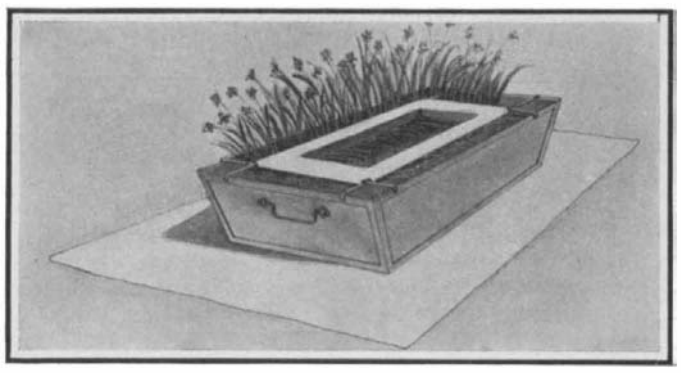
A POLLEN-GATHERING PATENT DEDICATED TO THE PUBLIC.

Mr. E. Moulié of Jacksonville, Fla., has invented a pollen-gathering device, patents for which he has dedicated to the public for the general good. Furthermore, he will place the device at the disposal of scientific men who are interested in the gathering of pollen. The apparatus is suitable for universities and colleges, and such institutions where botany is taught.

The importance of the invention may perhaps be gaged if we consider the previous methods of gathering pollen. With the first of his machines Mr. Moulié, under the most favorable circumstances, gathered one and a half ounces of pure pollen of the ragweed (*Ambrosia Artemisafolia*) in three days, and this with three charges of twigs, one for each day. It was the opinion of the late Prof. A. A. Curtiss, a prominent botanist, formerly connected with the Smithsonian Institution, that to collect that amount of pollen it would have taken one hundred persons thirty-six hours.

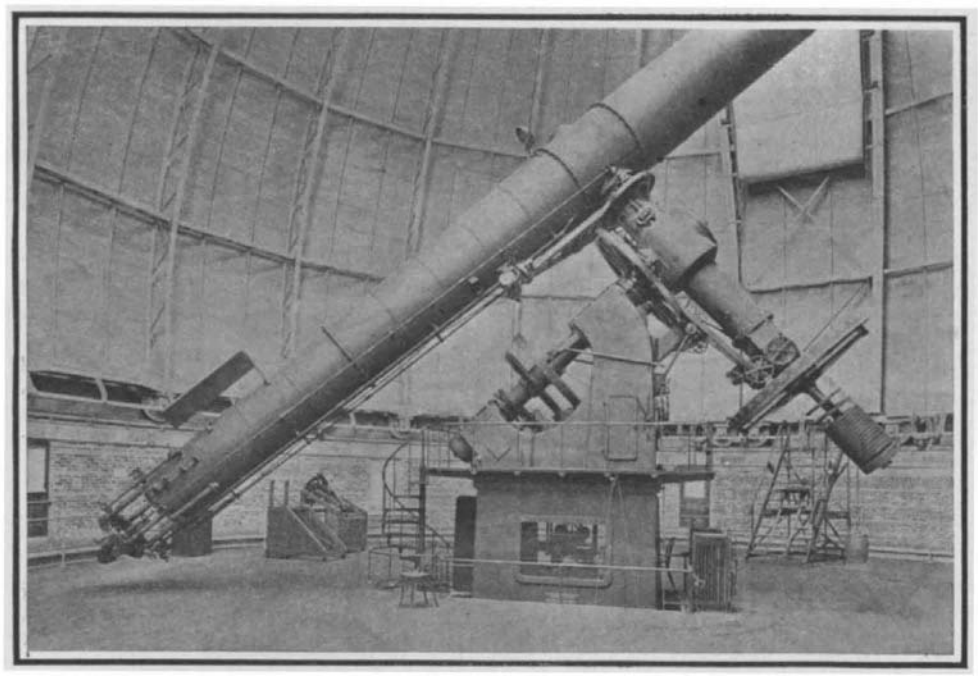
Mr. Moulié's device consists of a vessel provided with means for holding the slips or twigs bearing the blossoms from which the pollen is to be collected. The vessel is filled with water, so as to keep the twigs fresh and ripen the blossoms. The blossoms overhang the edge of the vessel, so that the pollen falls upon a paper sheet spread closely around the bottom of the vessel, which bottom is narrower than the top of the vessel, so that the paper is free to be removed without touching the vessel. The vessel or tank is made of sheet metal. Over the top of the tank is a sheet-metal plate supported over two longitudinal and two transverse rods, the edges of the plate being bent around the rods. This cover plate is smaller in area than the top of the tank, so that a narrow channel or opening is formed around the entire perimeter of the plate. The rods project across this opening, their ends being bent over the rim of the tank. Into the openings around the plate the twigs and branches are inserted, their lower limbs being immersed in water. The branches are tilted, so that their upper ends project beyond the sides of the tank. To keep them in this position, and to prevent them from sliding too far into the tank, the cover is cut at the center to form a pair of flaps, which are bent outward and engage the stems. As previously stated, the tank is surrounded by sheets of paper, on which the pollen falls as the blossom ripens. The ripening is brought about by the gradual rise of temperature in the room where the operation takes place. When desired, the water in the tank may be drawn off without disturbing the branches, through a tube connected with a stopcock near the bottom of the tank. Fresh water can be poured through an opening in the cover plate. The device renders it possible to collect the pollen of flowers in unlimited quantity in its full state of fertilizing power, a thing impossible to be sure of by the ordinary process, hitherto the only method available. The ease with which much pollen can be collected at practically no cost renders it possible to obtain a sufficient quantity for accurate and exhaustive analysis, and to add to our knowledge of that wonderful mystery of nature, the breeding of plants. Moreover, an antitoxin for diseases such as hay fever could probably be prepared from the pollen of the ragweed. If the device served this purpose alone, it would reflect considerable credit upon its inventor.

To obtain pollen from the ragweed, Mr. Moulié selected a room having a single window exposed to the east, two windows exposed to the south, and one window exposed to the west. The apparatus was charged with twigs bearing ragweed flowers which were not quite open. The charged apparatus was placed upon a table extending from one end of the room to the other, with a space of two feet between the apparatus and the walls. The vessel was filled with clean water poured in through the opening at the top, care being taken not to spill any of the water on the flowers. The paper was then spread around the apparatus, so as to cover a sufficient space from the bottom of the apparatus to about six or eight inches beyond the perpendicular line of the top of the twigs, so that the pollen could not drop outside of the paper. The paper employed was a thick Manila brand. After the apparatus was installed, all the windows and adjacent doors were closed, and a Rochester kerosene lamp having a burner one inch in diameter was placed on the floor. To avoid the danger of fire, the lamp was placed in a large tin can. After the lamp had been lit, the apparatus was left to itself, and the door of the room locked until the next morning.

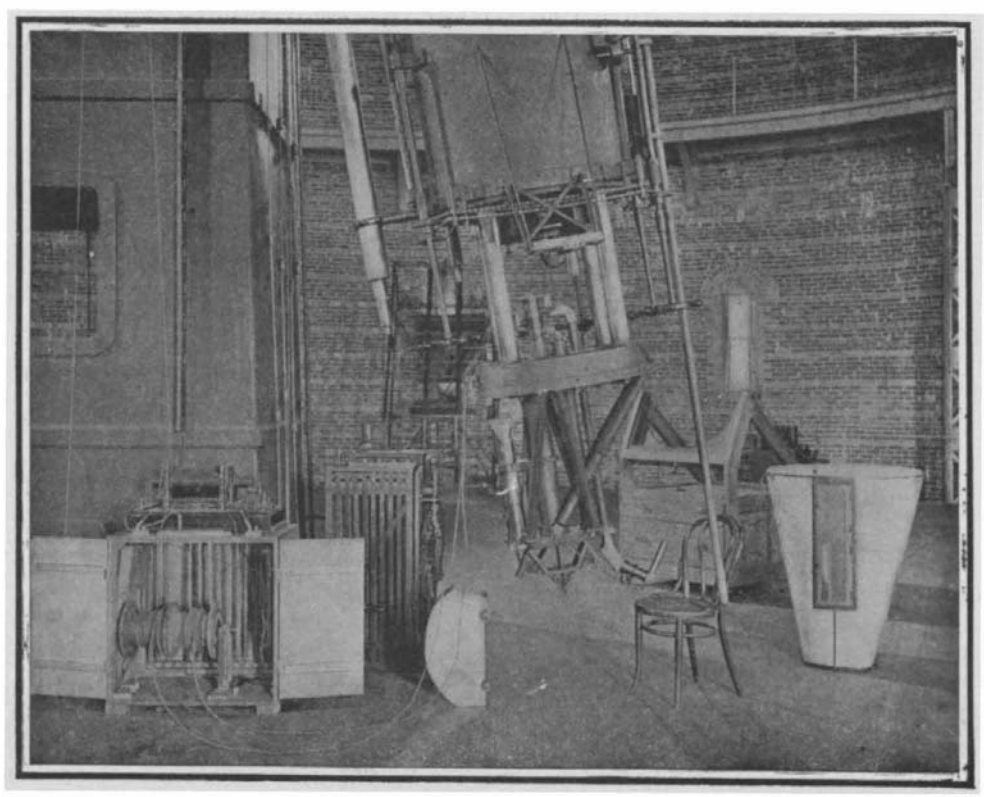


MOULIÉ POLLEN GATHERER.

The twigs selected must be used as quickly as possible after they are gathered. Moreover, they must be gathered in the morning before the sun is too high, but not before they are free from moisture (dew or rain). This brings the work of gathering to about noontime. After the room is opened, care must be taken in opening the doors, so as not to create a draft which might blow the pollen off the sheets upon which it has dropped during the half day and night. The door must be closed immediately for the same reason. The temperature at that time ought to be between 85 and 88 deg. Fah. In order to gather the pollen, Mr. Moulié took one sheet loaded with it, and placed it on a table in an adjacent room, closing the connecting door between the rooms as well as the windows and other openings. The pollen was collected by means of a feather and dropped into wide mouthed two-ounce jars, similar to those in which vaseline is sold. The jars were filled to about one-half inch from the bottom. The collected pollen contains a certain amount of moisture, which must be evaporated for safe keeping. To effect this, Mr. Moulié placed the jar or jars behind the windows in the room where the apparatus was installed, and arranged them so that they touched the windows. The rays of the sun streaming through the window pane and the glass jar caused evaporation to take place in about thirty minutes. Then after shaking gently until there were no more lumps, the jars were brought into the next room, and left there for one hour before they were corked. The corks selected were of the best quality and wrapped with a fine paraffine paper, so as to effect a tight closure. Small quantities of pollen can be poured in a single jar to the height of the neck. Very few readers of this journal realize what an ounce of pollen means. Perhaps some conception of the task may be had, if one imagines the collecting of an ounce of dust from the wings of butterflies.



The Yerkes telescope with floor raised to highest position.



Bruce spectrograph fitted to the Yerkes telescope.

PHOTOGRAPHING A STAR SPECTRUM.

BY PROF. S. A. MITCHELL, COLUMBIA UNIVERSITY.

If one should go to the Sandy Hook lightship off the entrance to New York Bay, and at night should see the lights of a steamer headed for the harbor, it would be practically impossible, merely by looking at these lights, to learn how fast the steamer was approaching. A rough guess might be made by watching the lights grow gradually brighter, but it would be the roughest sort of an approximation. But the astronomer with his telescope, observing the distant stars millions on millions and millions of miles away, can tell to an absolute certainty just how fast a particular star is moving toward us or away from us, giving the motion accurately to the fraction of a mile per second. Nor is this result obtained by watching the increase or decrease in the star's light, due to its approach or recession, for the stars are so far distant that no change in their brightness would be observed in a thousand years from their change of distance alone. The measurement of a star's motion in the line of sight is one of the new fields for the astronomer, and many and valuable are the scientific results accruing from this line of work.

The writer was at the Yerkes Observatory last summer, taking part in the campaign for measuring the radial velocities of all the brighter stars that can be seen from northern latitudes, and assisting in photographing the spectra of stars with the 40-inch telescope and its attached spectrograph. And what a magnificent instrument this greatest refractor in the world is! To work with this great telescope causes a feeling akin to awe in realizing that puny man, on this infinitesimal speck in the universe, called earth, by the aid of such an instrument, is able to fathom the depths of space, and reveal the secrets of stars millions and millions of miles away. Truly, there is no science which can show the matchless power of the human mind quite so well as does the old science of astronomy. the parent of all the sciences. A view of the largest refractor in the world shows also the high degree to which engineering skill has advanced in recent years, again attesting to the close union between pure and applied science.

The observatory, presented to the University of Chicago by Charles T. Yerkes, is situated seventy-five miles from Chicago on the shores

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