THE MYCOFLORA OF BERMUDA

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NEW YORK BOTANICAL GARDEN

THE Bermuda Islands, because of their nature and location, have always been of extreme interest to botanists as well as vacationists. Since the islands were built up in mid-ocean, and apparently never connected with any other existing body of land, all the land plants originally found there must have come from the outside world through natural agencies, for the islands were uninhabited up to the time of their colonization in 1609, and since many species are endemic it must be concluded that these have originated there through modification of pre-existent forms under extreme conditions of isolation.

When the writer made his first visit more than thirty years ago, in company with Dr. N. L. Britton, to study the flora of these islands, they were a "closed book" so far as our knowledge of the fungi was concerned. Up to that time few American mycologists had touched their shores, and they apparently paid little attention to the fungi so that scarcely more than a score of species were known. In fact, the islands were thought to be barren of this type of growth. However, as a result of our first two-week visit enough species were collected and identified to increase the total number to 122, which number has grown to nearly 400, exclusive of lichens, of which there are 89 species known.

The only other American mycologist who has devoted any considerable attention to the study of Bermuda fungi is Professor H. H. Whetzel, who spent a year there, 1921 to 1922, adding greatly to our knowledge of parasitic fungi, especially the rusts and smuts, and accompanied the writer on his second visit during the winter of 1926. All this work was conducted in collaboration with the local pathologists.

Two return visits were made by the writer, one during the autumn of 1938, and the other covering about the same season in 1940. While these were technically vacation visits, and of short duration, all the time was spent in the investigation of the fungi of the islands in collaboration with Mr. J. M. Waterston, then and up to the present time official plant pathologist. As a result of these two trips twenty-one new species have been described and many others added to the flora of the islands, some of which are of unusual interest from the standpoint of distribution. A few of these will be briefly discussed.

One interesting form collected on our first visit in 1912 was a little scarlet cup-fungus occurring on the dead foliage of native cedar. This was identified as *Sarcoscypha minuscula,* a species which had been described on dead foliage of cedar from Portugal just one year before we collected it in Bermuda, but nothing seems to have been known of the species in Europe outside of the original collection. While this is one of the more inconspicuous forms, it has been collected by the writer on each of his visits, as well as independently by Professor Whetzel, so that it may be said to be fairly common in those islands. So unique was the species that it was made the type of a new genus in our treatment of the cup-fungi of North America. Nothing more was heard of it until the species was reported from the Yosemite National Park, California, on incense cedar in 1941. This seemed so unusual that in our skepticism we wrote for a specimen of the California fungus. To our surprise the species was absolutely identical with that obtained in Bermuda. So, up to the present time this fungus is known from only three localities in the world: Portugal, Bermuda and the Yosemite National Park, California. It is possible that it is widely distributed and has merely escaped observation, but having been noted so many times in Bermuda by different collectors, this explanation scarcely seems plausible.

One more illustration of European species in Bermuda will be drawn from our pet group, the cup-fungi. Going back again to 1912, on that occasion another cup-fungus was collected which is larger and more conspicuous than the preceding, forming dark purple cups one half to three quarters of an inch in diameter, which by reason of their color contrast strongly with the white sandy soil on which they grow. This species, *Lamprospora Planchonis,* like the preceding, was originally described from Europe with one later collection from North Africa. It may be collected any place throughout the Bermuda Islands. Although known from Europe, and by far the commonest cup-fungus to be found in Bermuda, it has never been reported or seen from the mainland of North America, although the writer has searched for it in similar locations here. From the above it might be assumed that Bermuda had at some time had a land connection with Europe, but let us not be too hasty in our conclusions, for often strictly American species have also been found to be abundant in those islands.

Two illustrations of the latter might be cited. In 1926, in company with Professor Whetzel, an interesting fungus, *Poronia leporina,* was found on rabbit pellicles in one of the smaller islands in Hamilton Harbor. This species was originally described from material collected in Missouri in 1889, and at the time it was found in Bermuda was known from only three collections in America over a period of fifty-three

years. Yet this species was found to be abundant on one of the Bermuda Islands. Unfortunately, we have been unable to revisit this island, and at the present time it has been taken over as an American military base so that we can not check on its reoccurrence.

A second species, rare in America but abundant in Bermuda, is one described as new by the writer more than thirty years ago as *Ophionectria cylindrothecia* from a single specimen collected on cornstalks in Ohio at a much earlier but unknown date. Nothing more was seen or heard of this species until it was found among material on palm stems sent by Professor Whetzel in 1921 from Bermuda for determination. On our later visits to Bermuda it was again collected and found to be exceedingly common and abundant on the native endemic palmetto palm. This species then is known from no other place in the world except from one original collection in Ohio and abundant material obtained in Bermuda at different times and by different collectors. Just why should certain species, exceedingly rare in Europe or America, be abundant in this isolated spot? No explanation can be offered at the present time.

Of more than a score of species described as new to science from material collected on our last two visits, one only will be mentioned here, a subterranean puffball, *Scleroderma bermudensis,* described by Professor W. C. Coker, of North Carolina. Remains of this fungus were frequently noted on the sands along the shore and at first taken to be those of an earthstar. It was some time before it was discovered that it was the outer covering of a puffball which during its early stages was entirely concealed in the sand. At maturity the outer covering splits into several rays which bend outward in such a manner as to raise the spore mass as "by its bootstraps" out of the sand where the spores are easily and quickly dispersed by the wind, leaving the remains looking like pieces of dried leather. It is difficult to locate one before the outer covering begins to rupture, at which time this peculiar organism first becomes evident as a crack in the sand. This seems to be another endemic species.

All scientific exploration in these islands, which has become a naval base, has been suspended "for the duration." But there will always be a Bermuda, and it is hoped it may escape the ravages of war, and when the conflict is over it may remain the quiet, restful place so greatly beloved by such men as Woodrow Wilson, Mark Twain (Samuel Clemens) and many other outstanding Americans. At that time we hope we may resume our explorations and researches in that obscure but fascinating field, the mycoflora of Bermuda.

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SCIENTIFIC EVENTS

DEATHS AND MEMORIALS

DR. CHARLES NELSON HASKINS, Chandler professor of mathematics at Dartmouth College, died on November 14 at the age of sixty-eight years.

DR. LUTHER CROUSE PETER, professor emeritus of ophthalmology of the Graduate School of Medicine of the University of Pennsylvania, died on November 12. He was seventy-three years old.

GEORGE BURR UPTON, professor of automotive engineering at Cornell University, a member of the faculty for thirty-seven years, died on October 2 at the age of sixty years.

DR. ROBERT LINTON, of Los Angeles, consulting mining and industrial engineer, died on November 12 at the age of seventy-two years.

THE New York City Board of Health on November 10 adopted a resolution in memory of the late Dr. S. S. Goldwater for "Raising to new and high levels the standards of medical care." Dr. Goldwater, who had been a commissioner of the City Board of Health, died on October 22.

THE NATIONAL REGISTRY OF RARE CHEMICALS

THE National Registry of Rare Chemicals, Armour Research Foundation, Thirty-third, Federal and Dearborn Streets, Chicago, receives requests for sources of certain chemicals at a rate of approximately two hundred and fifty per month.

Dr. Martin H. Heeren, director of the registry, sends a list of chemicals for which no source is known to the registry. If any reader has one or more in his laboratory, he is urged to communicate with the registry. Even small amounts are important, inasmuch as all requested chemicals are to be used for experimental purposes only.

1. 2,4,6,2′,4′,6′ Hexachloradiazoamino benzene
2. Quinone-bis-beta naphthylimine
3. Porphyrindien
4. 5-Amino-Nicotinic Acid
5. Diethyl Oleyl Amid Phosphate
6. Hexamethylene di iso cyanae
7. Fused Titanium rod 99 per cent. pure
8. $CaSi_2$
9. Lichenin
10. Pepsinogen
11. 1,8 Dihydroanthraquinone
12. Calcium Sulfaguayacolate
13. Ergotamine Tartrate
14. 2,3,5-triiodophenoxy acetic acid
15. 2,3,5-trichlorophenoxy acetic acid