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THEATERS, GARDENS AND HORTICULTURE[1]

By Dr. C. STUART GAGER

BROOKLYN BOTANIC GARDEN

I APPRECIATE the gracious words of President Nason, and I accept the award of the Arthur Hoyt Scott Foundation with a sense of profound gratitude to the committee of award, and especially to those who established the foundation, which has been, and which will continue to be, a potent factor in the encouragement and enrichment of American horticulture, in memory of one whose interest in plants reflected the highest ideals and accomplishments of a gifted amateur.

To be deemed worthy of a place in a group of medalists which includes Mr. John C. Wister, Professor Liberty Hyde Bailey and Mr. J. Horace McFarland, the previous recipients of this award, and Mr. Richardson Wright, to-day's recipient, is an honor which any one might justifiably covet.

And I specially appreciate the privilege and honor of having some part in the dedication of this beautiful outdoor theater, which adds so much to the cultural charm of Swarthmore College, already rich in cultural assets and traditions.

It is superfluous to say that every friend of Swarthmore is under special obligation to Mr. Thomas B. McCabe, of the class of 1915, whose generous interest in the college and in the promotion of all that is best in life has made this theater possible, as a memorial to Arthur Hoyt Scott.

The wish to be of service to mankind through the medium of botanical science, to help "the man in the

[1] Given at Swarthmore College on May 23, on the occasion of the presentation of the 1941 Arthur Hoyt Scott Garden and Horticultural Award of a gold medal and $1,000, and the dedication of a new open-air theater on the campus.

street," as well as the scientist, appreciate something of the beauty of the plant world, and of the significance and importance of a knowledge of plants, has been the inspiration of all that has been accomplished during thirty-two years at the Brooklyn Botanic Garden; and now to have this recognition as a token of public appreciation and approval, has aroused in the recipient "an emotion warmer than mere intellectual gratitude."

If anything has been accomplished at the Brooklyn Botanic Garden during the past thirty-two years worthy of such recognition as this, it is due to the support and encouragement of generous and philanthropic trustees and other citizens and to the loyal cooperation of an able staff, which has made possible the development of an institution after a pattern which, in its entirety, is essentially new for a botanic garden.

Nothing, of course, can surpass the solid satisfaction of being able to spend one's life in doing what one most likes to do. In 1675 the Italian, Malpighi, cofounder with Englishman, Nehemiah Grew, of the science of plant anatomy, wrote, "In performing these researches so many marvels of nature were spread before my eyes that I experienced an internal pleasure that my pen could not describe." Happy is the man who, as I can do, may write thus of his life-work. But there is a deep gratification also in being made to realize that the results of one's efforts have commended themselves to others who are competent to judge, and that they have been of benefit to mankind.

An outstanding award, such as this one, not only gives confidence and encouragement for the future, but it can not fail to direct favorable public attention to the undertaking thus recognized, and thereby encourage the moral and financial support without which no institution can prosper.

In the year 1593 Queen Elizabeth made an official visit to Oxford University. The Latin play performed in her honor was written by my ancestor, an Oxford don, the Christ Church dramatist, Dr. William Gager. The Puritans of that time were violently opposed to the theater, and Gager's Latin plays brought down upon him the wrath of this unfriendly sect, led by Dr. John Rainolds, of Queen's College, Oxford. To prove the ungodliness of Dr. Gager, Rainolds published a book, "Th' overthrow of Stage-Playes," which is famous in the history of the academic stage.

And so it has been of interest to me, and may possibly have a mild interest for this audience, that almost exactly 350 years after the noise of battle between the Puritans and my ancestor died away, a Quaker college, presided over by a president who is an Oxford graduate, now invites a descendant of William Gager to give an address in dedication of an outdoor theater on the campus. So the wheels of history go 'round!

In that unusual "Swarthmore Saga," "An Adventure in Education," by the Swarthmore College faculty, relating the advances made by the college during the nineteen years of the administration of President Aydelotte, it was possible to refer truthfully to the Swarthmore campus as "a campus which is one of the horticultural delights of eastern Pennsylvania." And one may now add the statement, with confidence, that no campus combines, at the same time, more educational value in horticulture with horticultural beauty. Nature has done much for the Swarthmore campus, and this has been taken advantage of to the fullest extent by the authorities—and notably in this newest feature of an outdoor theater, converting natural topography and scenery into a place of delightful outdoor assembly.

A brief word about the history of outdoor theaters and the term scenery may not be without interest at this time and place. As is well known, the word "theater" is from the Greek verb theáomai (θεάομαι), meaning "to view," "to behold," and giving us finally the word *théatron* (θεατρον), meaning "a place for seeing," "a theater." The theater, like most elements of our secular culture, originated in Greece. At first it was nothing more than a dancing circle or orchestra, (ὀρχήστρα) marked out around an altar, and, like this one, it was commonly located at the foot of a hillside on which the audience stood or sat. Later there were tiers of wooden seats built against the hillside for the audience. The most prominent and important object was an altar of Dionysus, placed in the center of the *orchéstra*. There was no stage, and the theater was regarded as the temple of Dionysus, who was the very heart of all Mediterranean religion.

In the classic theater on the southeast side of the Acropolis, in Athens, the temple of Dionysus Eleuthereus stood back and to one side of the circle, and to meet a need of the actors a tent was placed at the edge of the *orchéstra*, where the actors might retire for changes of costume. The Greek word for tent is *skene* (σκηνή), from which we have our words "scene" and "scenery."

It is common knowledge that, in their theaters, as in many other ways, the Romans copied the Greeks. The outdoor theater of Pompey, in Rome, built about 52 B.C., seated about 10,000 persons. At its inauguration some 500 lions and 20 elephants were killed by gladiators. To-day, it would appear, the outdoor theater is inaugurated or dedicated by a program which includes the slow torturing of the entire audience by an actor selected, as here and now, for that specific purpose.

But what has the theater got to do with horticulture? Dionysus, the divine patron of the drama, was also a "Year-God" or "Vegetation-Daemon," and the

death and re-birth of Dionysus are the very essence of Greek tragedy. The reawakening of vegetation every spring was regarded by the Greeks as heralding his resurrection. Dionysus was also the god of wine, the product of the vine, and the great philosopher, Spinoza, tells us that, "It is the part of a wise man to feed himself with moderate, pleasant food and drink, and to take pleasure . . . with the beauty of growing plants . . . and theaters."

How interesting to recognize that horticulture has been so intimately related to the most profound concerns of the human mind—to art, to science, to education, to the drama, to religion. And how fitting to have upon this campus, so interesting and so beautiful horticulturally, the added feature of an open-air theater.

When Aristotle, about 375 years before Christ, established at Athens the first "botanic garden" of record, and placed his pupil, Theophrastus, in charge of it, the main object, as in the Arthur Hoyt Scott arboretum, was to provide a place for growing native and foreign plants, thus making them more easily accessible for study. We are told that the botanical researches of Theophrastus were based primarily on this collection of plants.

But Theophrastus, like Aristotle, was essentially a teacher, and he embodied the results of his lectures on plants in nine books and published them. Thus, from this early and primitive botanic garden, there emerged the two fundamental aims of all subsequent botanic gardens, namely, the advancement and the diffusion of a knowledge and love of plants; thus, also, were set the standards and the limitations of the activities of botanic gardens for nearly two thousand years—the search for new knowledge and the publication of the results *for the educated minority* of mankind. And this statement is made not to criticize but to commend, for in this way the greatest need of botanical science was met.

It would be difficult to exaggerate man's ignorance of plant life from the time of Aristotle even up to the nineteenth century. We say that the function of a botanic garden is the advancement and diffusion of knowledge; but in Aristotle's time, and for many centuries thereafter, there was not only no receptive general public for popular scientific education, but there was very little botanical knowledge to diffuse. This was due in part to lack of research and in part to the stupefying influence of superstition.

Nowadays every schoolboy and every schoolgirl knows the parts of the flower and the functions they perform. In Aristotle's time practically nothing was known of this, and it was not until 1793—almost the beginning of the nineteenth century—that Christian Konrad Sprengel, by painstaking research, demonstrated beyond dispute the rôle of insects in transferring pollen from one plant or flower to another.

As for the effect of superstition on scientific inquiry, we may cite the statement of Jerome Bock. He was a teacher, preacher, physician and botanist. His "*New Kreuterbuch*," first published in 1539, had six subsequent editions, and inaugurated the subject of plant description for the first time since Theophrastus. He was the first man to describe the stamen of flowers as made up of two parts, and the first to use the words "pistil" and "pollen." I refer to these matters as indicating his intellectual power and originality. He was one of the educational leaders of his time. But when he describes his investigations by which he was the first to discover that ferns reproduce by spores, he tells us that he made his observations on four successive years, in each case watching "all the night before the feast of St. John the Baptist." His own superstition and that of his contemporaries is further indicated by his statement that, "In these experiments I made use of no magic, or conjuring, or incantations"!

Illustrations of the newness of what is now common knowledge might easily be multiplied, but those just cited are specially appropriate to recall on this occasion, for they are foundational to the whole subject of plant breeding and ornamental horticulture. Without this knowledge of plant reproduction—of the structure and function of flowers—we should have only the "wild" flowers that "nature" provides, and we should lack all the innumerable horticultural varieties of iris and lilacs, peonies and roses, flowering cherries and chrysanthemums—not to mention the "bigger and better," earlier and prolificer varieties of fruits and vegetables with which our modern gardens are enriched. Without this knowledge it would be much more difficult to feed the enormous army we are now being forced to mobilize.

But civilization never stands still, and one of its greatest forward strides was the gradual but steady diffusion of democracy and, with democracy, of education among the masses. That which was known only to the intellectual aristocracy in the Middle Ages is now taught in all our public schools. It is not only free to all, it is compulsory to learn it.

The idea that the general diffusion of the method and results of science was second only in importance to scientific research has spread steadily, but all too slowly, since about 1875, when Asa Gray did not think it beneath his dignity as the greatest American botanist to write for public consumption his illuminating and non-technical little books on "How Plants Grow" and "How Plants Behave." This, and other similar instances, are striking illustrations of the truth that the humanizing and popularizing of knowledge are quite as important as the increase of knowledge.

In 1921, at the inaugural dinner for Dr. Aydelotte, the then new president of Swarthmore, Mr. George Walton, of the George School, wisely stated that "The Golden Age of Quakerism lies ahead. Its greatest activity will be education." It was such a recognition as this of the importance of education and of testing new ideas of education, that led to the formulation of the program of activities of the Brooklyn Botanic Garden when it was established in 1910. A new opportunity and therefore a new obligation for botanic gardens was recognized—not only that our knowledge of plant life should be promoted by scientific research, but that popular education concerning plant life should render to the general public a definite return in the way of public service along the lines of intelligent popular interest and public need. And so the keynote for the Garden was adopted and announced—"For the advancement of botany and the service of the City."

It seems fitting at this time to give a brief statement of the nature of the work as well as of the underlying philosophy for which the Arthur Hoyt Scott Award for 1941 has been made, for it is of general application.

For many years the Brooklyn Botanic Garden, so far as known to the speaker, has administered the most extensive and most varied program of popular public education of any botanic garden in the world, including not only what is now known as "adult education," but also courses of informal instruction for children in greenhouses and plantations. The scope and nature of the Garden's work has been stated as, "Anything scientific or educational based upon plant life," beginning with children's gardens (conducted primarily as an educational discipline) and including all aspects of botany and horticulture.

Many boys and girls have voluntarily attended these courses for children for from three to eight years consecutively, and many have thereby discovered their major interest in life, have taken their Ph.D. in botany and have become college professors of botany or horticulture or have gone into commercial horticulture for a life work.

The annual attendance at courses and lectures has averaged more than 100,000 a year. During the past twenty-nine years of the Garden's existence it has exceeded a grand total of more than 2,600,000 adults and children.

The plantations of the Garden have been developed as an outdoor museum of plant life. The diversity of the plantations, which comprise some twenty different kinds of gardens, led one of our friends to refer to them as "Gardens within a garden," and this designation has been officially adopted.

Of course the great tradition inaugurated by Aristotle's Garden—the advancement of botanical knowledge by research—has not been neglected. The investigations undertaken have resulted in substantial additions to knowledge which have been applied in connection with the maintenance of our own plantations, utilized in connection with a bureau of free public information, and given to the public through publications.

And I must mention one more aim and accomplishment as being most closely related to the interests of the founder and the namesake of the Arthur Hoyt Scott Foundation, and that is the beauty of the plantations. I quote from the Annual Report of the Garden for 1939:

> While the primary aim of the botanic garden is educational, we should minister not only to those who come to learn the Latin name of the Lilac, or what plant family comes between the Buttercups and Roses, or the latest variety of Iris, but also to those who come to seek only happiness and re-creation amidst beauty. And thus it becomes a fundamental aim to make the Brooklyn Botanic Garden as beautiful as possible.

The speaker's experience of thirty-two years has driven home the lesson that to develop an efficient botanic garden or arboretum takes time and patience and cooperation. Always and continuously it requires the education of the public and the trustees as to the aims and opportunities and requirements. That the highest efficiency requires adequate financing is a truism. That fact, however, is not always recognized and, when it is, it is not always easy to realize.

Just as plants grow old or obsolescent and have to be replaced from time to time with new or better plants, so also does knowledge about plants and their culture continually need revising and replacing with new ideas and information resulting from research.

In his "Ten-Year History" of the Scott Foundation, the present director, Mr. Wister, has stated this aspect of the work most effectively, pointing out the need of further studies in the breeding of ornamental plants, in their diseases, in their relation to their environment, in their nutrition, in their relationship to each other and in their naming.

The problems outlined, says your director, "are continuing ones, which could probably demand the attention of the Scott Foundation decade after decade." And I may add, it is attention to such necessary problems that raises a true arboretum or botanic garden above the level of a commercial nursery and makes it in a very real sense an educational institution.

The "Ten-Year History" quotes the great first director of the Arnold Arboretum, Professor Sargent, as stating that no plant collection can be worthy of scientific standing unless it has associated with it a first-class herbarium and a library. "There can be no doubt of their importance," says Mr. Wister, "even

if the point of view of this Foundation . . . is that of the practical gardener and not of the scientific botanist."

"Fundamentally," as he truly says, "the two points of view are, or should be, one," and I was gratified to read, with whole-hearted approval, his further statement that the Arthur Hoyt Scott Foundation "should be and is as much interested in scientific achievement as are any other botanical gardens."

As every one knows, we are now living in a most terrible period of the world's history. We are engulfed in a world revolution. It is a revolution of annihilation. Its aim, partially accomplished, is the obliteration of every moral, religious and educational standard and value. The civilization of human freedom and opportunity, into which you and I were born and with which we have been familiar all our lives, is threatened with extinction. Much of the old will permanently pass away, but everything possible of value must be salvaged from the old and incorporated into the new civilization to come.

These values have been stated so recently and so frequently that it is not necessary to enumerate them here. They include the advancement and diffusion of knowledge, of a love of truth and beauty, and a freedom to cultivate whatever emancipates the spirit of man from all that is sordid and base, from ignorance and superstition.

The only war of aggression that was ever fought to attain these ends has been waged by our churches, our institutions of science and art, our schools and colleges, our museums and botanic gardens—not by guns and bombs, but by the method of St. Paul, of overcoming evil with good, ugliness with beauty, ignorance with knowledge. What a privilege it is to be free to have some part, however small, in leading the coming generations in America toward a higher and still higher type of Christian civilization. Said Lord Tweedsmuir, in his autobiography, "Politics is still the greatest and most honorable adventure." We agree with this with one exception; for "politics" we would substitute the word "education."

THE SMITHSONIAN INSTITUTION AS AN ILLUSTRATION OF INTERNATIONALISM IN SCIENCE[1]

By Dr. CHARLES G. ABBOT
SECRETARY OF THE SMITHSONIAN INSTITUTION

ON October 23, 1826, James Smithson, the natural son of Hugh, Duke of Northumberland, and of Elizabeth Macie, a lineal descendant of King Henry the Seventh, made his will. It contained this provision: "In the case of the death of my said Nephew without leaving a child or children . . . I then bequeath the whole of my property . . . to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an Establishment for the increase & diffusion of knowledge among men."

This provision became effective on June 5, 1835, and became known at our State Department in September, 1835. President Jackson announced the matter to Congress in December. Senators Calhoun and Preston of South Carolina strongly opposed acceptance, but Senators Jefferson Davis of Mississippi and Leigh of Virginia recommended it, and after some months prevailed. In the House, ex-President John Quincy Adams was a strong advocate, and secured the approval there. On July 1, 1836, the President approved the bill of acceptance, and at once sent Richard Rush of Philadelphia to England to prosecute the claim in the Court of Chancery. Through Rush's tact and diligence and through the aid of English friends, the mission was accomplished in two years, notwithstanding that in those days chancery suits sometimes began with a man's lifetime and their termination became a feature of his epitaph.

On May 9, 1838, the Court of Chancery handed down its epoch-making decree adjudging the Smithson bequest to the United States. Mr. Rush sailed with the gold in the packet ship "Mediator" and deposited £105,000 at the United States Mint in Philadelphia on September 1, 1838.

Eight years later, after prolonged debates in Congress regarding this unprecedented gift, the Smithsonian Institution was founded by the enabling act approved August 10, 1846.

The Institution is the ward of the Government. It is governed by a Board of Regents comprising the Vice President, the Chief Justice, three Senators, three Representatives and six eminent citizens. Their Secretary is the Executive Officer.

The Regents were particularly happy in selecting Professor Joseph Henry of Princeton, the eminent discoverer in electricity, to be their first secretary. He conceived the plan of operations which has been followed for nearly a century, which has made the Insti-

[1] World-wide broadcast of the American Philosophical Society and WRUL, Philadelphia, May 15, 1942.