tire equipment is that it is not intended for investigation (other than pedagogical), but for the instruction of undergraduate students. This is in accord with the policy of the trustees of Smith College, which aims not to develop university work, but to concentrate all effort upon the undergraduate course. This course in plant physiology is taken each year by twelve students, seniors who must previously have had at least two years of botanical study; they work through the course described in the present writer's book, 'A Laboratory Course in Plant Physiology.'

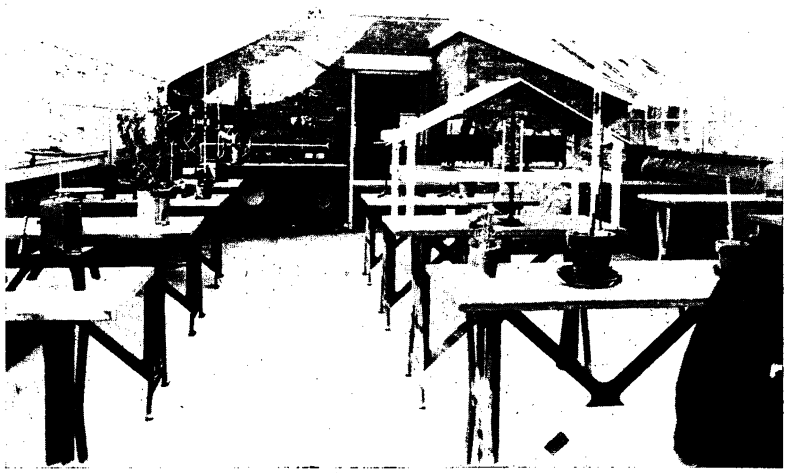


FIG. 6. View in the Greenhouse, looking toward the Laboratory.

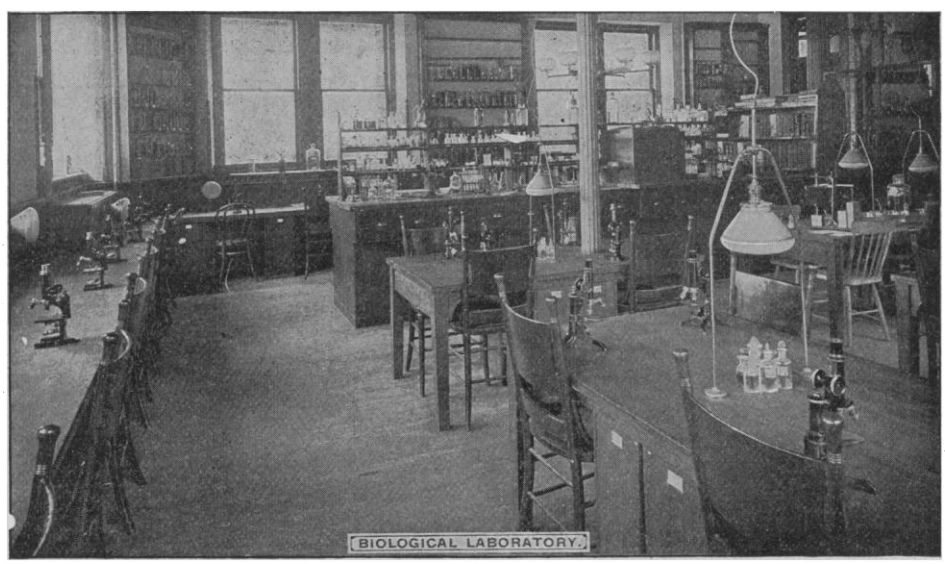
The Lyman Plant House was a gift to Smith College from the late Mr. E. H. R. Lyman, of Northampton and Brooklyn, N. Y., in memory of his mother. The new addition to this most appropriate and serviceable memorial is the gift of Mr. Lyman's son, Mr. Frank Lyman, and his daughter, Mrs. Alfred T. White, and her husband. The details of construction have received the close personal attention and the very generous interest of Mr. W. A. Burnham, of the firm of Lord and Burnham, of New York, by whom the additions, as well as the original range, have been constructed. As now finished, the enlarged plant house provides the college with the most essential part of a material botanical equipment of unsurpassed completeness and excellence.

W. F. GANONG.

AN ELECTRIC LAMP FOR MICROSCOPE ILLUMINATION.

THE chief desiderata for a microscope lamp are brilliancy and whiteness of light and an evenly illuminated surface of considerable extent from which to take the light. In planning eight years ago for the illumination of our biological laboratory at the Woman's College of Baltimore, we took into consideration Welsbach lamps and incandescent electric lamps, deciding on the latter. The ordinary incandescent bulb is too small to serve unmodified as the source of light for microscope illumination, and its light is too yellow. These difficulties, however, we have overcome with a fair degree of success by the adoption of two simple devices. Nearly white light is obtained by using forty-volt lamps on our fifty-volt current. This gives much more perfect incandescence than is obtained

with a lamp adapted for the voltage used, and, though the lamps burn out more quickly, still they last for a considerable time. Of the eighteen bulbs in use in our laboratory we have to renew about four a year, say twenty-five per cent. annually. We make use of the lamps only during the latter part of the afternoon in winter when the days are short. Little use is made of them at night. A forty-five-volt lamp on a fifty-volt current wears much longer than a forty-volt lamp, and gives a light much less yellow than that from a lamp adapted for the voltage used. For ordinary use such an arrangement is satisfactory.



An evenly illuminated surface of considerable extent is obtained in the following way: First a ground glass bulb is used which softens the light; then this is mounted in an ordinary reading globe with mirror back and ground glass front (cf. figure). The mirror-backed globes are much preferable to those with painted backs. The soft light from the ground-glass bulb is so reflected from the mirror at the back of the globe that the whole ground-glass front of the globe is nearly uniformly illuminated, and the two ground-glass surfaces through which the light passes gives it a very soft effect.

The light thus obtained is not perfectly white, but it is white enough to prove satisfactory in all the use we have given it, and it is very brilliant. We frequently use it in preference to daylight in the demonstration of minute structures, for example in the study of mitosis.

The essential features of this plan of illumination are the diffusion of the light as explained and having bulbs adapted for a voltage from five to ten volts less than that of the current in use.

These lamps may be mounted in many different ways. We use horizontal stationary lamps between each two desks around the outside of our laboratory; and in the middle of each of the central tables which are used by four students apiece, we have a stationary bracket in which the lamp may be raised or lowered, the lamp fastening by a thumb screw. Professor Drew, of the University of Maine, tells me that he has adopted the same style of lamp in his laboratory, but that he has them

mounted on flexible arms which allow the lamp to be placed in any desired position. This seems to me preferable to either mounting we are using.

MAYNARD M. METCALF.
THE WOMAN'S COLLEGE OF BALTIMORE.

*WORK OF THE AGRICULTURAL EXPERIMENT STATIONS.**

THE agricultural experiment stations in the different States and Territories, as well as the colleges with which they are connected, have been unusually prosperous during the past year. Two things have especially contributed to the greater expansion and increasing efficiency of their investigations. These are their closer affiliation with this Department and the material enlargement of the resources of the agricultural colleges, by means of which the stations have directly or indirectly been benefited.

COOPERATION BETWEEN THE STATIONS AND THE DEPARTMENT.

Much progress has been made in determining the lines in which the stations can most effectively cooperate with the Department, and the methods of arranging and conducting cooperative operations. Since both the stations and the Department have had enlarged resources, it has been possible not only to increase the number of cooperative enterprises, but also to conduct them on a larger scale. In some cases it has been found desirable to form groups of stations to investigate some problem affecting a large region. Thus, for example, a group of stations, in cooperation with the Bureau of Plant Industry, are engaged in investigations on the breeding of varieties of cereals adapted to the Northwest. In other cases a single station is sufficiently aided by the Department to enable it to undertake the thorough treatment of problems in a special line. Thus the Pennsylvania Station, in cooperation with the Bureau of Animal Industry, is preparing to make elaborate researches in animal nutrition, and for this purpose has devised and built a respiration calorimeter for experiments with large animals, which in size and complexity surpasses any apparatus hitherto used for such experiments. In other cases, two or more branches of the Department combine to work in conjunction with a station on some complex problem. Plans are now being made, for example, for an extensive experiment on the problems of range conservation and improvement, in which the Arizona Station will unite with the Bureaus of Forestry and Plant Industry and the Office of Experiment Stations (irrigation investigations). It is evident that a very great variety of effective combinations can be made with the general result of a union of forces thoroughly acquainted with local conditions with those having broad views and relations. Such a strong combination of forces for attacking the problems of agriculture exists nowhere else. It is believed, therefore, that largely increased benefits will soon accrue to our agriculture from this union of the stations with the Department. At the same time the stations were never so strong locally, and are better equipped than ever before to work by themselves on problems of immediate importance to their own constituencies.

The records of this Office show that the Department is at present cooperating with the stations in 43 States and Territories. Among the subjects on which cooperative investigations are being conducted are the following: Tests of varieties of grasses and forage plants in many localities; special experiments with grasses and forage plants for the arid region and the improvement of range lands; breeding ex-

* Part of the Annual Report of the Director of the Office of Experiment Stations.