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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.



The New York Times/Chester Higgins

The new conservatory complex at the Brooklyn Botanic Garden.

Brooklyn's Big Garden Getting Bigger

By **THOMAS MORGAN**

Special to The New York Times

The Brooklyn Botanic Garden will outline a \$25 million expansion project today that more than doubles the space for public exhibits and greenhouse plantings.

The expansion, the garden's first major one since 1910, includes an unusual four-building conservatory complex, part of which seemingly erupts from the earth.

One new exhibit, "The Trail of Evolution," which is to open next month, has already generated enthusiasm among botanists, geologists and museum exhibitors around the country. They are applauding the exhibit's juxtaposition of fossils and living plants and organisms to trace what is described as the earth's history over nearly four billion years.

Upgraded Bonsai Museum

The first phase of the expansion project, the conservatory complex, was designed by the Manhattan architectural firm of Davis, Brody & Associates. With an upgraded bonsai museum and aquatic greenhouse, it is scheduled to open May 19.

The rest of the capital improvement project includes renovations to the Palm House, designed in 1914 by the architectural firm of McKim, Mead & White.

The Palm House will be used for special events and a new education center, all to be completed by next winter.

More than \$23 million has already been raised from city and private donations, according to Donald Moore, president of the Botanic Garden.

Last month the New York Botanical Garden in the Bronx announced a \$21.4 million expansion to enable it to increase research and education facilities by at least 75,000 square feet.

The expansion at the Brooklyn Botanic Garden, which is about one-fifth the size of the Bronx garden, will total 80,000 square feet. Both gardens are renowned for horticultural exhibitions and research and plant publications.

The renovation at the Brooklyn garden promises to improve the economic health of the borough. Eastern Parkway, Prospect Park and the Brooklyn Museum, all of which abut the garden near Brooklyn's central core, are also in line for renovations.

The new conservatory complex, built of tubular steel and glass, is named for a Wall Street investment manager, Michael E. Steinhardt, and his wife, Judith, who donated \$3 million to the project. With 32,600 square feet, the complex comprises a rectan-

gular conservatory and three octagonal tubular-and-glass pyramid structures.

Public entry to all four structures will be through the rectangular conservatory at ground level. Then, to reach the three octagonal conservatories, also called pavilions, visitors will walk down a flight of stairs.

The pavilions, 12,000 square feet all told, will contain a desert environment, with plants from Madagascar, North Africa, southeastern California and New Mexico; a warm temperate environment, with plants from the Mediterranean region, and a jungle rain forest, with plants used in perfume, medicine and chemical manufacturing.

Realistic Fossils Sculptured

The ambitious "Trail of Evolution," a 100-foot-long, 17-foot-high exhibit, will integrate hand-crafted models of fossilized rock with living plants and organisms. Dr. Stephen K.M. Tim, the garden's vice president of science and publications, developed the exhibit and, along with artists from the Larson Company of Tucson, Ariz., sculptured some of the fossilized material.

Fossils from the Peabody Museum of Natural History at Yale University were borrowed to make some of the Brooklyn garden's models.

"All too often, people tend to regard fossils as something separate, dead and not related to the modern world," said Dr. Leo J. Hickey, professor of biology and geology at Yale and a curator of the Peabody museum. "People sometimes regard plants as the green backdrop for dinosaurs, and by juxtaposing fossils and plants, we give people implicit understanding of things. Integration is the important thing here, and that's what makes the Brooklyn Botanic Garden's exhibit unique."

Project a Dream for Years

The expansion project has been a dream of the garden's officials for more than a decade. The project has received \$11.65 million from the New York City Department of Cultural Affairs, with the remainder coming from private donations, particularly the Kresge Foundation, the Starr Foundation and the Gladys and Roland Harriman Foundation.

"I grew up in Brooklyn, and it has a clear, emotional tie to me," said Mr. Steinhardt, the largest single donor with his wife.

In an interview with her in his 33d-floor Manhattan office suite, he noted: "Until I went back to Brooklyn, the image I had made it seem farther from Manhattan than it is. The Botanic Garden has a certain quality, peace in an urban landscape that is not so peaceful. There is an architectural quality there and a sense of history that you don't see on Third Avenue."



The New York Times

Michael E. Steinhardt and his wife, Judith, who donated \$3 million to the Brooklyn Botanic Garden conservatory project.

They Cut Redwoods Faster to Cut the Debt Faster

By ROBERT LINDSEY

Special to The New York Times

SCOTIA, Calif. — Thousands of redwood trees are being felled along California's wild northern coast in an environmental drama that is arousing high emotions and demonstrating how decisions on Wall Street can affect people, communities and natural resources far away.

The emotions have been stirred by the decision of a Houston financier, Charles E. Hurwitz, to double the rate of tree-cutting in the nation's largest privately owned virgin redwood forests. Mr. Hurwitz says the production increase is necessary to repay \$795 million that his company, the Maxxam Group, borrowed in 1985 to buy the Pacific Lumber Company here.

Pacific Lumber, a venerable old California logging company that a 1951 Saturday Evening Post profile called "Paradise With a Waiting List," had a reputation for paternalistic policies toward employees and for harvesting timber at a pace slow enough to preserve its oldest stands of redwoods well into the 21st century.

Now, many residents here contend that trees are being cut so fast that both the region's environmental quality and its economy are in jeopardy. "To pay off this big debt, they're just chewing up the environment," said John Maurer, a former employee who quit to protest the new policies. "And they're taking out the cream, so there won't be anything left for the future."

Company Defends Practices

But spokesmen for the company say the accelerated cutting is in line with common industry practice and is not environmentally unsound. They say production can be sustained indefinitely under current plans.

The Pacific Lumber takeover is one of many financed by selling high-yield, high-risk corporate notes, through Drexel Burnham Lambert, specialists in what some people call "junk bonds."

And, as in many such takeovers, Maxxam sought to pay back what it borrowed by selling or otherwise making use of the purchased company's assets.

Maxxam, through its Pacific Lumber subsidiary, now owns 300 square miles of forest in one of the nation's most undeveloped regions, including vast stands of towering redwoods never before logged. The company is doubling its production by logging for the first time in this "old growth," which yield premium-priced lumber with few knots and more beautiful grains. And instead of cutting some trees, the company is felling all the trees in selected tracts.

Maxxam's harvesting of these trees, many over 1,000 years old, to satisfy



A recently clear-cut area of the Pacific Lumber forest near Eureka, Calif.

David J. Cross

debts incurred in a corporate takeover has been under increasing attack from environmentalists and local, state and Federal officials for more than a year. In recent weeks these critics have scored several victories.

Loggers See Another Side

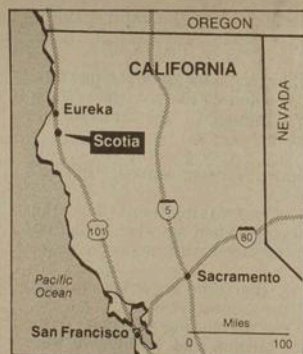
Perhaps most notable is that many company loggers and sawmill workers, who once scorned environmentalists as "tree huggers," have joined protests against the increased harvest. "They're just leveling everything," said Greg Garibay, a 34-year-old Pacific Lumber power plant worker. "They're destroying the future, leaving nothing for the next generation."

Environmental groups won court decisions blocking harvests in several parcels. Two bills were introduced in the California Legislature to prohibit large logging companies from cutting more timber than they grow each year.

Meanwhile, the harvest uproar has focused new attention on the takeover of Pacific Lumber.

Lawyers for the Federal Trade Commission say they are reviewing evidence presented by two United States Representatives who said it showed that Maxxam and Mr. Hurwitz might have violated Federal antitrust law in the acquisition. Congressional investigators also say they have evidence of "irregularities" in Maxxam's termination of Pacific Lumber's pension plan.

Spokesmen for Mr. Hurwitz deny any



The New York Times/March 2, 1988

Scotia is in logging country, amid stands of undeveloped redwoods.

illegalities or improprieties in the acquisition or in the pension plan's termination.

Big Paychecks, Big Worries

They also deny that the harvesting practices are detrimental to the environment or to the future of the local economy. John A. Campbell, a Pacific Lumber executive for several years who is now vice president and operations director here, says consultants have determined that if the company maintains its current policies for 20

years, its timberlands "will still support a substantial timber inventory of old-growth redwoods and Douglas fir." If production is then reduced, he says, there will be enough timber growth to sustain production indefinitely.

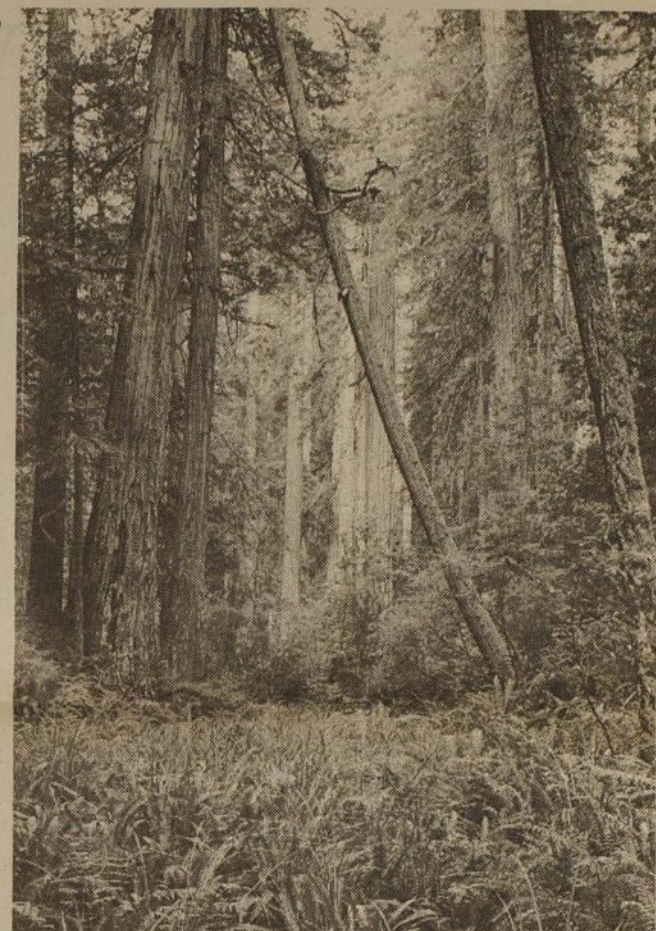
Here in Scotia and nearby logging communities, loggers and sawmill crew members are driving new pickup trucks and enjoying the biggest paychecks of their lives, with many working a 60-hour week to meet the new production schedules.

But many also worry the trees are being cut so rapidly that the region's natural resources will be depleted to form what several called "another Appalachia."

"Many people who have worked for Pacific Lumber for years feel hopeless and helpless," said William Bertain, a lawyer here who represents former Pacific Lumber shareholders fighting the increased harvest and the terms of the takeover. "They feel Maxxam is raping the land and dismembering the company."

Clearing of Large Tracts

One worker, who said he did not want his name published because he feared company reprisal, said cathedral-like groves of old redwoods towering more than 300 feet high were being "mutilated." While Pacific Lumber's practice had been to harvest logs by selectively removing some trees and leaving others for re-seeding and later harvest,



David J. Cross

A stand of old-growth redwood forest on a tract of land owned by the Pacific Lumber Company in northern California.

the practice is now to clear all trees from areas ranging from 40 acres to more than 500 acres.

"Clear-cutting is bad for the land," the worker said. "We get monsoons here eight months of the year; soil is drained off the land; and people are afraid to speak up how they feel. They're stuck here. They can't afford to move out."

But Mr. Campbell, the company executive, defends clear-cutting as a responsible, common forestry practice.

"Removing the old-growth redwood, which now grow little if at all," he told a recent legislative hearing, "will allow the land on which they stand to regenerate forests of faster-growing new trees; in addition, there will be massive replanting."

Despite such assurances, opponents of corporate takeovers financed through high-yield bonds are using the cutting of centuries-old redwoods as further ammunition.

"This is a very important example of the takeover and dismemberment of a good corporate citizen," said Representative John D. Dingell, Democrat of Michigan, chairman of the Energy and Commerce Subcommittee on Investigations and Oversight. "It is bad for employees and the economic health of the area."

Other Legal Questions

Mr. Dingell, a Michigan Democrat, is attacking the Pacific Lumber deal on another front. In a Jan. 28 letter to the Federal Trade Commission, he and the ranking Republican on the subcommittee, Thomas J. Bliley Jr. of Virginia, said Mr. Hurwitz may have violated a 1976 Federal antitrust law in the acquisition of Pacific Lumber.

They contend that Maxxam, along with an affiliated company, acquired more than \$27 million in stock in Pacific Lumber before notifying the Federal Trade Commission that it was interested in the company as a takeover target; the 1976 law, according to

spokesmen for the subcommittee, requires a company to notify the F.T.C. whenever it has acquired more than \$15 million worth of another company's stock.

On another issue, subcommittee staff members said Friday that questions had been raised about Pacific Lumber's pension plan, which had \$90 million in assets when it was terminated after the takeover.

Maxxam kept more than \$50 million and used \$37 million to buy annuities for the 2,861 plan participants.

High-Risk Assets

Those policies were purchased from the Executive Life Insurance Company of Los Angeles, which has provided annuities to employees at several companies taken over with Drexel Burnham financing. According to investigators, that insurance company was chosen for the annuities contract despite missing a bidding deadline. And four Pacific Lumber executives objected to Executive Life because a large proportion of its assets are in high-risk securities, among them a significant share of the bonds issued for Maxxam's takeover of Pacific Lumber.

Efforts were made to reach Mr. Hurwitz for his response to these allegations, but a spokesman said he was not available. In a telephone interview, Howard Bressler, general counsel to Maxxam, said the company had complied "meticulously" with all applicable laws in the merger. He said there was nothing improper about the handling of the pension plan and that the beneficiaries are well protected.

But Mr. Dingell objected that no one represented the employees' interests in the annuity purchase. With the \$50 million the company took out of the pension plan, he said, "the employees are being asked to finance the takeover and get none of the benefits of ownership — and unfortunately, this is not an isolated case."

New York Botanical Garden Planning \$21.4 Million Expansion

By SUSAN HELLER ANDERSON

The New York Botanical Garden is planning an ambitious expansion that will include a new plant science center and the renovation of its landmark museum building in the Bronx to house exhibitions.

The \$21.4 million project, the largest expansion since the botanical garden was established in 1891, reflects its growing stature as one of the world's premier plant research institutions.

The project will include a new 75,000-square-foot wing to house the Herbarium, a collection of more than five million plant specimens, and the garden's library.

The four-story brick addition will adjoin the existing complex at 200th Street and Kazimiroff Boulevard. Its design, by Philip Johnson and John Burgee, echoes the 88-year-old museum building's graceful arches and elegant facade.

New York to Contribute

The museum building originally housed two exhibition halls and the Herbarium. As the Herbarium's collection grew, however, it took over all the exhibition space. Relocating the Herbarium will allow the museum building to accommodate exhibitions again.

The garden was founded by J. Pierpont Morgan, Cornelius Vanderbilt 2d and Andrew Carnegie, among others, primarily for study and public enjoyment. Since then, the garden's research and scientific function has grown, along with its education programs and scientific institutes.

For the new wing, the city will contribute \$11.4 million and the botanical garden must come up with the rest. It is seeking to raise much more — \$62 million to finance the new construction and endow its various science, horticulture and education programs and its research institutes. Ground will be broken next January, and the building is expected to be finished in the sum-

mer of 1991. To minimize exposure of the Herbarium's collections, the new wing will have windows on one side only.

'A Great Renaissance'

"Horticulture is having a great renaissance," Dr. James M. Hester, the garden's president, said in an interview. "The new building will allow for expansion of the library, storage of our precious collections and room for graduate students and visiting scientists."

Renovation of the museum building, a Beaux-Arts confection designed by Robert W. Gibson with Corinthian columns and a copper dome, will include refurbishing a 700-seat auditorium, the creation of new classrooms and expansion of the garden's retail operation.

Dr. Hester is to announce the plans tonight in the Enid B. Haupt Conservatory, a glass structure modeled after the Crystal Palace in London, which houses 1,000 rare and fragile plants.

25,000 Species

The most visible aspect of the botanical garden is its explosion of flowers and plants on 250 acres in the north-central Bronx, where 25,000 species bloom. On a second site in Millbrook, N.Y., the Mary Flagler Cary Arboretum occupies 2,000 acres of forest and wetlands open to the public.

The garden's primary research activity is the discovery, classification and study of the earth's one million-plus plant species through expeditions. The plants serve in research that may offer new sources of food and energy and cures for diseases, as well as ways to use plants to curb pollution.

In the early 1980's, Dr. Hester, the former president of New York University, established two institutes to tie plant research to human problems.

The Institute of Economic Botany studies plants used by people. It has



The New York Times/Jack Manning

The museum building that is to undergo renovation at the New York Botanical Garden in the Bronx.

contracts with pharmaceutical companies to collect plants for medical experiments.

The Institute of Ecosystem Systems examines "how man's activities are af-

fecting the plant world," Dr. Hester said. "When we're increasing awareness of how damaging man is to the environment, it's our job to be as active as possible in the public debate on things like acid rain."

Famed Explorers Represented

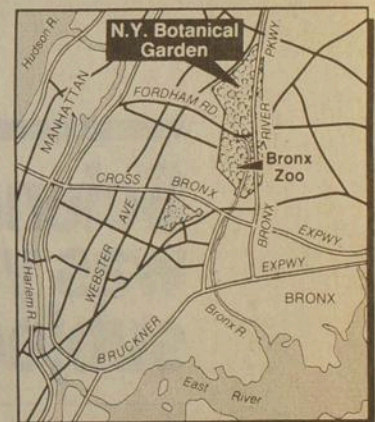
The garden's education program reaches more than 54,000 children a year. In the Children's Garden, they plant and harvest their own vegetables.

In cooperation with the City University of New York, the garden enables students to earn master's degrees and doctorates in biology. It also runs undergraduate programs with Lehman College and Bronx Community College.

A key resource for its programs is the Herbarium, one of the world's most comprehensive. Specimens are gathered on expeditions, dried, preserved, pasted onto papers and stored in cabinets, away from light, dust and insects.

Specimens from Captain Cook's first voyage in 1768 are preserved in the Herbarium's lockers. There are specimens from the Lewis and Clark expedition, and an 1835 collection by David Douglas, who gave his name to a fir tree.

Along with the Herbarium, the new center will house the garden's library,

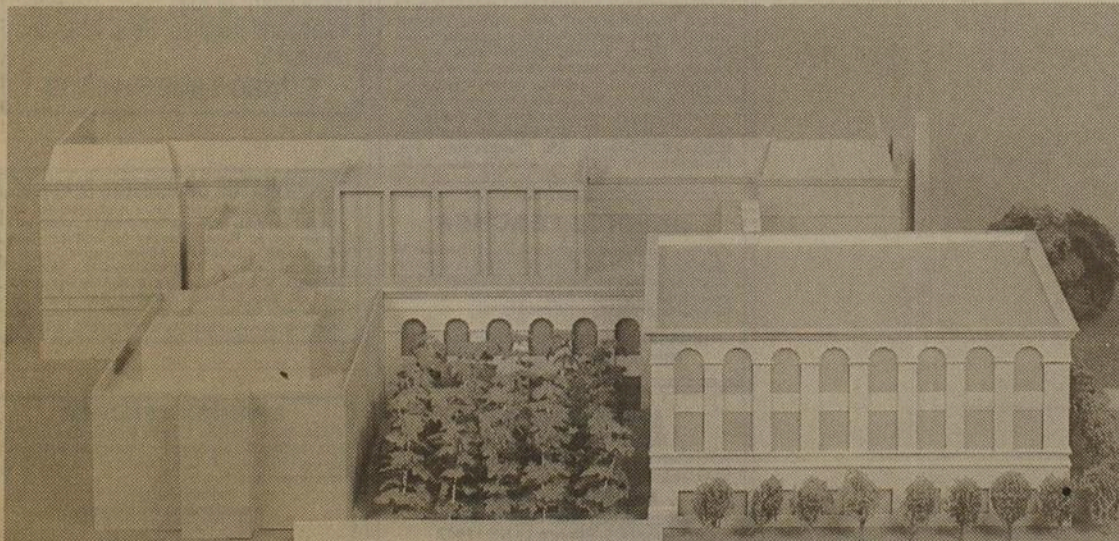


The New York Times/Feb. 24, 1988

The project is the botanical garden's largest expansion ever.

which contains writings from the 13th century to the present, along with films, photographs, drawings and prints and a collection of 18th and 19th century microscopes.

Patents: Saturday in Business Day



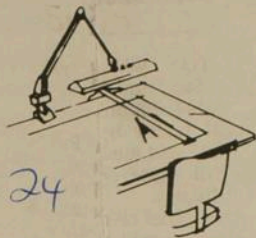
The New York Botanical Garden/Allen Rokach

Design by Philip Johnson and John Burgee for plant science center, right, at New York Botanical Garden.

FEB 24 1985

FROM THE DESK OF . . .

WILL SZABO



Feb. 24

Dear Bidsy,

This article was in the "Times" this morning. I wasn't sure if you get the paper daily or not. Any how - I thought it would be of interest. The Herbarium is mentioned a couple of times which is a plus as far as I am concerned. Now that everything is planned to be bigger + better, they may want you to hustle off to the Amazon to get more.

Love,
Babs

Design by Philip John

Bronx Bo

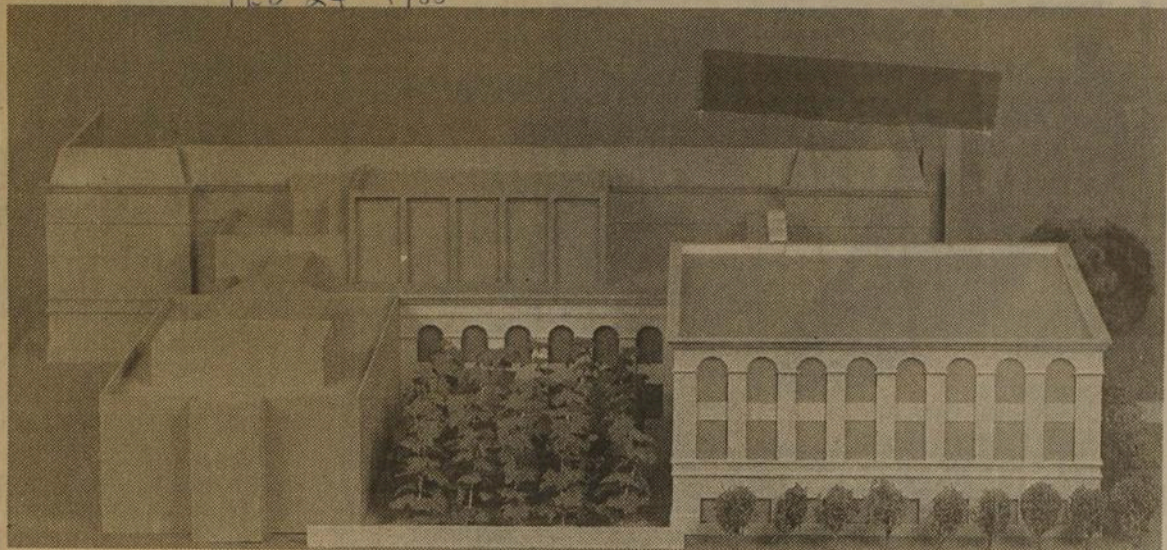
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FEB 24 1988



The New York Botanical Garden/Allen Rokach

Design by Philip Johnson and John Burgee for plant science center, right, at New York Botanical Garden.

Bronx Botanical Garden Plans an Expansion

By SUSAN HELLER ANDERSON

The New York Botanical Garden is planning an ambitious expansion that will include a new plant science center and the renovation of its landmark museum building in the Bronx to house exhibitions.

The \$21.4 million project, the largest expansion since the botanical garden was established in 1891, reflects its growing stature as one of the world's premier plant research institutions.

The project will include a new 75,000-square-foot wing to house the Herbarium, a collection of more than five million plant specimens, and the garden's library.

The four-story brick addition will adjoin the existing complex at 200th Street and Kazimiroff Boulevard. Its design, by Philip Johnson and John Burgee, echoes the 88-year-old museum building's graceful arches and elegant facade.

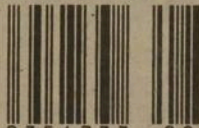
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For the new wing, the city will contribute \$11.4 million and the botanical garden must come up with the rest. It is seeking to raise much more — \$62

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Continued on Page B2, Column 4

The National Fungus Collections

Mary Ellen Lentz and Paul L. Lentz

Mushrooms and other fungi have been known since antiquity, but the terms *mycology* (for the study of fungi) and *mycologist* were not used until the middle of the nineteenth century. The father of American mycology was Louis David von Schweinitz, General Agent for the Moravian Brethren in North Carolina and Pennsylvania early in the nineteenth century, a superintendent of Brethren academies in the two states, Administrator of the landed Moravian estates in North Carolina, and distinguished field botanist of that period. The two important papers that Schweinitz wrote on the fungi of those regions were published in 1822 and 1832. Although a considerable quantity of American mycological literature appeared throughout the nineteenth century, the first journal of national scope was not established until 1885. This was the *Journal of Mycology*, founded by William Ashbrook Kellerman. Following Kellerman's death, a successor journal began publication in 1907 under the auspices of the New York Botanical Garden. This periodical, *Mycologia*, is now the official journal of the Mycological Society of America, which was organized in December, 1931.

Federally subsidized mycological research began in a very small way in the United States with collections of fungus

The authors are in Mycology Investigations, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md.



The priceless Michener Collection is maintained in five metal bookcase sections. Fungi named by Schweinitz and other early American mycologists are glued onto heavy paper sheets and filed in covers for safekeeping.

specimens by government-sponsored expeditions. This modest beginning was followed by uncertain progress for many years, even into the twentieth century. Now, the National Fungus Collections at Beltsville, Maryland, is the largest taxonomically oriented mycological facility in the United States. Its staff includes eight professional mycologists and 12 supporting workers. Administratively, the National Fungus Collections is in Mycology Investigations, a unit of the Crops Protection Research Branch, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture. It is also integrally related with the Department of Botany of the Smithsonian Institution. Mycologists of the National Fungus Collections hold appointments as honorary curators of the Smithsonian Institution, and they maintain all of the fungus specimens of the National Herbarium except lichens.

The mycological herbarium of the National Fungus Collections is regarded as the largest in America, quite possibly the largest in the world. In recent years, the National Fungus Collections has been able to purchase, or to receive as donations, several entire herbaria from other institutions. These additions have increased the total number of specimens to more than 850,000. This enormous herbarium is supplemented by a collection of reference literature that ranks among the best in the world. After

OUR FAR-FLUNG CORRESPONDENTS

A STROLL IN THE GARDEN

AMONG the hundreds of scientists currently working at the Brookhaven National Laboratory, in Upton, Long Island, where atomic energy is being studied in its many phases, there are about a dozen botanists, and not one of them, to judge from my experience on a recent visit out there, has anything but kind words to say for nuclear radiation—at least insofar as it affects his chosen field of research. Working away in their small corner of this vast installation—and it is a small corner, representing only some five per cent of Brookhaven's operations—the botanists are in a position to realize more concretely than most of their colleagues just how radiation maims and destroys living organisms, but this in no way dims their singularly cheerful professional view of it. For radiation, with its power to raise havoc among genes and chromosomes, and thereby spawn mutations that alter all forms of life, is the clue to countless genetic mysteries, and at Brookhaven the scientists are able not only to observe its workings closely but to perform unprecedented experiments with it, often in a laboratory unique in the history of science—a carefully sealed-off ten-acre garden, where, from February to November, for all but a few hours of every day, a collection of trees, vines, shrubs, vegetables, grasses, and flowers is deliberately exposed to gamma rays emanating from a captive specimen of cobalt 60, a substance that is a powerful source of nuclear radiation.

Rising to a height of nine feet near the center of this garden is a stainless-steel tube, four inches in diameter, which also extends four feet below the ground to a cinder-block pit. The cobalt 60, generally referred to as the "source," is encased in a cylindrical stainless-steel jacket—eighteen inches long and two inches in diameter, and with a four-inch-thick lead plug on top—that fits inside the tube and can be moved up and down inside it, like a piston, by a pulley system. Waiting to envelop the source when it is lowered to rest in the pit, and to absorb its rays as long as it remains there, is a cylindrical lead shield, eight inches thick. At four-thirty every afternoon during the spring, summer, and fall, after

elaborate precautions have been taken to make certain that all visitors to the garden have departed, the source slowly emerges from its shield in the pit and rises to a point about four feet above the ground. There it remains during the night and the next morning, while its rays permeate every living thing within a radius of perhaps a hundred yards. Then, at one o'clock in the afternoon, it slips back down into its cinder-block chamber, relaxing its grip on the garden long enough to let the botanists move in and study the effects of its presence.

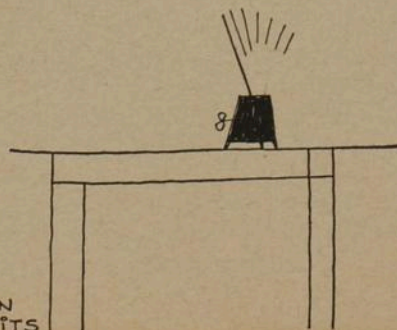
If the botanists, unlike the other scientists at Brookhaven, can experiment freely with the malignant, as well as benign, powers of radiation, the reason, of course, is that their victims are plants. As they roam about in their garden, their consciences need not be troubled at the sight of, say, a maple that, instead of serving as an erect and gracefully proportioned ornament to the landscape, stands stunted and malformed, with strangely convoluted, leathery leaves. While showing me some of Brookhaven's eerie botanical exhibits, Dr. Seymour Shapiro, coordinator of the laboratory's Radiation Mutations Program, remarked, "As far as I know, only one man—an Indian named Sir Jagadis Chunder Bose, who wrote a book called 'The Irritability of Plants'—has ever maintained that plants can feel pain. And the evidence on which he based his claim has not inspired widespread support." The botanists do not hesitate to admit that their program involves large-scale destruction of life, since harmful mutations far outnumber helpful ones (for every mutation that may lead to an improvement of the strain, there are hundreds that render it weak or sterile or monstrous), and, as Shapiro, a reflective, pipe-smoking man of thirty-three who is rather given to understatement, put it, "Of course,

a program of this sort would be out of the question for human beings, however beneficial it might be in the long run. With plants, though, we can go ahead just as we like. So far nobody has complained about the casualties."

The victims of the ritual in the garden are being sacrificed in a worthwhile and what many of the botanists believe to be an urgent cause—a campaign to produce and manipulate plant mutations in a way that will improve the various species for the benefit of mankind. A cereal grass that will stand up well against disease and frost, a flower of some rare hue, an uncommonly nutritious fruit from an uncommonly robust tree—it is this sort of thing that the botanists are searching for. Radiation, many experts believe, is the chief, if not the only, cause of mutations, and when it is concentrated and intensified, as in the garden, it drastically speeds up the process of evolution—essentially a process in which the relatively few beneficial mutations thrive and spread while the great mass of useless or retrogressive ones wither and die out. In the past, this process, stimulated only by the small and widely diffused amounts of natural radiation that are present in soil, air, and water, has moved at a pace so leisurely as to be almost imperceptible to man. Now the botanists at Brookhaven, with their ready access to the laboratory's sources of radiation, possess the means of forcing nature to hustle along, prematurely revealing her plans for the future. Compared to plants growing in accord with nature's dawdling timetable, the plants in the Brookhaven garden produce mutations in fantastic profusion. In one study made of corn, to cite a not unusual example, an examination of thirty-five thousand kernels taken from ears that had been exposed only to a natural dosage of radiation turned up eleven mutations, or not quite one in three thousand,

while the corn grown in the Brookhaven garden showed one mutation for every ten kernels.

BROOKHAVEN, where the study of plant mutations has been under way since 1949, is so far the only institution in the United States to have undertaken a large-scale pro-



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