palace gardens.
Jebelin: Superintendent of experimental plantations.
Southern Nigeria, Agricultural Department: Director of agriculture, assistant director, mycologist, superintendent of agriculture, four assistant superintendents, curator, conservator of forests.
Transvaal, Pretoria, Department of Agriculture: Botanist, mycologist, conservator of forests.
Transvaal museum: Superintendent of herbarium.
Uganda, Kampala, Agricultural Department: Director of agriculture, botanist, six district agricultural officers.
Entebbe: Chief forestry officer of botanical, forestry, and scientific department, three assistant forestry officers.

Zanzibar: Director of agriculture.

Australia, New South Wales, Sydney Botanic Garden: Director and Government botanist; superintendent; botanical assistant; university professor of botany; technological museum, curator; director of forests.

Queensland, Brisbane: Colonial botanist, director botanic gardens, secretary and manager, overseer Acclimatization Society's gardens, director forest department.

Cairns: Instructor in tropical agriculture, manager Kamerunga State Nursery.

South Australia, Adelaide: University professor of botany; botanic gardens, director.

Port Darwin: Curator, conservator woods and forests.

Tasmania, Hobart: Government botanist, chief officer of forests, officer in charge botanic gardens.

Victoria, Melbourne Botanic Gardens: Curator, national herbarium; Government botanist and university professor of botany; conservator of forests.

Bermuda, Agricultural Department: Director.

Canada, Ottawa: Director of Government experimental farms, Dominion horticulturist and curator of botanic garden, Dominion botanist, two assistant botanists.

Ceylon, Peradeniya, Department of Agriculture: Agricultural director; botanist and mycologist; assistant botanist and mycologist; superintendent of experiments; superintendent of horticulture; curator of Royal Botanic Gardens, Peradeniya; curator, Hakgala Gardens; conservator of forests.

Cyrus: Principal forest officer, inspector of agriculture, assistant director.

Falkland Islands: Government House garden, head gardener.

Fiji: Superintendent of agriculture, curator botanic station.

Hongkong, Botanic and Forestry Department: Superintendent, assistant superintendent.

Malta: Inspector of agriculture, superintendent of public gardens.

Mauritius, Pamplemousses, Department of Agriculture: Director, first assistant director department of forests and botanic gardens, second assistant director.

Reduit: Overseer, forest officer.

New Zealand, Wellington, Department of Agriculture: Biologist, chief forester State forest department; head gardener Colonial Botanic Garden.

Dunedin: Superintendent.

Napier: Superintendent.

Invercargill: Head gardener.

Auckland: Ranger.

Christchurch: Head gardener.

Seychelles: Curator botanic station.

Straits Settlements, Singapore, botanic gardens: Director, two assistant superintendents.

Federated Malay States, Forest Department: Conservator.

Kuala Lampur, Agricultural Department: Director of agriculture, chief agricultural inspector, agriculturist, mycologist, two assistant

mycologists, economic botanist, assistant superintendent Government plantations.

Perak (Taiping), Government gardens and plantations: Superintendent.

Selangor and Negri Sembilan: Assistant superintendent.

West Indies, Barbados, Imperial Department of Agriculture: Commissioner, scientific assistant, mycologist and agricultural lecturer.

Antigua, botanic station: Government chemist and superintendent of agriculture, Leeward Islands; second assistant agricultural curator, botanic station.

Barbados, department of agriculture: Superintendent, assistant superintendent.

Dominica Botanic Station: Curator, assistant curator.

Grenada Botanic Garden: Agricultural superintendent, agricultural instructor.

Montserrat Botanic Station: Curator.

St. Kitts-Nevis Botanic Station: Agricultural superintendent, agricultural instructor, Nevis.

St. Lucia Botanic Station: Agricultural superintendent, assistant superintendent.

St. Vincent Botanic Station: Agricultural superintendent, assistant agricultural superintendent.

Virgin Islands Botanic Station: Curator.

Bahamas Botanic Station: Curator.

British Guiana, Georgetown, Department of Science and Agriculture: Director, assistant director and Government botanist, forestry officer, head gardener, assistant gardener, agricultural superintendent.

British Honduras Botanic Station: Curator.

Jamaica, Department of Agriculture: Director, two traveling instructors, superintendent public gardens and plantations, superintendent of King's house gardens, superintendent of the experiment station.

Tobago Botanic Station: Curator.

Trinidad, Department of Agriculture: Director, assistant director, Government botanist, curator Royal Botanic Gardens, mycologist, forest officer.

India, Botanical Survey of India: Director, economic botanist, two assistants for phanerogamic botany.

BOTANICAL OFFICERS ATTACHED TO DEPARTMENTS OF AGRICULTURE.

Imperial Agricultural Research Institute, Pusa, Bengal: Mycologist, economic botanist, supernumerary botanist.

Bengal Agricultural Department, Calcutta: Economic botanist.

Bombay Agricultural Department, Poona: Economic botanist.

Central Provinces Agricultural Department, Nagpur: Economic botanist.

Madras Agricultural Department: Government sugar-cane expert, agricultural college, Coimbatore; lecturing botanist: mycologist.

Punjab Agricultural Department, Lyallpur: Economic botanist.

United Provinces Agricultural Department, Cawnpur: Economic botanist.

Eastern Bengal and Assam, Agricultural Department: Economic botanist.
Bengal, Calcutta, Royal Botanic Garden, Sibpur: Superintendent, curator of herbarium; curator of garden, overseer, three probationers, assistant curator, overseer gardens in Calcutta; Agri-Horticultural Society of India, secretary, assistant secretary, and superintendent.
Darjeeling, Lloyd Botanic Garden: Superintendent, curator.
Cinchona department: Superintendent of Cinchona cultivation.
Mungpoo plantation: Manager, two overseers.
Mungsong plantation: Manager, assistant manager, overseer.
Bombay, Bombay City, municipal garden: Superintendent.
Ghorpuri Botanic Garden: Superintendent.
Poona, Government gardens: Superintendent.
Central Provinces, Nagpur, public gardens: Superintendent.
Madras, Madras City, Agri-Horticultural Society: Honorable secretary, superintendent.
Ootacamund, Government gardens and parks: Curator.
Cinchona department: Director of Cinchona plantations, superintendent Dodabetta plantation, superintendent Nedivattam and Hooker plantations.
Punjab, Delhi, Government Horticultural Department: Officer in charge, superintendent historic and other gardens.
Lahore Government gardens: Superintendent; superintendent agri-horticultural gardens.
Simla: Superintendent.
Northwest Frontier Province: Agri-horticulturist.
United Provinces of Agra and Oudh, Agra, Taj, and other gardens: Superintendent.
Allahabad, Government gardens: Superintendent.
Cawnpur, memorial and other gardens: Superintendent.
Kumaon, Government gardens: Superintendent.
Lucknow, horticultural gardens: Superintendent, probationer.
Saharanpur, Government botanic gardens: Superintendent.
Dehra Dun, Imperial Forest Research Institute: Imperial forest botanist.
Eastern Bengal and Assam, Dacca (Ramna): Arboricultural expert.
Native States, Mysore (Bangalore): Economic botanist.
Baroda: Superintendent.
Travancore (Trivandrum): Director.
Udaipur: Superintendent.

23. The Royal Botanic Garden of Dublin, Ireland.

[Extract from article by Prof. N. L. Britton, in Science, Vol. 4, No. 88, 1896.]

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 in-

cludes 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.

24. The Royal Botanic Garden, Edinburgh, Scotland.

[Extracts from Royal Botanic Garden, Edinburgh, Vols. I to IV, 1903–1908.]

58 acres in area; established in 1670. Is one of the three gardens maintained by the state in the United Kingdom, the others being the Royal Gardens at Kew in England, and the Glasnevin Garden at Dublin in Ireland. It occupies an unequally-sided quadrilated area of 58 acres (bounded upon all sides by public roads and dwelling houses) on the north side of Edinburgh—about a mile from the shore of the Firth of Forth. Its highest point, at Inverleith House (R.)—the official residence of the regius keeper of the garden—toward the northwest, is 109 feet above sea level, and thence the ground falls away on all sides. The lowest point—a depression 48 feet above sea level, with an east and west trend through the middle of the garden—is the site of an old bog, and the ground rises again to the south of the depression. The surface soil is generally alluvial sand resting on clay at considerable depth. In the lower part of the area the clay comes to the surface.

There are two entrances—one upon the east side from Inverleith Row into the garden, the other upon the west side from Arboretum Road into the arboretum. The garden is open daily from 8 a. m. on week days and from 11 a. m. on Sundays until sunset. The plant houses are open from 1 p. m. until 5.30 p. m., or until sunset if this be earlier. The museum is open on week days from 10 a. m. until 6 p. m., on Sundays from 1 p. m. until 5.30 p. m. The herbarium and the library are open on week days from 10 a. m. until 6 p. m., excepting on Saturday, when they are open until 1 p. m.

This garden is the outcome of the existence of three gardens; the Royal Garden, established in 1670 at Holyrood House, the Town's Botanic Garden, established in 1676 at Trinity Hospital, and the College Garden, established in 1702, adjacent to the college buildings.

In 1724 the College Garden was turned to other uses, and in 1763 the other two were moved to a site which proved temporary, and in 1820 they were moved to their present site.

The plan shows the garden as it was in 1900: it is in process of reconstruction.

The garden has been devoted to the teaching of botany.

There are within its borders the following: A herbaceous garden, rock garden, arboretum, plant houses (see plan), office of garden, museum, laboratories, lecture hall, herbarium, library, and ladies' cloak room.

In 1907 there were 674,208 visitors to the garden—the largest number on a Sunday was 25,601, the smallest 708; the largest number on a week day was 3,365, the smallest 40.

25. The Glasgow Botanic Gardens.

[Extracts from The Glasgow Botanic Gardens, Its Conservatories, Greenhouses, etc., by Christopher Sherry.]

40 acres in area.

In 1891 these gardens were made the property of the corporation of Glasgow.

The gardens are devoted to the culture of plants and illustrative botany. They furnish plants for the regular lectures given by the University of Glasgow, St. Mungo's College, and the Technical College. Flowers and plants are supplied to the students of the Glasgow School of Art.

The gardens are open to the public during the months of December, January, and February from sunrise to sunset, and during the other months from 6 a. m. to sunset. The winter garden is open to the public from 10 a. m. (except on Sundays, when they are opened at 12 o'clock noon) till half an hour before sunset; but they are never open later than 6 p. m.

The azalea house is 38 feet long, 28 feet wide, and 21 feet high; the cool orchid house is 35 feet long, 20 feet wide, and 12 feet high: the intermediate fern house is 31 feet wide, 35 feet long, and 16 feet high: the greenhouse is 45 feet long, 23 feet wide, and 14 feet high; the succulent house is 45 feet long, 29 feet wide, and 18 feet high; the pal house is 81 feet long, 51 feet wide, and 42 feet high; the economic house is 45 feet long, 29 feet wide, and 18 feet high; the tropical-fern house is 45 feet long, 23 feet wide, and 14 feet high; the stove is 38 feet long, 28 feet wide, and 21 feet high; the aroid and tropical orchid house is 35 feet long, 20 feet wide, and 12 feet high; the waterlily house is 31 feet wide, 35 feet long, and 15 feet high. The plants and trees are arranged according to their natural order. There are 55 species of birds that frequent the garden at the present time.

26. The Botanical Gardens of Guatemala.

[Extract from Boletin, Noviembre de 1910.]

They are located in Guatemala City, are generally known as the experimental gardens, and are under the direction of the bureau of agriculture. The gardens are divided into sections, one section devoted to specific groupings of plants—ornamental, industrial, forage plants, orchids, and flowers, and medicinal plants.

27. Agri-Horticultural Garddns at Lahore.

[Extracts from A Traveler's Notes, James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

169 acres in area.

They are maintained by the Government.

More of a large nursery where plants, seeds, etc., are sold and experiments carried on.

There are two halls in the center of the garden—the Montgomery and the Lawrence—now used for dances and as libraries.

The main roads leading from several gates converge toward these halls.

One of the chief features in this garden is a large plantation of numerous varieties of limes, pomeloes, and in particular oranges.

28. Wingfield Park and the Horticultural Gardens at Lucknow.

[Extracts from A Traveler's Notes, James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

40 acres in area.

The horticultural gardens are extremely well kept, only a few hundred yards from the road leading to the famous Residency and one of the principal thoroughfares in the European quarter. There are no gates, the entrance being marked by two white stone curbings.

The roads are 20 feet wide, hard, clean, and in perfect condition, and are covered with a peculiar red sand, which seems to bind well.

There are no fences around the park. It is surrounded by roads.

The horticultural gardens are principally used for food and vegetables.

29. Empress and Bund Gardens, Poona, India.

[Extracts from Empress and Bund Gardens Report, 1905–1915.]

The Bund Gardens are a favorite resort of the public. Every effort is made to keep them attractive and clean. The two gardens are run under the same management.

The Empress Gardens are open for the instruction of such Malees as offer themselves. Although notices were put in the newspapers to this effect, none took advantage of the offer.

Local students of botany are always given facilities for their studies as far as possible.

It should be noted that while the flowers in the empress Gardens suffer from lack of water those in the Bund Gardens are thriving, due to the moisture-laden air that blows over the gardens.

30. Victoria Gardens, Bombay, India.

[Extracts from A Traveler's Notes, James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

The gardens and the museum attached are situated some distance from the European quarter.

The plants in the gardens not indigenous to India are mostly South American.

31. The Botanical Garden at Calcutta.

[Extracts from A Traveler's Notes, James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

272 acres in area.

These gardens are located at the village of Seebpore, about an hour's drive out of the city of Calcutta, and possess numerous fine avenues of trees, being 60 to 70 feet high.

There is a remarkable growth of bamboos in great variety, palms such as are rarely seen elsewhere, and fine mahogany trees.

There is a Banyan 106 years old, the main stem of which is 16 feet in diameter, and a splendid avenue of the Toddy palm.

The garden has a frontage of 1 mile in length along the bank of one of the world's finest watercourses, the great Hougli River, and is to gardens what the Taj Mahal is to buildings.

In this garden are many very fine lakes, the arms of which are spanned by bridges.

There is a nursery of all kinds of plants, with several glass houses for use in the cold seasons. These glass houses need not to be heated in this climate.

32. The Public Garden of Jeypore.

[Extracts from A Traveler's Notes, James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

70 acres in area.

The public garden at Jeypore is considered one of the finest in India, and by many the finest. Most of it is under grass in first-rate condition, or under shrubberies with beds in front. The roads are for the most part 30 feet wide.

There is a menagerie in the garden, also a museum, the building being considered one of the finest outside of Europe.

The ground is cleverly and not too abruptly undulated; its fernery, or greenhouse of reeds, is the largest and best in the East.

33. The Garden at Saharunpur.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

200 acres in area.

This garden is maintained for trials of new economic palts and for the distribution of vegetable and other seeds, and the like.

It has an annual subsidy of 20,000 rupees, but it returns 16,000 rupees to the treasury, and therefore it is not a heavy expense to the Government.

It is not kept up for the people's pleasure, because the town is not an important place, and there are but few British at the station.

There are no beds in the garden, the entire space being laid out with winding roads, trees, isolated or in clumps, and here and there a small pond.

There are two or three fine avenues of trees (Casuarinas) about 60 feet high, a good-sized house covered with grass, and a museum of especial interest. There is but little shrubbery.

Sixty acres are set aside for seeds and experiments with new cottons, sugar canes, and other economic plants.

The vegetable garden, upward of 60 acres in extent, is at one end of the grounds. They are kept chiefly for seed purposes to supply soldiers and other residents.

34. Botanic Garden at Tokio.

[From notes furnished by Mr. W. T. Swingle.]

40 acres in area; established in 1683.

This garden did not attain importance until shortly after the restoration in 1868. It has played an important part in the improvement of agricultural and horticultural work in Japan proper, and in

Japanese possessions such as Yuchu Islands, Formosa, and Korea. The largest herbarium in Japan is located in the botanic garden, and in addition a very well kept and beautifully arranged planting of trees, shrubs, and flowers is maintained in the Koishikawa Park. The best botanical library in Japan is to be found here, and the Botanical Society of Japan holds its meetings here. The botanical department of the University of Tokio, the largest university in Japan, is located in the garden. The garden is in the northwestern suburbs of Tokio, about 2 miles from the university and about 4 miles from the center of the city. Its 40 acres extend from the bottom to the top of a low range of hills. The most striking portion of the garden is the landscape garden in pure Japanese style; this feature occupied about one-fifth of the area and is situated on the side of a low hill, with an exceedingly picturesque lake at the bottom.

There is a tea house used by the Japanese in the garden.

35. Botanic Gardens at Buitenzorg.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

The garden consists of three establishments: The argicultural garden, about 2½ miles out of Buitenzorg, is 200 acres in area; the scientific garden at Buitenzorg is 90 acres in area and 900 feet above sea level; and the mountain garden, which contains 50 acres.

The scientific garden is laid out in plots on undulating ground on the banks of a small river. The garden has existed about 75 years, and was arranged in this manner about 50 years ago. The house of the governor general of Java is in the garden.

This garden contains some very fine, very old trees. Some of the palms being nearly 60 feet high. It is said that next to Kew, Buitenzorg has a greater number of palm species than any other botanical garden in the world. The herbarium of tropical plants is most complete.

The library contains many fine works, and receives the scientific journals of every society of note in Europe.

This garden is notable for the thoroughness of its system.

The agricultural gardens contain all kinds of economic plants. What is done in this garden is done so thoroughly as to demand the admiration of all who visit it.

There is an extensive well-filled laboratory.

To the ordinary visitor this argicultural garden proves more interesting than that at Buitenzorg, as this one is practical, and the other purely scientific.

The mountain garden is devoted to natural flora of the region, and is very rich in specimens. Especially rich in those of tree ferns growing from an elevation of about 1,500 feet from the base to about 1,000 feet from the summit.

36. The Botanical Garden of Lima, Peru.

[Extracts from Wright's Peru.]

30 acres in area.

The botanical garden of Lima, known as the Exposition Park, named in commemoration of the general exposition of 1870, which took place in these grounds. It is laid out in shaded walks, artificial

lakes, grottoes, gardens, and conservatories, in which all kinds of tropical and subtropical plants and flowers are to be seen, including choice Peruvian orchids. A circle of palm trees incloses a pretty kiosk, and several artistically placed buildings ornament the grounds.

37. The Botanical and Zoological Gardens of the Government of Paraguay.

[From Bulletin, July, 1916.]

These gardens are located on the Paraguay River, in the immediate vicinity of Asuncion, at Trinidad. They have, within recent years, been greatly enlarged and improved by buildings and equipment. An agricultural school is maintained, and the entire work is under the direction of Dr. Fiebrig.

38. The South African National Botanic Garden.

[Extracts from Nature, vol. 91, Aug. 14, 1913, p. 611.]

400 acres in area; established in 1912.

A farm on the Rhodes estates, to the south of Groote Schur, on the eastern slopes of Table Mountain. It adjoins the country seat of Van Riebeek, the first Dutch governor (1652–1662).

The eastern half consists of flat or slightly undulating land, about 200 feet above sea level. The western half rises to about 1,000 or 1,500 feet, including the lower ends of three richly wooded gorges. The lower-lying parts have been heavily planted with pines, oaks, and poplars.

The underlying rock, except perhaps in the most elevated parts of the estate, is granite. The slopes, however, are for the most part strewn with blocks of sandstone from the mountain above.

Many acres are overlain with the rich deposit of humus derived mainly from the oaks and poplars.

There is a good water supply from two streams in the adjacent gorges.

In selecting this site the well-known Cape southeastern wind was taken into account. The tract already bears several hundreds of species of plants more or less representative of the Cape region itself.

The control of the garden is vested in a board of five trustees, three of whom were elected by the Government. Two further nominations are made; one by the corporation of Cape Town, and another by the Botanical Society of South Africa.

The trustees make the following appointments: A director and a secretary. In addition there is the usual gardening staff.

39. The Imperial Botanical Garden, Petrograd, Russia.

[Extract from an article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

The Imperial Botanical Garden at Petrograd 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 published Acta, and many researches prosecuted there are printed in the Bulletin and Memoirs of the Imperial Academy.

40. Botanic Garden at Singapore.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

66 acres in area.

These gardens are situated about 3 miles out of the town and are very well kept. They are entirely surrounded by a public road, and contain a very fine lake with an island in it.

The herbarium contains a large collection of Malay plants. The aviary and the menagerie contain many interesting specimens.

In the experimental and economic gardens are many kinds of plants yielding dyes, oils, spices, resins, fibers, as well as many medicinal plants, etc., carefully labeled and arranged as to their particular economic value. There is also a fine collection of oaks.

41. Public Gardens at Penang, India.

[Extracts from A Traveler's Notes, by James H. Veitch; published by James Veitch & Sons, Royal Exotic Nursery, Chelsea, 1896.]

55 acres in area.

These gardens are located about 4½ miles from Georgetown. They are of horseshoe shape, quite surrounded by a range of hills about 5,000 feet elevation. All the ground is undulated.

The work on these gardens was practically begun in 1890. The whole park is under grass, coarse but good. There is a small collection of economic plants in the garden which is to be increased, as it is considered a useful feature to the planters in the island.

The office building shelters a rich herbarium of the Penang flora. The houses in this garden are roofed with palm stems.

42. The Botanical Garden of Geneva, Switzerland.

[Extract from an article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

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.

43. The Brooklyn Botanic Garden, Brooklyn, N. Y.

48 acres in area.

The Brooklyn (N. Y.) Botanic Garden was established in 1897. It is under the general jurisdiction of the board or committee of public parks of New York City, but under the direct management of the Brooklyn Institute of Arts and Sciences. This latter body raised prior to 1909 $50,000 as an endowment, the interest on which is to be used for the purchase of plants, flowers, shrubs, and trees for the garden.

The institute follows plans prepared by the city. The grounds are to be maintained, the buildings heated and lighted, salaries paid, equipment bought, etc., by the city. It is free to the public at all times. The institute has a director, a curator of plants, a curator of public instruction, an honorary curator of economic plants, a consulting landscape architect, a head gardener, and a foreman.

The total cost is to be approximately $300,000.

Instruction is given as follows:

1. *Garden practice.*—A course in outdoor work, open only to those pupils who are recommended by their teachers for excellence in nature study in their schools. The work includes the raising of common vegetables, flowers, and fiber plants.

2. *Nature study.*—Spring course: The structures and germination of seeds; the parts of a plant and their uses; relation of the plant to soil, air, water, and light. The course consists of actual study of the plants themselves, with experiments and greenhouse work done by the children; no bookwork, no home work, no examinations. Open to children from 8 to 12 years of age. Fall course: A similar course will be given in the fall.

3. *Back-yard gardens.*—Assistance in planning and planting home gardens. Open to children whose names are sent in by their principals, teachers, or parents.

HOUSEHOLD BOTANY AND HORTICULTURE.

4. *Kitchen gardening.*—A short course designed for those women who desire to work in their own small gardens, and, for those interested in domestic science. Garden plans, preparation of seed beds, tools, varieties of seed, seed sowing, and cultivation.

5. *The small flower garden.*—Plans, color schemes, preparation of garden beds, planting, transplanting, cultivation, the wild-flower garden.

6. *Indoor plant culture.*—A course for those who enjoy raising plants in their homes. Bulbs, house plants, window-gardening methods of propagating plants in the house.

7. *Landscape design.*—Three illustrated lectures on the principles of landscape design for small areas; supplemented by three field excursions.

8. *Bacteria and other micro-organisms in the home.*—Eight periods devoted to lectures, laboratory work, and conferences on the occurrence of bacteria, yeasts, molds, and other micro-organisms in the home, in water, sewage, etc.

Note: Courses 4 to 8, inclusive, are open free to members of the Brooklyn Institute of Arts and Sciences on presentation of membership certificates; to all others there is a nominal charge of 50 cents for each course to cover incidental expenses.

9. *The garden week by week.*—Fall course: Lessons on the preparation for winter, outdoor planting of bulbs, winter cover crops, taking up and storing of plants. Spring course: Practical work, taking up garden operations, and those things which should be done each week in preparation for the outdoor season. Greenhouse and outdoor practice, with a few explanatory lectures.

SHORT COURSE IN POPULAR BOTANY.

10. *Local flora.*—The elements of systematic botany, primarily for the purpose of getting acquainted with the native wild flowers. Field collecting, the making of herbarium (for those who wish), lectures, and conferences. Especially valuable for teachers of nature study.

COURSE FOR TEACHERS OF SCHOOL GARDENING.

There is an increasing demand for persons adequately prepared to become teachers or supervisors of children's gardens, but opportunities to secure the necessary preparation are not numerous. As in other cases where special problems are to be met and solved, an interest in children, a mere liking for the work, or even native teaching ability, while highly essential, are not of themselves to insure success.

The following nine courses (11–19) are planned to acquaint the prospective teacher with some of the main problems to be met with in this work and such effective solutions of them as have been worked out in practice. The nine courses are considered as a unit, and are not offered separately. Wherever possible it is urged that the entire course be completed within two school years. Special importance is attached to No. 19.

11. *Elementary botany.*—A survey of general physiological and morphological principles, illustrated by a few of the more important types of plants. Eight lectures and demonstrations in laboratory and greenhouses.

12. *Nature study—Nature in relation to gardens and plant life.*—Topics: Plant structure; fruit and fruit formation; weeds; weeds dispersal; insect pests; birds in their relation to agriculture; garden friends, shrubs; shade and lawn trees. Credit will be given for this course in nature study on presentation of a satisfactory certificate of similar work done at any other accredited institution.

13. *Soils and agricultural principles.*—A study of soils; fertilizers, natural and chemical; relation of water and air to soil; liming soils; mixing of soils and tillage.

14. *Plant propagation and greenhouse work.*—Methods of plant propagation, care of plants, cuttings, raising of seedlings for the outdoor garden. Work related to children's gardens.

15. *Fungus and insect pests.*—Three lectures and demonstrations on the occurrence of and methods of combating the commoner fungus and insect pests of garden and greenhouse plants.

16. *Children's garden practice.*—Practice work with a class of children, including such topics as planting and making the garden, laying out the grounds, preparation of soil, seed sowing, transplanting, cropping, cultivation, school garden management, improvement of school grounds, preparation of exhibits.

17. *Fall garden work.*—Practical work with the outdoor bulb bed, harvesting of garden crops, indoor planting of bulbs, raising of plants indoors, the window box.

18. *Pedagogy of botany.*—A brief discussion of the mental processes involved in learning and teaching science, and the fundamental principles which underlie and point the way to laboratory and field work.

19. *Practical garden work.*—A summer's work with children in a garden under supervision. This work may be done at the Brooklyn Botanic Garden, or its equivalent in some children's garden the work of which is acceptable to the botanic garden.

ADVANCED COURSES.

20. *Mycology and plant pathology.*—Morphology and pathology of the fungi and bacteria. Life histories of fungi; methods of control of plant diseases, etc. Prerequisite, a satisfactory college course in general botany.

21. *Fresh-water microbiology.*—A course of lectures, recitations, and laboratory work on the various organisms found in drinking water. Odors, colors, etc., of drinking water; methods of microscopical and bacteriological examination.

22. *Cytology.*—A course of lectures and laboratory work on cell physiology and cell morphology. Methods of cytological technique and practice in accurate interpretation of cell phenomena.

23. *Experimental evolution.*—Detailed studies of the nature and causes of variation and heredity. Some of the subjects considered are historical résumé of the evolution theory, physical basis of inheritance of acquired characters, kinds and causes of variation, mendelism, biometry, principles and technique of plant breeding. This course is open to college students with a knowledge of the elements of physics, chemistry, geology, botany, and zoology. The work is primarily intended for students in pure science and for agricultural or horticultural students fitting themselves for various professional activities in these particular fields.

24. *Phytogeography.*—A course dealing with plant distribution over the earth. Prerequisites are courses in plant ecology, geology, and a good general knowledge of climatology and systematic botany.

DEPARTMENT OF GRADUATE STUDY AND RESEARCH.

25. *Seminar.*—A biweekly meeting of the garden staff and advanced students for the discussion of fundamental problems of botany or of general biology.

26. *Journal club.*—A biweekly meeting of the garden staff and advanced students for the review and discussion of current botanical literature. Open to others on invitation.

27. *Research in plant physiology.*—Independent investigation of problems of plant metabolism and irritability.

28. *Research in mycology and plant pathology.*—Independent investigation of problems in fungi and fungous diseases of plants.

29. *Reserach in plant genetics.*—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics.

COOPERATION WITH LOCAL SCHOOLS.

(*a*) *Talks at schools.*—The principals of any school, public or private, may arrange with the director to have lantern talks given at the schools on various topics related to nature study, such as garden

work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the botanic garden. Principals may address the director for appointments.

(*b*) *School classes at the garden.*—Schools not provided with lanterns may arrange for their classes, accompanied by their teacher, to come to the botanic garden for such talks as are mentioned above. At present not more than 70 children can be accommodated at any one time.

The garden equipment, including greenhouse, plant material, lecture room, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the garden. This must be arranged by appointment with the director, so that such work will not conflict with regular classes and lectures.

The principal of any secondary school in Brooklyn may arrange also for a series of 10 lessons on plant culture to be given during the fall to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher.

(*c*) *Consultations.*— Conferences may be arranged by teachers and principals for discussion of problems in connection with gardening and nature study. Monday and Saturday afternoons are usually available for this purpose. Appointments must be made in advance.

(*d*) *Study and loan material.*—On request, the garden will endeavor to provide living seedlings or plant parts for study, to the extent of our present limited facilities. Teachers may arrange to have various physiological experiments or demonstrations conducted at the garden. Petri dishes, ready for exposure, will also be loaned on request of teachers. Schools must arrange to call for study or loan material, and must return the loan material promptly in good condition.

DOCENTRY.

Classes, and other parties of several persons, wishing to view the plantations, under guidance, may arrange with the curator of public instruction for appointments with a docent to conduct them through the garden.

THE HERBARIUM.

The garden herbarium consists at present of about 40,000 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algas, and myxomycets. This collection may be consulted by those interested, and specimens submitted will be gladly identified.

THE LIBRARY.

The rapidly growing library of the garden occupies temporary quarters on the main floor of the laboratory building. This is not a circulating library, but is open for consultation without charge to all persons, from 9 a. m. until 5 p. m. Over 60 current periodicals devoted to botany and related subjects are regularly received.

LECTURES FOR CHILDREN.

Stories about useful plants.—Illustrated. For children of members of the Brooklyn Institute of Arts and Sciences. Admission only by ticket, which may be had on application to Miss Shaw.

April 18. Rope and how it is made. (Manila and sisal fibers.)
April 25. The story of bread. (Wheat.)
May 2. Beverage plants. (Cocoa and chocolate.)
May 9. A plant serving a useful purpose. (Rubber.)
May 16. The food of half a billion people. (Rice.)

Talks on gardens. (Illustrated.) Open to all children without charge. Tickets may be had on application to Miss Shaw.

April 20. How to make a garden.
April 27. The seed: how plants start. (Illustrated by experiments and pictures.)
May 4. Birds and their relations to gardens.
May 11. The garden's friends and foes.
May 18. The wild flowers now in bloom.

It is necessary to limit the number of tickets for these talks to children. This is due to the small size of the present lecture room.

These talks will be repeated for school classes if so desired, either at the garden or at the school. Another series of talks will be given during the fall and early winter. Further particulars will be announced later.

LECTURES FOR ADULTS.

Spring course.—Lectures on civic botany: Dangers to plants from the city's smoke and gas: conservation of forests; foreign fruits of our city markets; economic importance of plant breeding.

44. Botanic Garden of the University of Pennsylvania, Philadelphia.

[Extract from an article by Prof. N. L. Britton in Science, Volume IV, No. 88, 1896.]

The University of Pennsylvania has recently established a garden of about 3 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 botany, good library facilities, and a small herbarium afford capital opportunity for research, especially in physiology and morphology.

45. The Arnold Arboretum of Harvard University, Jamaica Plains, Mass.

[Extracts from A Guide to the Arnold Arboretum, by Charles Sargent, 1917, and from notes from Dr. W. T. Swingle.]

220 acres in area; established in 1872.

The Arnold Arboretum was started in 1872 as a tree museum for Harvard University. Its original size was 120 acres, but this has been increased to 220 acres of hill and valley.

This arboretum is doubtless the most noteworthy arboretum in the world, not only because of the size and character of its collections, but because of the fact that a splendid botanical library is located in

the arboretum. Books relating to trees have been most carefully indexed so that information can easily be obtained about any given species.

The collection of trees in the arboretum was arranged by groups of species which are called genera, and the genera, so far as it has been found practicable to do so, have been planted according to their botanical relationships into family groups. The plan will show the positions of these groups.

There is an administration building which contains the library and herbarium, the administrative offices and laboratories, and a collection of the woods of North American trees.

There is a small greenhouse used for garden propagating purposes.

From the Arnold Arboretum as a center, expeditions have been sent to all parts of the North Temperate Zone, and very full collections have been made of the trees and shrubs from these regions. For example, the work done in China has led to the publication of Plantæ Wilsonianæ, which is one of the latest and best works on the flora of China, and is accompanied by two magnificient atlases including over 1,000 large-size photographs. Similar exploration and similar photographs have been made in Japan, Korea, and Formosa.

In December, 1882, a contract was made between the university and the city of Boston, which was to last 1,000 years. The city was to construct and maintain, under the direction of its park commission, the drives and walks, which were planned by a landscape architect retained by the city, to police the grounds, and assume all taxes which might be levied. The university agreed to open the arboretum to the public from sunrise to sunset during every day in the year, reserving, however, entire control of all the collections and of the grounds with the exception of the drives and walks.

Upward of 50 species of birds have been breeding here during the last 20 years. Among them there are the song thrush, veery, rose-breasted grosbeak, thrasher, oriole, bluebird, wood pewee, indigo bird, redstart, warblers, ruffed grouse, quails, Mongolian pheasant, green heron, night heron, great blue heron, and several species of wild ducks (these last four are only occasional visitors), yellow-breasted chat, Brewster's warbler, Carolina wrens, mockingbird, tree sparrow, white-throated sparrow, myrtle warbler, butcherbird, pine grosbeaks, crossbills, redpolls, siskins, snow buntings, titlarks, water thrush, red-shouldered hawk, Cooper's hawk, sharp-shinned hawk, and the screech owl.

Prof. Sargent's "Sylva of North America" is a noteworthy publication from this institution. (See map.)

46. The Botanic Garden of Harvard University, Cambridge, Mass.

[Extract from article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

7 acres in area; founded in 1805.

There are about 7 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.

47. The Botanical Garden of the Michigan Agricultural College.

[Extract from article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

Several acres in area; founded in 1877.

The botanical garden of the Michigan Agricultural College was begun in 1877. There are now about 3 acres under high cultivation, exclusive of the arboretum and decorative grounds, which together cover several acres. There are several small greenhouses, a herbarium of about 60,000 specimens, a good botanical library, and extensive, well-equipped laboratories.

48. The Missouri Botanical Garden of St. Louis.

[From data furnished by the officials of the garden, and from notes from Mr. W. T. Swingle.]

125 acres in area.
Open to the public, 1860.
75 acres now open to the public (1916).

ORIGIN AND HISTORY.

Established by Henry Shaw, an Englishman residing in St. Louis. After its establishment he broadened his plans to meet greater future public needs.

This garden is, without doubt, the wealthiest botanic garden in the world.

The department of botany of the Washington University is located at the garden, and very important research work on many phases of botany is done in the garden under the best possible conditions. Special greenhouses have been made for pathological and physiological work, and a very good library on all phases of botany is available to the students.

There are probably more visitors to the St. Louis Botanic Garden than to any other garden in the world located in a city of the same size and special attention is given to the preparation of exhibits and education material that will both interest and instruct the visitors.

In the garden, so far as conditions permit, the plants are arranged instructively, labeled with common names and scientific names and geographic range. The planting in an attractive manner is never lost sight of.

The director of the garden is at the head of the school of botany.

Gardening instruction is provided for in a four-years' course. There are six scholarships.

Capable employees are engaged in research work.

EQUIPMENT.

The collection of living plants is large, 11,000 species (1916), 6,000 of which are under glass. There is a large collection of books. The herbarium contains over half a million specimens. It contains the herbaria of Barnhardi, Engelmann, Redfield, Reverchon, Eggert, and many other well-known collectors. Much material from Chapman's herbarium also.

The library contains more than 58,000 books and pamphlets. It contains a very large collection of publications dating from before the time of Linnæus.

PRODUCTIVITY.

The effectiveness of the garden in reaching the general public can hardly be measured except by the number of visitors to it and the questions they ask. They average over 100,000 a year.

In research work the 18 yearly volumes of the garden report show results commensurate with the opportunity.

FOUNDATION.

The Shaw bequest consists largely of real estate in the city of St. Louis. In 1911 it was appraised at about $3,000,000, but it is constantly increasing in value, and there is a steady increasing rental income. Up to 1917 this revenue averaged about $111,000 per year, and at that time only about 44 per cent of the gross income was available for the expenses of the garden. It amounted to $45,300 for that year, and it was spent as follows:

Gardening	$28,500	(63 per cent.)
Garden pupils	1,200	(2½ per cent.)
Herbarium	2,200	(5 per cent.)
Library	4,700	(10 per cent.)
Office	6,300	(14 per cent.)
Research	2,400	(5½ per cent.)

Having this very considerable endowment, the garden is able to plan its work for a long time ahead and is likely to become one of the greatest botanic gardens in the world.

FUTURE PROSPECTS.

The foundation of the establishment seems secure. The trustees have already increased the original area of the grounds by one-half, and detailed plans exist for the improvement of additional land that will double the present area.

Plant houses have been doubled in size. A fireproof building has been erected.

The already large equipment for research work is to be increased. More men are needed. (See map.)

49. Botanic Garden of United States Department of Agriculture, Washington, D. C.

[Extract from article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

The Botanic Gardens of the United States Department of Agriculture, at Washington, D. C., have an extensive range of green-

houses 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 improvements. 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, Yearbook of the United States Department of Agriculture, and circulars of the several divisions.

50. New York Botanical Garden.

[Extract from the New York Botanical Garden and Columbia University, by Prof. N. L. Britton, reprinted from the Columbia University Quarterly, September, 1916.]

400 acres in extent: established in 1895.

The first appropriation of land was 250 acres; 150 acres were added in 1915.

Grounds are open to the public at all times, and the buildings are open every day without charge.

The grounds are situated at the northern part of Bronx Park, extending from Pelham Avenue north to the southern end of the Bronx River Parkway at Williamsburg Bridge.

The reservation is diversified in topography; the Bronx River runs through it from north to south—a quiet stream through meadows in the northern part south of Williamsburg Bridge, passing into a narrow wooded valley, forming a cascade below, then plunging in a series of rapids through a picturesque rocky gorge, and passing into quiet, lake-like waters toward the southern end of the tract near Pelham Avenue. West of the Bronx River, coming from north to south, the visitor passes first through river meadows, followed by areas of river woods and a nearly level plain on an ancient gravel terrace, on which the fruiticetum, or collection of shrubs, is established. Passing a chain of three lakes, two of them used as water gardens, he enters the famous Hemlock Forest, 40 acres in extent, west of which the museum building and great greenhouses are situated on undulating land, partly occupied by the plantations of conifers; and southward he finds several valleys separated by rocky ridges, one of these valleys being occupied by the grouped herbaceous plantation. Flower gardens are massed about the greenhouses and along the border screens.

East of the Bronx River, the deciduous arboretum is established on hilly and undulating ground nearly the whole length of the reservation, surrounding another large range of public greenhouses located near the Bronx Boulevard, which bounds the reservation to the east, south of which are located propagating and experimental greenhouses, nurseries, and experimental grounds. Farther south, on the high eastern bank of the Bronx River, is situated the stone mansion built by the Lorillard family in 1856, the propagating greenhouses of the park department, and the new rose garden now under construc-

tion, and a long lake picturesquely situated between rocky wooded hills. There are 70 acres of natural deciduous forest occupying both sides of the river; a driveway system about 5 miles in length has been constructed, and there are over 15 miles of broad paths and trails already built.

An agreement between the New York Botanical Garden and the trustees of Columbia University provides for cooperative educational facilities.

Appropriations of money by the city aggregating over $1,250,000 have been expended in the construction of buildings, driveways, paths, fences, and water supply, and in grading and drainage; and the city makes annual appropriations for the maintenance of grounds, buildings, and collections. Living plants, books, and specimens in value exceeding $500,000 have been brought together by the board of managers, who have also expended large sums in development and maintenance. Living plants of more than 14,000 kinds are now growing in the grounds and greenhouses.

It is estimated that the value of the land is not less than $11,300,000, and the expenses incurred on buildings, driveways, etc., $1,400,000.

Appropriation of land for the planting, equipment, etc., the value of the plants, the collections, contents of the library, the public museums, the herbarium, together with the $550,000 endowment fund, represents property of a total value of about $14,000,000.

The museum building will cost about $250,000 to complete; completion of the greenhouses, $150,000; and the development of grounds and plantations, $100,000.

The board estimates that $10,000 spent annually for several years in developing the grounds would represent slow progress. They estimate they need a gift of $500,000 to complete the grounds.

This garden was established as a botanic garden, a museum, and arboretum, with a collection of plants, shrubs, and trees, and for the advancement of botanical science and knowledge, and the prosecution of original researches, and for affording instruction in the same, for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation, and instruction of the people.

The following features are of special interest:

1. The largest conservatories in America.
2. The largest botanical museum in the world.
3. A collection of cone-bearing trees, mostly evergreens.
4. The herbaceous garden.
5. The collection of hardy shrubs.
6. The deciduous arboretum.
7. Extensive flower gardens at conservatory range 1.
8. The old stone mansion, containing meeting rooms, laboratories, office of the secretary, etc.
9. Special collection of hardy plants in various sections of the grounds.
10. The hemlock forest, covering about 40 acres.
11. Gorge of the Bronx River.
12. The north meadows and river woods.
13. Deciduous woodlands on rocky ridges in southern and central parts of the reservation.

14. General park features.

There are two ranges of greenhouses. The first one includes a large conservatory with a central dome about 90 feet in height. The area under glass is about 1 acre. This house contains 15 compartments separated by glass partitions and doors. Briefly, these houses contain different kinds of specimens from all over the world; at range No. 2 there is a large collection of orchids; range No. 3 has seven houses; there is a large power house for the heating of the various buildings; the botanical museum building is 312 feet by 90 feet and contains a museum of economic botany; an exhibition of systematic botany; an exhibition of fossil botany, lecture halls, library, herbarium, and laboratories.

51. Botanic Gardens of the University of California, Berkeley.

[Extract from an article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

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.

52. Botanic Garden of Smith College, Northampton, Mass.

[Extract from article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

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

53. The Buffalo Botanic Garden, South Park, Buffalo, N. Y.

[Extract from article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

The Buffalo Botanic 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.

54. The Botanical Garden of the University of Habana, Cuba.

[Extract from the Standard Guide to Habana.]

This botanic garden is located on the Paseos of Carlos III, and adjoins the extensive gardens of the palace of the President. It contains numerous specimens of tropical trees, fruits, plants, and flowers, and there are avenues of royal palms, artificial grottos, and miniature cascades. Cuba's flora comprises over 3,350 native plants, besides those which have been introduced.

55. Hope Gardens, Kingston, Jamaica.

[Extracts from Guide to Hope Gardens; published by Aston W. Gardner & Co., tourists' agents.]

200 acres in area; established in 1874.

Hope Gardens is an experiment and teaching station, as well as a botanic garden. Mr. William Harris, F. L. S., is the superintendent.

The first beginning of an experiment station at Hope was in 1874, under Mr. Robert Thomson. The Government came into possession of 200 acres of land there in 1873, and determined to transfer the new varieties of cane received from the botanic gardens of Mauritius and Martinique and planted in the small garden at Castleton to the ample area at Hope. Nearly 18 acres were put under cane in 1874, and 5 more in 1875, and during the same year 10 acres were planted in teak. A small nursery was also formed. In 1885 Dr. Morris, at that time director, proposed that the land around the nursery should be made into a public park at a cost of £5,000, though he thought a botanic garden could not be carried on without a system of reservoirs for the storage of water. However, Gov. Sir Henry Norman decided, as there were no conveniences for people traveling cheaply from Kingston at the time, that there should be no outlay except gradually in improving the garden.

In 1897 the Government transferred the present director with office and herbarium from Cinchona to Hope, with the intention of making it the central botanical establishment of the island. Since that time the garden has gradually been formed and extended.

The following plants are grown for experimental purposes, and also for use in teaching agricultural principles, and the best methods of dealing with these tropical crops: Sugar cane, coco, coffee, tobacco, banana, nutmeg, citrus, grapevine, pineapple, yam, sweet potatoes, etc.

Practical instruction is given in the garden to apprentices, to boys from the industrial school, to students at training colleges, to elementary school-teachers in their vacation, to agricultural students, and to planters themselves.

There are about 1½ acres under sugar cane of 107 varieties, which are being tested by the agricultural chemist. Seedlings are grown from the seed and are tested as they mature.

Forastero and Criollo coco are grown, and experiments made as to the value of shade trees, and as to the difference in growth, and yield of crop, when planted close and at wider distances apart. The general opinion at one time was that coco would not grow in dry districts like the plain of Liguanea, but it has now been proved in the gardens that not only will coco grow well here with irrigation, but that it will yield larger crops than in wet districts.

Coffee of several kinds may be seen: Arabian or common coffee, Liberian, Abbeokuta, highland coffee of Sierra Leone (stenophylla), Maragogipe, golden drop, etc. Experiments are being made as to influence of shade, coming true to seed, etc.

Two acres of tobacco are under cultivation, and the leaf is cured in the tobacco house close by. The apprentices are instructed in all the details of cultivation, and the technique of curing the leaf for cigar tobacco.

A collection of 23 varieties of bananas from various parts of the world, chiefly obtained through the kindness of the director of Kew Gardens and the commissioner of the imperial department of agriculture, has been established.

Grafted nutmegs are cultivated, together with seedlings, to test early fruiting, of growth, etc.

Budded citrus plants have been planted out for comparison, of varieties that have proved successful in Florida and California, and also of native seedling trees.

Grapevines of a few European varieties are grown on arbors.

Pineapples of several varieties are grown, and experiments are being made in cross-fertilizing different varieties, with the object, for instance, of getting a pine with the flavor of the Ripley and the fine appearance of the smooth cayenne.

Rubber plants of various kinds are grown, Para, Castilloa, Ceara, etc. On the whole the Castilloa or Central American rubber tree seems to be best suited for this island.

Visitors can purchase plants at the nursery, or orders will be booked by the attendants and plants for Kingston and neighborhood will be delivered at the Parade Garden, Kingston, where purchasers must send them. The gardens can not undertake to deliver plants at private residences or stores.

56. The Royal Botanic Garden of Trinidad, Port of Spain.

[Extract from an article by Prof. N. L. Britton, in Science, Vol. IV, No. 88, 1896.]

63 acres in area; established in 1818.

The Royal Botanic Garden of Trinidad was established in 1818, and now occupies about 63 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 bulletins, dealing especially with topics of economic application.

57. The Arboretum and Botanical Garden of the Central Experiment Farm, Ottawa, Canada.

[See Central Experimental Farm, Department of Agricultural Bulletin 5, second series, Herbaceous perennials, Arboretum and Botanic Garden, Ottawa, 1908; also Bulletin 2, second series, Catalogue of Trees and Shrubs, Arboretum and Botanic Garden, Ottawa, 1899.]

65 acres in area; established in 1887.

This garden was established in an effort to test as many species and varieties of trees, shrubs, and herbaceous plants as could be made to grow in the climate of Ottawa, Canada. In 1899 a list was published of 3,071 trees and shrubs that had been tested up to that time, with notes on their hardiness. Great importance has been given from the beginning to herbaceous perennials at this botanical garden, and by 1908, 2,116 species and varieties, representing 280 genera, were reported on. The botanical garden at Ottawa is famous for its herbaceous perennial border; it is about half a mile long and 12 feet wide, and contains a remarkable, perhaps the best, collection of hardy perennials to be found anywhere in the world; certainly the best to be found in America.

Acts and Resolutions of Congress Relating to the Botanic Garden, Washington, D. C.

Act of March 3, 1843 (5 Stat. 642). Joint Committee on the Library given direction of care and preservation of botanic and horticultural specimens brought home by the Wilkes Exploring Expedition.

Act of May 15, 1850 (9 Stat. 427). Removal of public greenhouse and bontanical collection to a suitable site on public grounds authorized.

Act of March 3, 1855 (10 Stat. 673, sec. 20). First use in statutes of term "Botanic Garden," in appropriation for draining grounds.

Act of July 28, 1866 (14 Stat. 323, sec. 18). Salaries increased 20 per cent.

Act of July 14, 1870 (16 Stat. 268; R. S. 2505). Free entry of plants, etc., imported by Botanic Garden.

Act of July 15, 1870 (16 Stat. 364; R. S. 1833, 1834). Inventory and report of property to be made by architect of the Capitol.

Joint resolution of July 15, 1870 (16 Stat. 391; R. S. 1826). Supervision of Capitol police extended over Botanic Garden.

Joint resolution of March 3, 1871 (16 Stat. 601). Balances of certain appropriations not to be carried to surplus fund, but available for expenditure by Joint Committee on the Library.

Act of June 4, 1872 (17 Stat. 220; R. S. 1832). Annual statement of public property by architect of the Capitol.

Act of March 3, 1873 (17 Stat. 490). Accounts of property to be kept and annual reports made by officers responsible for property.

Revised Statutes, 1827. Superintendent, assistants, and two additional laborers to be under direction of Joint Committee on the Library.

Act of June 20, 1878 (20 Stat. 227). Part of grounds to be taken to complete roadways and footwalks on First Street.

Act of March 3, 1883 (22 Stat. 520). Same as act of July 14, 1870.

Act of October 1, 1890 (26 Stat. 609, par. 679). Same as act of July 14, 1870.

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Act of July 7, 1898 (30 Stat. 685). Pay of laborers, etc., not to be determined by act of March 15, 1898.

Act of March 3, 1899 (30 Stat. 1378, sec. 2). Fence around Botanic Garden to be removed on or before January 1, 1903; joint committee to report a plan for removal of garden to another location.

Act of March 3, 1901 (31 Stat. 1039). Similar to joint resolution of April 12, 1892.

Act of August 5, 1909 (36 Stat. 78, par. 652). Same as act of July 14, 1870.

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HISTORY OF THE BOTANIC GARDEN.

A botanical garden was among the projects considered by President Washington for the Federal City, and its location was the subject of correspondence between him and the commissioners of the Federal District. The latter, writing to Washington on October 1, 1796, discussed "the disposition of the public grounds in the city, and having already recommended sites for the National University and mint, they add that the establishment of a botanical garden has been lately suggested, and if the site proposed, which is not named, does not meet with the President's approval that a portion of the National University site can be devoted to that purpose."[1]

The President, replying on October 21, decided in favor of the square bounded by Twenty-third, Twenty-fifth, and E Streets NW., the Potomac River being on the south, as the site for the university,[2] and added:

> Conceiving (if there be space sufficient to afford it) that a botanical garden would be a good appendage to the institution of a university, part of this square might be applied to that purpose. If inadequate, and the square, designated

[1] W. B. Bryan. A History of the National Capital, vol. 1, p. 276, 1914.

[2] This site was subsequently used for the Naval Observatory, and is now occupied by the Hygienic Laboratory of the Bureau of the Public Health Service.

in the plan of Maj. L'Enfant for a marine hospital, is susceptible of that institution and a botanical garden also, ground there might be appropriated to this use. If neither will admit of it, I see no solid objection against commencing this work within the President's Square, it being previously understood that it is not to be occupied for this purpose beyond a certain period; or until circumstances would enable or induce the public to improve it into pleasure walks.

The establishment of a botanical garden at the National Capital was also not infrequently the subject of communications by various writers, printed in the public press and elsewhere, in which the importance of such an institution both to the science and application of botany was discussed.

In the opinion of a contributor of the National Magazine for December 1, 1801:

Perhaps nothing would tend more to benefit this city and the Nation at large than that the seat of the General Government should be the depository of the arts and sciences. With this impression, I have sometimes speculated on fanciful improvements, and imagined the President's house converted into a national museum, where, as in Paris and London, a national institute might be established and lectures read. * * * Such speculations, however glad I might be to see realized, are attended with difficulties, which do not obstruct the following lands being appropriated for public use, which are well calculated for the purpose. I can not help recommending it to all those who wish to promote a scientific knowledge of the various branches of agriculture. The plan I propose is to lay out about 50 acres of land for a botanic garden in this city, in the following manner.

The writer then proposes five branches of the garden, each of which he describes with considerable detail, while several others are merely mentioned. The first was a Linnean garden, calculated for the botanist who studies plants scientifically, and designed to contain every possible variety of plant. The second was a cattle garden, in which should be grouped separately the plants preferred by, wholesome or unwholesome to, cattle, sheep, horses, goats, and swine, respectively. The third was a hay garden, to contain all plants of which hay can be made, which, with the preceding, would serve to instruct the practical husbandman. The fourth was an esculent garden, to show every plant which furnishes food for man; while the fifth was a dyer's garden, containing all plants which afford any assistance in dyeing colors. The other provisions were for rock plants, creepers and climbers, bog and water plants, marine plants, an herbarium, and a nursery. Included in the scheme of the writer were also extensive series of lectures, both scientific and practical.

Another article, the author of which signed himself "Franklin," was published in the Washington Expositor of January 9, 1808, under the title "Proposals for establishing an experimental agricultural and botanical society at the seat of the General Government." The writer prefaces by stating that:

Approaching, as we seem to be, the period when it will be necessary for our country to put forth all her resources; when improvements in agriculture, in arts, and in manufactures will be encouraged and cherished, as the sinews of our strength, we can not too early lay the foundations of those societies which the experience of other nations has found so conducive of their prosperity. To render us independent we must raise and naturalize those plants the products of which are by custom rendered necessary to our comfort and convenience. All those vegetable productions of other nations which our varied clime will nourish and support, particularly such as may become useful to our infant manufactures, ought to receive public attention. Gardens and nurseries capable of receiving and propagating them, where the chemist, botanist, and

agriculturist can have free access at all seasons, will, it is hoped, now become of peculiar interest to the patriot and legislator. * * * For objects of this nature there is certainly no place better adapted than the seat of the General Government. The climate of Washington is calculated for the production of a greater number of plants than a much more northern or southern situation would be. Here reside during the winter and in the spring intelligent Members from all parts of the Union, who will have an opportunity of knowing the result of the experiments made. * * * Within the limits of the Federal seat are large and ample reservations for public gardens and other national objects which may advantageously be applied to the purposes of a botanical garden, a public nursery, and an agricultural farm.

The society proposed was to consist of shareholders not exceeding 500, organized after the manner of a scientific association.

The primary objects of the society are to collect at the seat of the General Government the useful and ornamental vegetable productions; and, by experiment, ascertain the mode of culture for each best adapted to the climates and circumstances of the United States; as also to form a nursery and repository of seeds, from whence they may be easily disseminated through the United States. To this end they may take a lease of one or more of the large central reservations of land for public use in the city of Washington; and, whilst realizing their own views, render an essential service to the place; for as a remuneration for the use of the grounds, the society might plant and protect such trees as will be wanted for their future ornament. They would likewise be enabled, from their nursery, to supply at reasonable rates such trees and shrubs as may be required when the grounds occupied by the public buildings of the United States are put in order. * * * Seeds of the most useful, as well as the most rare and beautiful plants, may be had from the society, and their freshness at all times depended upon.

It remained, however, for the Columbian Institute to make the first actual trial, which was carried sufficiently forward to demonstrate the importance and utility of such an establishment, and only failed in attaining its ultimate purpose through the lack of proper support.

Establishment, location, and extent of the garden.—One of the principal objects proposed in the organization of the institute, the establishment of its botanic garden, is probably to be considered as its most important achievement. The Metropolitan Society, according to its plan of June 15, 1816, had "in contemplation to apply to Congress for the appropriation of about 200 acres of ground called 'the Mall,' which was designed in the original plan of the city for a public garden. In this place it is proposed to cultivate the plants and seeds which may be presented to them: and as they multiply, to distribute them throughout this extensive continent." At a later date it was explained that, with sufficient aid, the botanic or national garden may be used to cultivate all kinds of indigenous trees, shrubs, roots, grasses, etc., to be distributed to every part of the United States. Beautiful, shady, cool walks may be formed, yielding a pleasant and healthy means of recreation, and the science of botany may be improved and encouraged.

By the act of incorporation, approved April 20, 1818, the institution was authorized to procure, by purchase or otherwise, a tract or parcel of land for a botanic garden not exceeding 5 acres. Beginning at a meeting on October 5, in that year, the subject of obtaining a lot for a building as well as a garden was given frequent consideration. In the draft of a memorial to Congress, agreed to on December 28, though possibly not used, mention is made of a reservation of 20 acres situated at or about the junction of the Capitol Park or Mall and the extension of the President's Square, in which the 5 acres for the institute might be advantageously located.

As a result of correspondence between the president of the institute and the Committee of Congress on the District of Columbia, the following bill was passed by Congress and received the approval of the President on May 8, 1820:

[Statute I, Chap. LXXXI.—An act for the benefit of the Columbian Institute, established for the promotion of arts and sciences in the city of Washington.]

Be it enacted, etc., That there be granted, during the pleasure of Congress, to the Columbian Institute, for the promotion of arts and sciences, the use and improvement of a tract of public land in the city of Washington not, exceeding 5 acres, to be located under the direction of the President of the United States, for the purpose of enabling the said Columbian Institute to effect the object of their incorporation: *Provided*, That whenever the said institute shall be dissolved, or cease to exist, or to employ the said tract of land for the purposes aforesaid, all right, title, and interest hereby granted to the same shall revert to and vest in the United States as completely as if such grant had never been made. (16th Cong., 1st sess. From Private Stat. L., United States of America, 1789–1845, vol. 6.)

The conditions of this grant were accepted by the institute on May 23, and on the same date the committee to select the site recommended as, in their opinion, the most eligible, as it was the most central, the square inclosed between Seventh and Ninth and F and G Streets NW., containing 4½ acres, subsequently used for the building of the Patent Office. It was here that the greenhouses for the living plants brought home by the United States exploring expedition in 1842 were first located, but for some reason, not recorded in the minutes, the attention of the institute was almost immediately turned from the Patent Office site to the extreme eastern end of the Mall, and on May 29, 1820, the agreement of the President of the United States to this selection was reported to the society. On the plat of the measured ground, signed by J. Elgar, surveyor of Washington City, it is said to have been laid out August 12, 1820, but this information appears not to have been officially communicated to the institute until October 11, when Mr. Elgar states in a letter that he is ready to show the metes and bounds. It was, moreover, not until April 10, 1821, that a certificate confirming the location was signed by the President; and as late as September 1, 1821, a resolution was passed by the institute calling upon the commissioner of public buildings to put the institute in full and complete possession of the ground. Certain steps looking to the improvement of the site seem, however, to have been taken during the latter part of 1820, though apparently it was not until the summer of 1821 that activities in this direction were actually begun.

In the certificate by the President, which conforms with the plat, the grounds being part of public reservation No. 2, were described as follows:

Beginning at a point in the south line of Pennsylvania Avenue, where said line intersects the circular road west of the Capitol, and running thence westwardly bounding on said line, 627 feet 8 inches; then due south, 578 feet 10½ inches, to the north line of Maryland Avenue; then bordering on said line eastwardly, 627 feet 8 inches, to the circular road aforesaid; then bounding on said road, to the first beginning, containing 5 acres of ground.

The Capitol Grounds at that time were much less extensive than at present, and were bordered near the base of the steep slope on the west of the Capitol by the circular road above mentioned, to which both Pennsylvania and Maryland Avenues extended. The place of

these avenues in the grounds, though reduced in width, is now taken by the two broad walks leading to the western entrance of the building. Moreover, First Street had not then been carried through at this place, and the grant to the Columbian Institute extended continuously from the circular road to a point between First and Second Streets, in the shape of a truncated triangle of which the north and south sides were equal.

This tract the institute began to improve and cultivate, but in 1822 the question of its enlargement was agitated and was embodied in the draft of a petition to Congress placed before the society on February 6 of that year, but possibly not transmitted. In this draft it was said:

> And they further solicit * * * the sole and exclusive right to occupy the remainder of the ground to the west of that now inclosed (to Second Street), on the same terms as before granted, which would not only preserve the garden free from intrusion (by its being surrounded with streets) but it would add greatly to the value of the whole appropriation by giving more extent to the various designated portions for the forest trees and plants of this very extensive Republic.

Just two years later, February 7, 1824, a petition in the same words or to the same effect was ordered presented to Congress, where it received favorable consideration, resulting in an act approved May 26, granting:

> The use and improvement of the tract of public ground in Washington City, which is bounded on the east by the Botanical Garden, in the occupancy of the said Columbian Institute; on the north by Pennsylvania Avenue; on the west by the Tiber Canal; and on the south by Maryland Avenue.

This extension was, in fact, essentially to the position of Third Street, and, accordingly, the grounds so enlarged comprehended the area of the present United States Botanic Garden, plus the width of First Street and the tract reaching therefrom to the circular road near the Capitol. Of this entire area the institute remained in control until practically the close of its activities, the extension of the Capitol grounds to First Street and the opening of the latter taking place in 1836.

The entire Mall at this time was not only not improved but was in an unprotected and desolate condition. Its northern side and eastern end were, moreover, low and swampy and frequently invaded by the waters of the Tiber and the canal. The institute, which was the first establishment privileged to make use of any part of this tract, had much difficulty in overcoming these conditions, which were more or less improved during its occupancy of the site under the direction of a municipal commission formed to deal with draining the lowlands south of Pennsylvania Avenue. After the abandonment of the garden, the Mall remained unoccupied until the selection of the site for the Smithsonian Institution between Ninth and Twelfth Streets, in 1846.

Inclosure of the garden.—A committee to consider plans for inclosing the ground reported on June 20, 1821, that they believed a good board fence, 5 feet high, with a live fence of American thorn planted inside of it, would answer every purpose required; for before the board fence had entirely decayed the live fence would have risen sufficiently high to be both secure and ornamental. Such a board fence, entirely inclosing the garden, was completed by October 6 in

that year, but there is no evidence of the placing of the so-called live fence until near the close of 1823, when the planting with honey locust of three-fourths of the distance on Pennsylvania Avenue was reported.

The above relates wholly to the smaller area covered by the first grant. How and when the added tract was inclosed is not shown by the records of the society. A more elaborate form of inclosure than a board fence or hedge began soon to be agitated, however, but being far beyond the means of the institute relief could only be obtained through Congress. On the suggestion of Thomas Law, it was recommended on January 28, 1826, that Congress be petitioned to authorize the sale of public lots, and the use of the proceeds thereof in building a stone wall and iron railing around the ground and satisfying other needs of the society. The extent of this wall was placed at 2,925 feet, and its cost at $4,000. On April 21, 1832, an estimate for a brick inclosing wall having been submitted, the secretary was directed to communicate the same to the Committee on Public Buildings of the House of Representatives, and on December 15 similar action was again taken, but none of these requests met with favorable response, though the subject was brought before the House, possibly on more than one occasion, the last being on June 7, 1834, when an appropriation for the purpose was stricken out, as the existence of such a wall would be an obstacle toward the western extension of Capitol Square, which was already in contemplation.

Improvement and care of the ground.—When the Institute took possession of the ground it found two small frame houses built upon it by a Mr. Baily, who had obtained a 10 years' lease from 1813 of a considerable tract of public land extending to Seventh Street, but a settlement of the owner's claims was soon effected. On October 6, 1821, a committee recommended the layout of two ponds, one formed by a large ditch encircling an island, the other in still lower ground, to be dug entirely out, which would serve for a fish pond and for many other purposes, both to be elliptical in shape. On December 1 of the same year it was reported that about half the ground had been plowed. The committee on the garden was authorized on June 7, 1823, to ascertain the practicability and advantage of conveying the water of Tiber Creek into the reservoir of the garden, and during October following walks were laid out and certain leveling of the grounds was done.

The first report of progress and of conditions was made to the society on December 6, 1823, and was, in part, as follows:

> The ground for the garden has been completely drained and partly leveled and is in a great degree fit for cultivation. An elliptical pond has been formed 144 feet for the transverse and 100 feet for the conjugate diameter, with an island in the middle 114 feet by 85 feet. The canal that surrounds it is 15 feet wide and 2½ feet deep. There is also a drain from the spring leading to the pond through the center of the ground and from the pond to Tiber Creek, with a conduit at the lower side of the pond by which water can be either let into or out of the pond. At high water and a spring tide 2½ feet of water flows into the pond, which can be there confined by putting a plug into the bore of the log, or the water can be nearly all let out and kept out. The island wants still to be leveled for cultivation and the upper side of the pond to be deepened to produce a level.
>
> Four walks have been laid out—one on Pennsylvania Avenue, one on Maryland Avenue, one opposite the circular road around the west side of the Capitol, and one in the center of the ground leading to the pond. The three walks

on the side of the garden are 20 feet wide, with borders of 26 feet, in which to plant trees and shrubs; the center walk or road is 15 feet wide; the whole is well graveled. The commissioners appointed to drain and improve the public grounds on the south side of Pennsylvania Avenue have been very liberal in contributing to these improvements. They have given $100 in cash, and have done all the leveling and graveling, amounting to between $300 and $400 more.

From this time on there are frequent references in the minutes and other papers of the society to work done in the garden, leveling of ground, making beds, ploughing, draining, deepening of water in the pond, maintaining walks, etc., but no general description of the grounds. The institute had very little money for any purpose and but limited amounts could be expended in this connection, the only help received from outside appearing to have been that above recorded. In the latter part of 1825 and the beginning of 1826 the garden then having reached its larger size, special efforts were made for assistance. The commissioners, for draining the low ground south of Pennsylvania Avenue, were first appealed to to cause the garden to be drained, but their funds had been exhausted. Application was then made directly to Congress to authorize the sale of public lots for the benefit of the institute, as described in another connection, a part of the fund so obtained to be used for bringing water from the eastern branch of Tiber Creek, first to a reservoir in Capitol Square, where it would be "a great security against the progress of fire in case of accident either in the Capitol or any of the adjacent buildings," or from which it might be carried into every room of the Capitol, and "after leaving the Capitol, be thrown up in a beautiful jet d'eau of 30 feet in the Botanic Garden," and subsequently serve to water the garden, etc.

The wording of a complaint made to the institute by the commissioner of public buildings on June 9, 1827, relative to some of the work done at that period is now of much interest as bearing upon the question of maintaining an agreeable and symmetrical vista through the Mall from the Capitol. It also called attention to the fact that the location of the garden brought it under constant observation by Members of Congress, though this never gained the society any pecuniary aid from that body. The commissioner's letter was partly as follows:

> The Botanic Garden belonging to your institute is so directly in view from the Capitol that I hope to be pardoned for a remark in relation to the improvement of it. The new section of the Washington Canal was laid out along a line drawn through the middle of the Capitol and of the Mall. The footway, canals, and plantation in the garden do not coincide with this line but diverge from it at an acute angle. This discrepancy is so glaring and so very offensive to the eye that I am satisfied every person visiting the Capitol would be grateful for its removal.
>
> I was gratified by the location of the Botanic Garden in its present site from an expectation that it would become an ornamental appendage to the Capitol and that under the eye of Congress they would be induced to foster it. But you are aware, sir, that whether it shall become an ornament or deformity depends materially upon the plan which shall be pursued in its improvement. I flatter myself, therefore, that this subject will be considered not unworthy the attention of your enlightened body.

The discrepancy was found to be much less serious than the commissioner had intimated and was soon corrected. On November 20 following the treasurer reported to the society that—

> By means of the late expenditures on the Botanic Garden the following objects have been attained, viz: The ground has been completely drained by

drains extending between 400 and 500 yards in length and in some places 3 feet deep; the canal has been deepened, so that it now surrounds the island and is between 3 and 4 feet deep and about 18 feet wide, with a good foot bridge over it. Several new walks have been made and the whole well graveled. The ground has been well ploughed and harrowed at least three times over. A tool house has been erected. The border on Maryland Avenue and the island have been properly prepared for the reception of seeds and plants. It is believed that it would be most beneficial, at the same time least expensive, to cultivate this border and the island and to sow the remainder of the ground in the center with white clover in the spring. And to effect these objects a gardener can be obtained for $60 per annum, who will not only preserve the garden, but will plant any seeds or plants that may be received, besides supplying trees where dead.

In a letter dated August 6, 1830, written in protest of a proposed leasing of the ground as a pleasure resort, in connection with which the objects of the institute would continue to be carried out, William Elliot spoke of the condition of the garden at that time as follows:

It is urged that the garden remain uncultivated, and that we make no use of it. But even in its present uncultivated state, it is a not unpleasant object as seen from the Capitol; and certainly much more worthy the Nation than a pleasure garden, with its usual scenes of debauchery. And why is the garden not cultivated, and the other proper objects of the institute accomplished? Because we have no funds. Let those gentlemen who complain first pay up their annual and other dues and then see what can be done. No money has been laid out (of any amount) on the Botanic Garden for about three years. How then can we expect it to appear? However, with what has been laid out, the ground has been well drained; good gravel walks made; and more than 1,000 shrubs and trees planted and in a thriving condition. No matter who has charge of the garden, it will require time for the trees and shrubs to grow.

S. L. Knapp (Ignatius Loyola Robertson), writing from Washington in 1830, had the following to say:

Congress has granted to this institution the use of several acres of land for a botanic garden and other purposes. By the liberality and exertions of some of its members this garden has been well laid out, and many of the trees and shrubs of other countries have been transplanted and nurtured there. This, with a little of that liberality that Congress has shown to other institutions or other projects, would flourish; for there are several literary and scientific men who would spend many of their leisure hours in the botanic department of the society if they could do it to advantage.

From the brief summary of local events and conditions prepared each year for the National Intellingencer by John Sessford, the following are of interest in this connection:

1832. The Botanic Garden, on the west front (of the Capitol), from the temporary manner of its inclosure, is not kept in a good state—a continuance of the iron railing from its east end around it would give confidence to those who have embarked in the project by securing the safety of the plants and shrubbery and adding beauty to the neighborhood.

1834. In and around the Capitol some handsome improvements have been made. The fountain is neat and ornamental, but too confined. The naval monument loses its effect from being so near the Capitol. Were it removed to the island in the Botanic Garden, properly elevated, with a sufficient sheet of water around it, it would be seen to more advantage. The surplus water from the fountain might also be taken there and jets formed.

The immediate care of the garden, in default of the requisite means, was subject to varied and never satisfactory arrangements. No one person was paid regularly on wages for more than a short period, and the wages ranged only from $5 to $21 a month. Temporary labor was often relied on, and for specific jobs, and it would appear from the records as though during a good part of the time no one was employed about the grounds. Mr. John Foy, the gardener

of the Capitol grounds, rendered some assistance at times, more particularly in supervision work. One of the frame houses in the garden, up to the time of its removal in 1825, was a resource in this connection, though not continuously, occupants being found who would look out for the preservation and cultivation of the garden in consideration of the use of a small piece of ground for raising vegetables. In one case a rental of $75 was exacted of the tenant, but in another no charge was made for the house. The same services were secured in still another instance in return for the grass grown in the garden.

An unusual proposition made to the institute in August, 1830, by one Francis Barnes was favorably considered by some of its most influential members, but failed to be carried out, and it is doubtful if it could legally have been accepted. Mr. Barnes asked for a lease of the garden for a term of years, and while he would be recompensed by charging admission fees to visitors, though members of the institute would always be classed as guests, he did not state, except indirectly, what form of entertainment he had in mind. On the other hand, his proposal seemed most exceptionally favorable to the society and was mainly as follows:

I will, at my expense, keep the garden in perfect order, pay all necessary attention to the plants already growing therein, cultivate all such seeds and plants as the institute may provide, and, in short, do all in my power to promote the science of botany, and fulfill to the strictest letter the objects of your incorporation.

I will, at my expense, repair the fences now standing or erect new and substantial fencing in their stead, lay the garden out in handsome and tasty style, erect arbors in various parts thereof, and set out vines of various kinds to afford shelter and cool retreats to such persons as may visit it, where refreshments may be obtained by the payment of a moderate compensation therefor.

I will erect an ornamental building in some part of the garden, having therein a convenient room or place of meeting for the members of the society, where they may congregate, free of expense, and by calling therefor receive every accommodation on such terms as can not fail of being satisfactory.

As the garden will be open to visitors at a small expense, a strict police will be established, to prevent the ingress of improper persons, to guard the plants, flowers, etc., from the depredations of such heedless or idle persons as might break or otherwise injure them.

At the expiration of the lease the buildings and improvements made at my expense will be given over to the institute in perfect order and at all times during its continuance it will afford me pleasure to welcome the members of the institute in the garden and to listen to any suggestion they may make for its further improvement.

In conclusion I beg leave to refer more particularly to the second article of this proposition and assure the members of the institute that no pains will be spared to promote their views—to make the garden an ornament to the metropolis and the country at large and to afford to the members of the institute (as guests) and to the respectable citizens of Washington and to strangers visiting the seat of government (at a small expense) a cool, comfortable, fashionable, and respectable place of innocent recreation.

Planting.—The records of the institute are entirely devoid of any descriptive account of the planting or of the growth of trees and shrubs in the garden, containing only occasional and brief references to this subject. Money was appropriated in small sums from time to time for procuring and planting forest trees and seeds of various kinds, and a few contributions from both domestic and foreign sources were also acknowledged. In August, 1822, a proposition by the commissioners for draining the low ground south of Pennsylvania Avenue to furnish and plant such trees as the institute may

require to ornament and beautify the garden was accepted. In December, 1823, native forest trees growing in the District of Columbia were collected and planted at the expense of John Quincy Adams to the amount of $25; and in 1826 several hundred cuttings of the white mulberry were ordered purchased and planted. A list of the plants growing in the garden at about this time was prepared, but a copy of it has not been found.

Distribution of seeds.—Many gifts of seeds, both domestic and foreign, are mentioned in the records, and presumably portions of most, if not of all, of them were planted in the garden. Some of the lots received were extensive and some were evidently intended to be disposed of elsewhere than in Washington. The names of the plants represented are seldom given, but trees, shrubs, and grains, more especially the latter, were included. Richard Rush, while Secretary of the Treasury, transmitted several important lots, evidently obtained through the consular service, coming mainly from Tangier and India, and including wheat, barley, the seeds and fruit of the date, and presumably other forms. In 1828 a general distribution on a basis similar to that subsequently followed by the Department of Agriculture was begun and continued for at least three or four years, possibly longer. On July 7 of that year the Secretary reported that, in pursuance of the resolution of May 19, authorizing him to distribute at his discretion certain grains and seeds, he had immediately given notice in the city newspapers, in consequence of which numerous applications had been made by Members of Congress and others, and that nearly the whole of the grain and seeds had been distributed. The notice was as follows:

> The Columbian Institute has just received from Tangier, in Morocco, some wheat and barley, which it is supposed may form a useful addition to the stock of those grains already in the United States, particularly in the States and Territories south and southwest of Washington. The institute has also received some seeds and fruit of the date, which have been sent under a belief that they may be succes fully cultivated in the most southern part of the Union. Tangier, whence these grains and seeds are brought, is in the latitude of 35° north; though black frosts are rare, white frosts are frequent there in January, February, and March.
>
> Those Members of Congress who may desire to obtain a portion of either or all of these objects will please make known their wishes to Mr. Dickins, the secretary of the institute.—May, 1828.

Surrender of the garden and enlargement of Capitol Square.—As elsewhere explained, the institute reached a state of disintegration by the middle of the thirties, and, while a few of its members made an earnest effort to continue its existence and to revive and strengthen interest in its projects, the botanic garden became almost wholly neglected. The hope of securing a building for the museum, library, and meetings, however, persisted until the end, and the inclusion of the eastern part of the garden in Capitol Square in 1836 furnished opportunity for an appeal to Congress to reimburse the society to the extent of $1,500, the amount it had expended in connection with that section of the grounds. Though favorably reported upon by the House Committee on Public Buildings, with a bill for the relief of the society, this measure did not pass, owing, undoubtedly, to the moribund condition of the institute. Ceasing to exist as an active organization in 1837, the fact that it had established and maintained a botanic garden for nearly two decades seems almost immediately

to have been forgotten, and the selection of the identical tract for the United States Botanic Garden 13 years later would, therefore, appear, so far as shown by any of the records now available, to have had no relation to its former occupation by the Columbian Institute.

Capitol Square at the time of the founding of the institute, in 1816, was of limited extent, but soon after the rebuilding of the Capitol had been started, following the visit of the British troops, a beginning was made toward providing a park around that building. The improvements were carried on under appropriations granted from year to year. Excellent walks were constructed, trees, shrubbery, and flowers were planted, and stretches of lawn were laid out, under the superintendence of John Foy, the first gardener, whose services were also occasionally availed of in the botanic garden of the institute and whose place, after his death in 1833, was taken by John Mayer. The adornment of the grounds at that time had already begun to attract attention, though the improvements had only in part been accomplished.

As early as January 21, 1829, Charles Bulfinch, architect of the Capitol, recommended to the House Committee on Public Buildings the improvement of the grounds directly west of the Capitol, including the site of the botanic garden, in the following words:

> The Capitol being now finished with the exception of these particular objects, I beg leave to suggest that the public grounds immediately adjacent should conform in some degree to the importance and high finish of the building. To bring them into such state, I propose that the triangular space between the Pennsylvania and Maryland Avenues, and as far as Third Street at the bend of the canal, should be permanently fenced in. This would secure the improvement of the ground and render it practicable to form the footwalks on the avenues, one of which has not been brought into form, and the other is only paved one-half of the required width.

While regarding this work as necessary to the betterment of the public grounds in the immediate vicinity of the Capitol, and as such likely at some period to be sanctioned by Congress, the committee did not think it expedient to recommend it at that session.

In the House of Representatives on June 7, 1834, a bill making appropriations for the public buildings and grounds being under consideration, "Mr. Vinton moved to extend the square west of the Capitol to the foot of the slope, and to extend the Botanic Garden to the canal, but the motion did not succeed." In the same connection Edward Everett proposed to amend the bill "by removing the naval (Tripoli) monument from its present situation (on the west terrace) to the square east of the Capitol, but, on a suggestion of Mr. Watmough, modified the motion to remove it to the Botanic Garden; but after some desultory discussion the motion was rejected." This monument remained on the west terrace of the Capitol until 1860, when it was removed to Annapolis, Md.

The "act in addition to the act entitled 'An act making appropriations, in part, for the support of the Government for the year 1836, and for other purposes,'" approved July 4, 1836, contained the following provisions:

> For extending the Capitol Square and improving the grounds within and adjacent to the same as far west as the first street intersecting the Pennsylvania Avenue from the east, the sum of $25,000.
>
> For conveying the surplus water of the Capitol to Botanic Gardens, making a basin, and purchasing a fountain of Hiram Powers, $5,000.

In his report to Congress of December 21, 1836, the commissioner of public buildings, Maj. William Noland, stated that "the extension of the Capitol Square as far west as First Street has engaged much of my attention, and, though the work has been retarded for the want of materials, the whole inclosure will be completed by the last of March." And also, "A part of the materials have been purchased for conveying the surplus water of the Capitol to the Botanic Garden, making a basin, and purchasing a fountain of Hiram Powers; but owing to the failure on the part of the contractor to comply with his contract the work will not be finished before the month of May." It is doubtful from the wording both of the act and of the commissioner's report where the basin and fountain were intended to be placed, though they seem clearly to have been associated with the garden. It is certain, however, that the site of the garden was never embellished by a fountain of Hiram Powers, and these improvements were evidently designed for Capitol Square.

The civil and diplomatic act for 1837 provided an additional appropriation of $40,000 for the enlargement and improvement of the Capitol Grounds, in regard to which the Commissioner of Public Buildings reported on December 15 of that year that, "The extending of Capitol Square to First Street west has been completed, so far as was contemplated by the appropriation of March last, with the exception of a part of the center footway, which has been left in an unfinished state for the want of materials, the contractor having failed to send on the requisite supply of flagging."

From a contemporary account published in 1837 or 1838 we learn that a stone wall surmounted by an iron railing had been built around Capitol Square, and a reservoir, with a jet d'eau, one of the early projects of the institute, had been introduced. The two broad walks or approaches replacing Pennsylvania and Maryland Avenues within the new area of the square were in course of construction, and the laying out of gardens and the planting of trees and flowers were well under way. John Sessford, writing for 1838, stated that:

> The grounds west of the Capitol, under the direction of the commissioner and superintendence of the public gardener, have been improved tastefully and produce a fine effect. Connected with this should be inclosed the grounds west of First Street to Third Street for a botanic garden.—National Intelligencer, January 4, 1839.

Subsequent provisions by Government for the care of living plants.—Five or six years after the abandonment of the botanic garden of the Columbian Institute the Government was called upon to provide for its own use like, though not identical, accommodations. The collections of the United States exploring expedition to the South Seas, 1838–1840, deposited at the Patent Office as received in Washington, included a large quantity of living plants and seeds. For a short period in the care of the National Institution, the Joint Committee of Congress on the Library, in July, 1843, appointed the Commissioner of Patents, Mr. Ellsworth, to the custodianship of all Government collections in that building, and in August placed Capt. Charles Wilkes in special charge of the gatherings of the exploring expedition. Mr. William D. Brackenridge, who had been the horticulturist and assistant botanist of the expedition, was retained in charge of the botanical specimens. In a report to Curator Charles Pickering, of

the National Institution, dated November, 1842, Mr. Brackenridge stated:

> The institute has also come into possession of a collection of rare and highly interesting living plants, brought home also by the expedition, which has since received several additions in return for seeds distributed from the same source; also a few donations of other plants from various quarters. For their preservation a greenhouse 50 feet long and partitioned into two apartments has been erected on the lot behind the Patent Office. The number of species in cultivation amounts to 500, and with duplicates of the same there are about 1,100 plants in pots over and above those now coming up from seeds. * * * The live plants brought home by the squadron amounted to 254 species.

The first greenhouse was constructed in 1842, presumably from the appropriation of $20,000 to the naval service for transporting to Washington and arranging and preserving the collections made by the exploring expedition. Greenhouse construction was further continued on the same square during the two succeeding years, under the direction and control of the Library Committee. The civil and diplomatic appropriation act of March 3, 1843, contained an item of $1,200 for taking care of the botanical specimens brought home by the exploring expedition, and under this provision a second greenhouse was erected between September, 1843, and January, 1844. The corresponding act of June 17, 1844, with an item of $2,200 on account of the botanical collections of the same expedition, provided for "enlarging the greenhouse," but which of the houses was so enlarged is not stated. The accounts for material and labor continued from July 11 until October 31, 1844, and the size of the addition was given as 78 feet 7 inches long and the same width as the old parts. Mr. Brackenridge deplores, in his report for 1842, the lack of a place for outdoor planting, a desideratum which was evidently not supplied in that location. The other regular employees in the greenhouse service seem to have been a gardener or assistant florist and a laborer.

An extension of the Patent Office Building, begun in 1849, made it necessary to displace the above greenhouses[1] and they were transferred in 1850 to the site of the former botanic garden of the Columbian Institute on the Mall between First and Third Streets. Mr. Brackenridge continued in charge until 1853 or 1854, being also employed under A. J. Downing upon the improvement of public grounds in Washington during 1851 and 1852. The name of William R. Smith, who afterwards became superintendent, first appears upon the pay rolls in June, 1853, as gardener or assistant florist, at the rate of $1.25 a day. The greenhouses in their new location remained, moreover, under the supervision of Capt. Wilkes until August, 1854.

The removal of the greenhouses and the work upon the new site during the first year is thus described in the annual report of the Commission of Public Buildings for 1850:

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[1] "In order to make room for the foundation of the eastern wing (of the Patent Office), it became necessary to remove a part of the conservatory, in which is kept the rich collection of tropical plants that were selected and preserved with so much skill and care by Capt. Wilkes and the scientific gentlemen who accompanied him on the exploring expedition. The appropriation which could be applied to that object being insufficient to erect a new building adapted to the purpose of their permanent preservation, it was thought best to remove that part of the structure which interfered with the foundation of the Patent Office, and rebuild it in a cheap manner, so as to preserve the plants until Congress might fix upon a spot on which a permanent building should be constructed, and select adjacent grounds for the cultivation of the hardier plants of the collection." (Annual Report, Secretary of the Interior, Dec. 3, 1849.)

The square immediately west of the Capitol inclosure was selected by the Joint Committee on the Library as the most suitable for the location of the public greenhouse. The two small buildings on the Patent Office Square have been, as was required by the appropriation contained in the deficiency bill, approved May 15, 1850, removed, and by the use of such of the materials as were suitable, reconstructed. And to afford ample room for the care and preservation of the botanical collection, in addition to these a more commodious building has been erected, which is so planned and located as to form a wing to some more elevated and handsome structure. Although these buildings may answer their purpose, the site upon which they are located will require very extensive improvements in consequence of being so low as to occasionally subject it to an overflow from the tidewater of the canal and some parts never free from standing water.

To remove this evil and render the grounds eligible for the purpose to which they have been assigned would require the surface to be raised and so formed as to insure a good surface drainage at all times; by this and walling in the Tiber stream from the Pennsylvania Avenue culvert to the canal this lot of ground would present an entirely different aspect, and, I have no doubt, would be well adapted to the more ornamental features which the artistic skill of the gardener may design for it.

The cost for materials, labor, etc., so far incurred has unavoidably exceeded the appropriation about $1,200 or $1,300, which sum will be further increased by the subsequent payment of several claims which will be due to persons who have not yet entirely completed their engagements for the performance of certain portions of the work.

The location and style of execution of these erections have been conformable to a plan approved by the Joint Committee on the Library. This plan contemplates a more elevated and ornamental structure, of which the present central building, as before stated, is designed as the eastern wing.

In his report for 1851 the commissioner said, with reference to the improvement of the grounds west of the Capitol, that the work done consisted—

In taking up and resetting 200 feet of curb and pavement on the south side of Pennsylvania Avenue; trimming and graveling the east front of the Botanic Garden and removing and replacing the fence on the south side of the same; filling earth on the garden square, when it has been offered at a low price; and filling in a triangular space on the south side of Maryland Avenue east of the canal. There yet remains of the appropriation for these objects $229.31 unexpended.

No appropriation has been made for the last two years for the improvement of the Botanic Garden Square. I have now presented estimates for some additional buildings for the plants and for filling up, draining, and laying out the square in a suitable manner. The sum asked is all that will be necessary for the improvement of this ground until it shall be the pleasure of Congress to inclose it with an iron fence.

From the same report it appears that a part of reservation No. 17, "lying on the west side of New Jersey Avenue has been selected as the site of the public nursery. It has been suitably inclosed and a stream of water conducted to it by permission of the heirs of the late Daniel Carroll, of Duddington, from a spring on their mansion grounds. This square of ground is now ready for the use for which it was inclosed." The site of this public nursery or propagating garden seems to have been changed in 1857 to a small, triangular reservation between Third Street and Four-and-a-half Street and Missouri Avenue and the canal close beside the Botanic Garden.

In a report to the commissioner in 1853, W. D. Brackenridge stated:

The idea you suggested to me some time ago, of asking for an appropriation to fill up the low square on which the public greenhouse is situated, is an improvement which, if you succeed, would redound much to your credit, as it is one of the most unhealthy sinks in our city—so much so that the men employed

at the greenhouses are more or less sick with chills and fevers during the most part of the year.

The following remarks on the garden are from the introduction to "A catalogue of plants in the National Conservatories," prepared by William R. Smith in 1854:[1]

I would here state that the majority of the plants in this list are the results of the United States Exploring Exposition commanded by Capt. Wilkes, with several additions by other officers of the Navy and Army. Mr. Brackenridge, by a judicious system of exchanging, has obtained many important additions. Several of the plants first discovered by the expedition are now to be found wherever an exotic collection exists; as an example, I may cite the beautiful Gloxinea rubra, etc. This system of exchanging should be further extended. The indigenous plants of this country could be readily exchanged for useful plants from other countries.

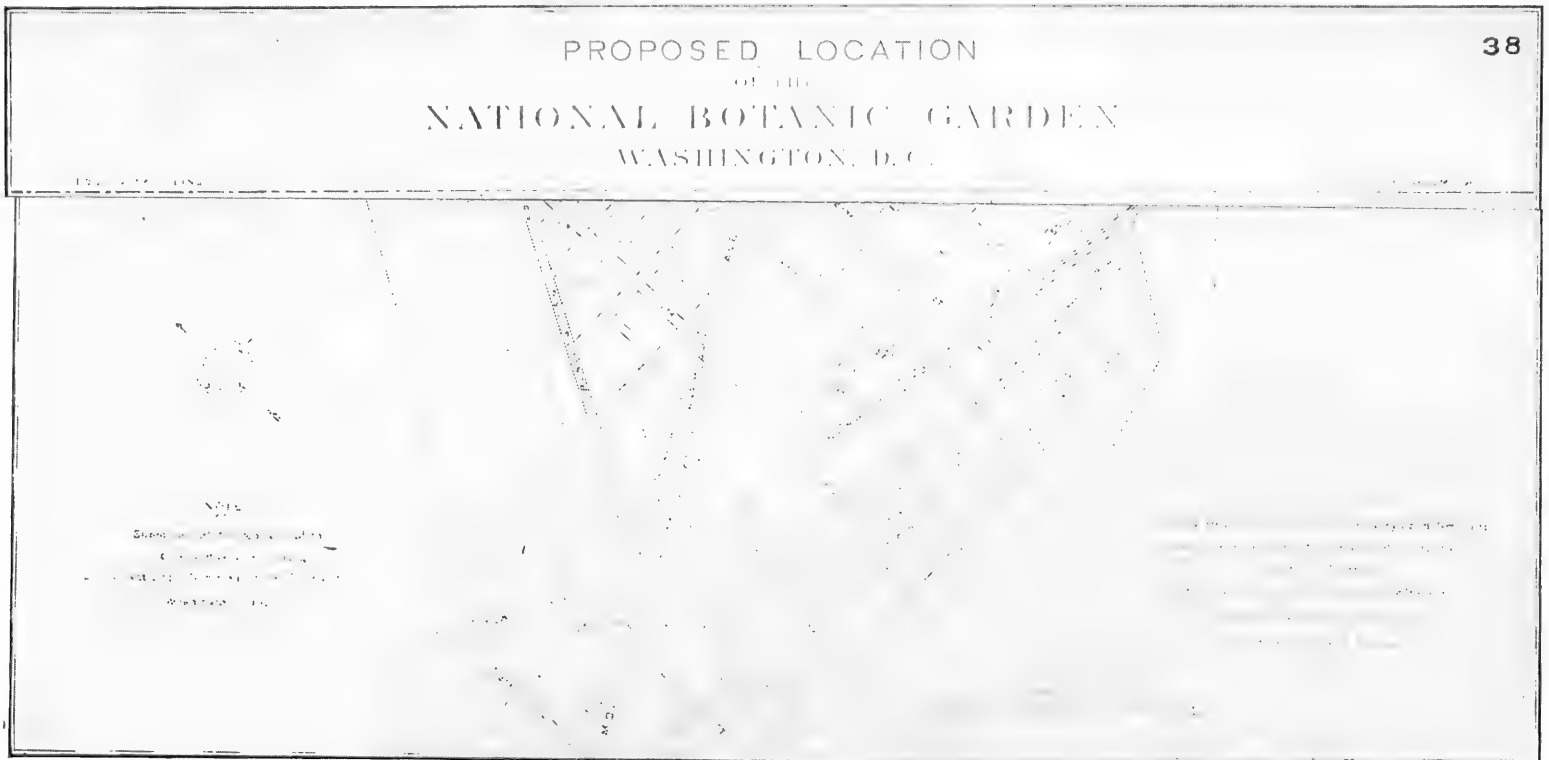
The conservatories are situated in the square immediately in front of the Capitol, west side. * * * A systematical natural arrangement of indigenous, medical, and other useful hardy plants could be formed in it, which would be of great benefit to the collegiate institutions of the District, and would assist in making Washington, with its libraries and museums, what might be called the City of Reference.

The Exploring Expedition greenhouses removed from the Patent Office have been located here about four years.

I may here state that the seeds from the collection are gathered, and, together with such plants as can be spared, are distributed to the order of the chairman of the Joint Library Committee, the Hon. J. A. Pearce, Senator from Maryland, and Capt. Wilkes; exchanges being managed by the superintendent.

In 1859 the garden was spoken of as a pleasant place to visit, with gravel walks, bordered with box, rare plants, and trees. The cultivation of plants had, therefore, by that time been extended beyond the greenhouses, and the later aspects of the site as a botanical garden, as contemplated by the Columbian Institute and on the same ground which it had occupied, had been started.

[1] A popular catalogue of the extraordinary curiosities in the National Institute, arranged in the building belonging to the Patent Office, by Alfred Hunter, 1854 and 1855, pp. 64–70.



Note the favorable distribution of forest and open land; some of this land has been under the plow for many years and together with the forested portions is in excellent condition for the purposes of a botanical garden. The contour lines show each 5-foot elevation above mean low tide, thus indicating the exact modeling of the surface of the grounds.

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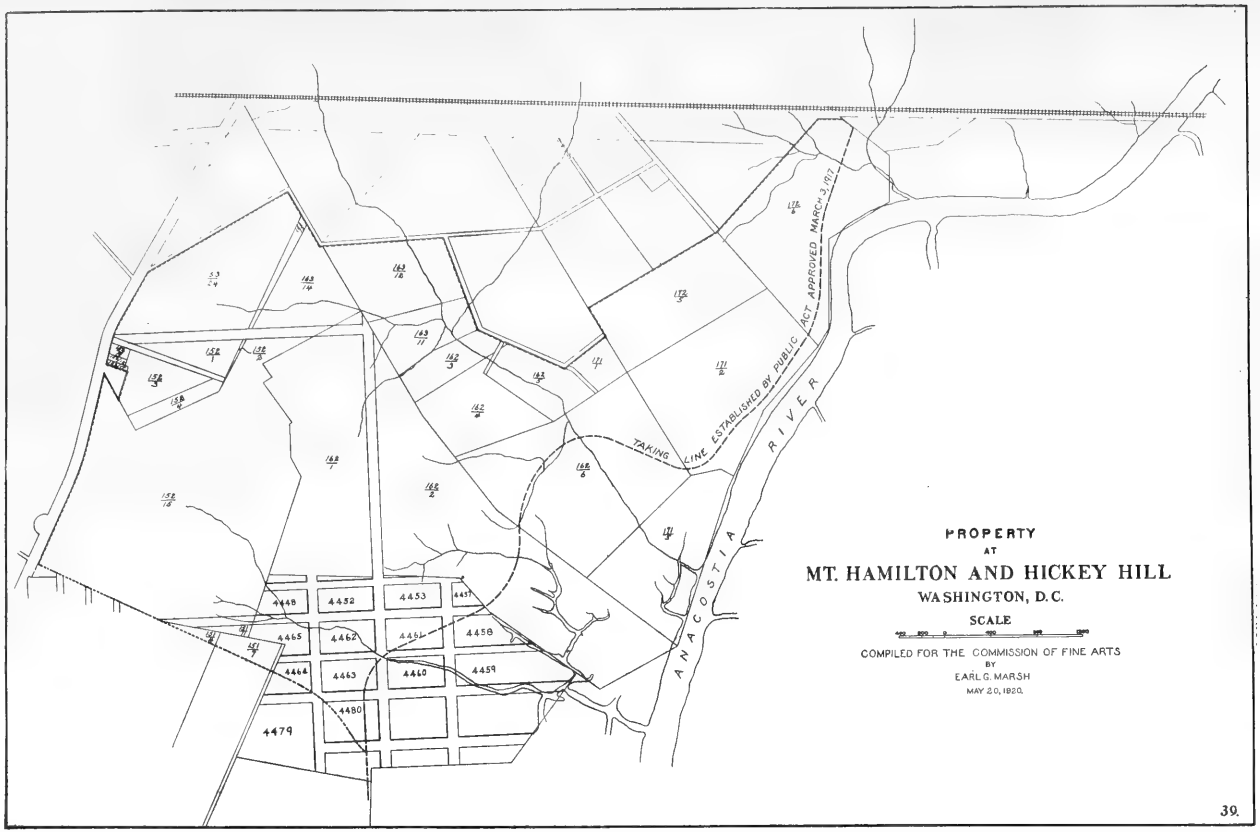
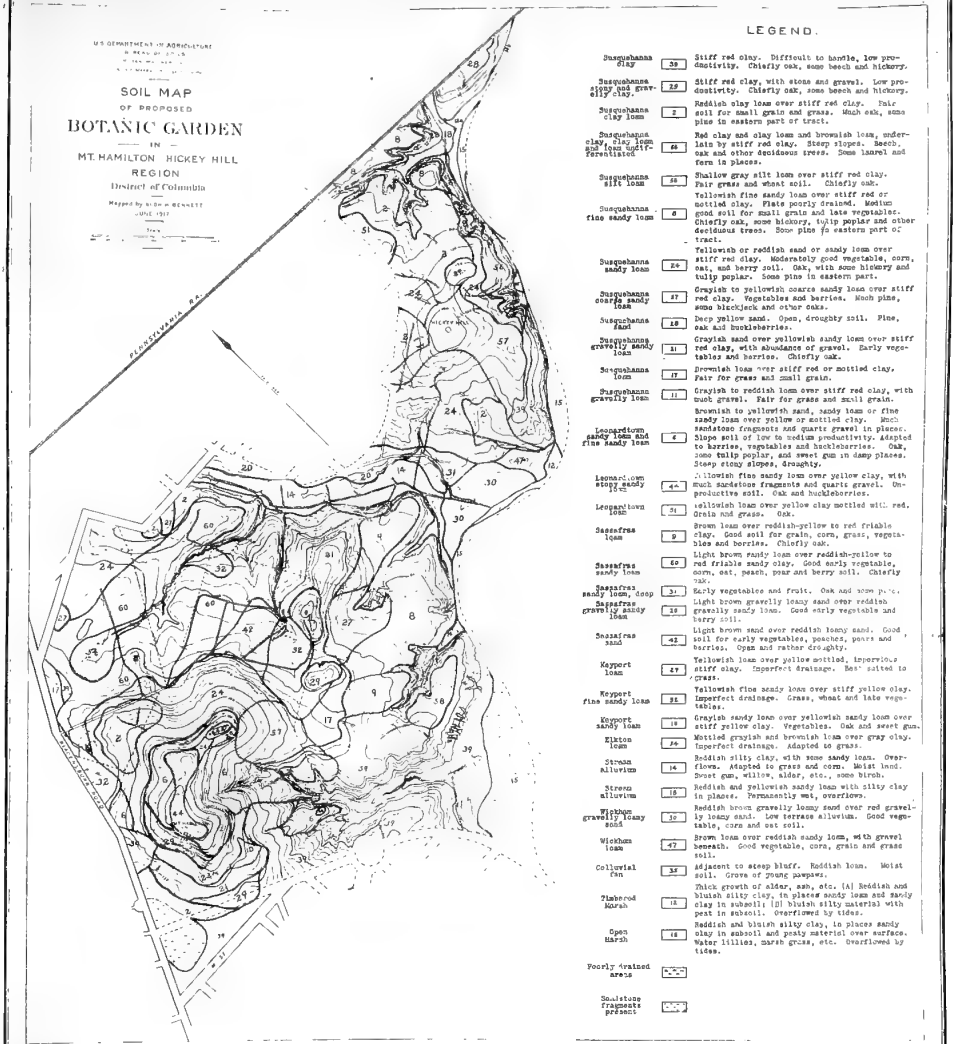
PROPOSED LOCATION
OF THE
NATIONAL BOTANIC GARDEN
WASHINGTON, D. C.

Note the favorable distribution of forest and open land; some of this land has been under the plow for many years and together with the forested portions is in excellent condition for the purposes of a botanical garden. The contour lines show each 5-foot elevation above mean low tide, thus indicating the exact modeling of the surface of the grounds.



The acquirement, by the Government, of the area shown to the right of the 1917 Anacostia taking line is already an accomplished undertaking; it requires only the addition of the remaining numbered areas to start the project to ultimate success.



An ideal situation where 52 conditions of soil distributed about the whole area makes it possible for widely diversified types of plants to thrive under conditions best adapted to their needs.