of the two shores of the Pacific render their community of origin antecedently probable. Ethnologists have demonstrated the indigenous character of American man, but the coarse-haired yellow and brown races of Asia are evidently intruders who have replaced or amalgamated with older curl-haired peoples. While it is not impossible that some elements of the Mongoloid series may have entered Asia from the northeast, the tropical plants could scarcely have been taken over by way of Alaska, and megalithic ruins and other traces of primitive cultures similar to those of ancient America mark a route from Easter Island to Fiji, Sumatra, Madagascar and southern Arabia, whither archeologists now trace the straight-haired men who initiated the agricultural civilizations of the valleys of the Nile and Euphrates.

With the assistance of a kinetic theory of evolution and of pertinent facts and analogies it is thus possible to sketch anthropological evolution without the predication of conditions essentially different from those which exist at the present day. Man is a relatively ancient animal which long since attained a cosmopolitan distribution. Divergent tendencies of variation met, however, with ever-strengthening opposition through the growth of mental powers and social habits, and the segregation of groups comparable to zoological species took place only through geographical isolation. The specific separation of the peoples of the two continents also came to an end with the development in America of the arts of agriculture, navigation and government, which resulted in the conquest and colonization of the islands and shores of the Pacific and Indian Oceans, and the subsequent integration of the superior mixed races and civilizations of these and the adjacent regions.

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WASHINGTON, D. C.

## *THE NEW LABORATORY AND GREENHOUSE FOR PLANT PHYSIOLOGY AT SMITH COLLEGE.*

THE remarkable renascence which botany is experiencing in America, both in investigation and in education, is intimately associated with the development of plant physiology. The reason is plain. The present movement is essentially an exploitation of the new field opened up by our new view of the plant as not primarily a living structure, but a living being. Hence the study of all vital processes becomes of first importance. The new physiological equipment of Smith College, here to be described, is an adaptation to the ever-increasing importance of plant physiology.

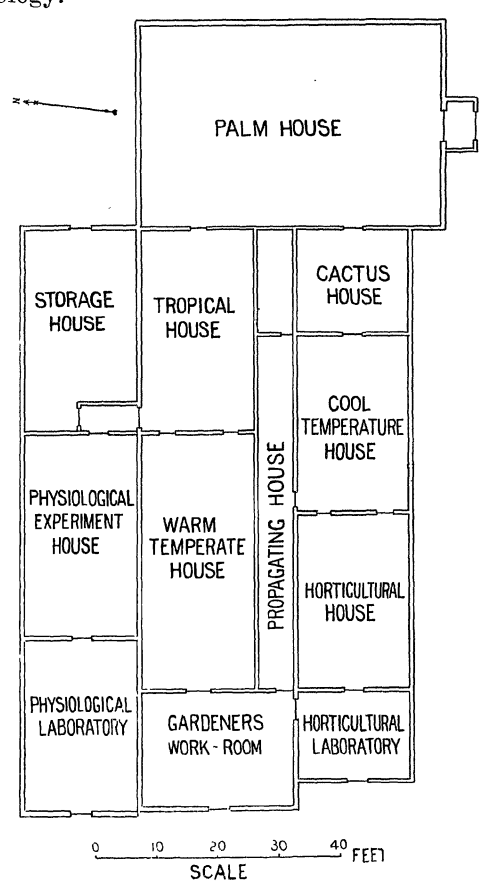


FIG. 1. Ground-Plan of the Lyman Plant House at Smith College.

Smith College has possessed for four years, as an adjunct of the Department of Botany, a thoroughly built, properly stocked and fully manned range of greenhouses, known as the Lyman Plant House, of which the ground-plan is illustrated herewith (Fig. 1). The new laboratory and greenhouse, now completed, have been attached to the range as shown in this plan. The storage house is at present used as a cool house for plants not in growth, but it is so built that, if the expansion of the college work requires, it can be added to the experiment house by the simple removal of a partition.

The appearance of the laboratory in relation to the greenhouses is shown in Fig. 2. The laboratory appears in the center of the picture; to the right is seen the gardener's work room, and beyond that a portion of the horticultural laboratory, while the greenhouses extend in parallel rows behind these buildings. The laboratory is plainly but thoroughly built of brick, of 20 x 28 feet in area, and is designed to afford ample, but not unnecessary, room for twelve students. The interior arrangements are well shown by Figs. 3 and 4. There are three sorts of tables. The study tables, at which each student has a place with a drawer for personal effects, are of the plain laboratory sort. The apparatus tables, for the assembling of the appliances for experiments, are made three feet in height for convenience of working standing, and beneath them the space is utilized for cupboards in which bell-jars and the larger glassware are stored. The gas and tool table, in front of a window (on the left of Fig. 3), also three feet in height, is fully equipped with the appliances suggested by its name. There are three sets of cases. One is for balances, shown on the left of Fig. 4, with three compartments, and glass doors (shown open in the picture). This is affixed to the brick wall dis-

Fig. 2. General View of the Lyman Plant House, with the New Laboratory in the foreground.

connected from the floor, and its top is utilized for the storage of large articles. The second is for chemicals, shown on the right in Fig. 4 (also with glass doors open), with cupboards beneath. The third consists of three cases for the storage of the more elaborate appliances, of which the equipment is excellent; they are partially shown with closed doors on the left of Fig. 3. Beneath them are many drawers, for

the storage of the numerous articles necessary in a course in which every student works through a comprehensive series of 6. It is 20 x 32 feet in area, very thoroughly built, with ample and readily controlled heating and ventilation systems.

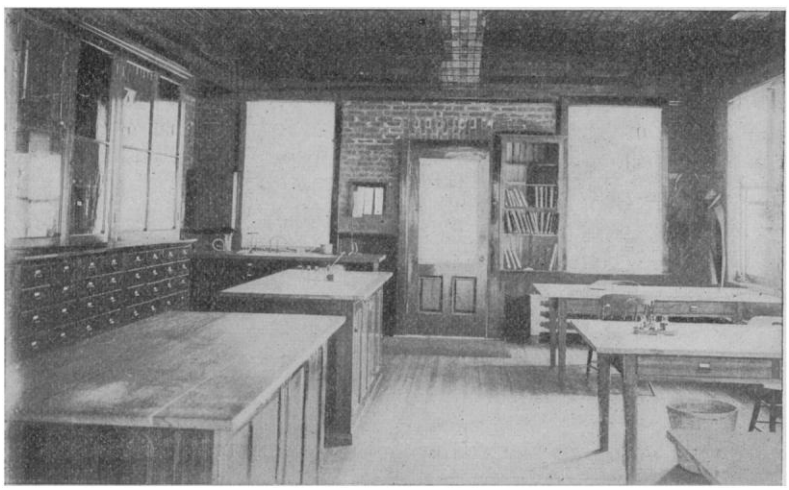

FIG. 3. View in the Laboratory, from the door of the Greenhouse.

physiological experiments. And the other furniture proper to such a laboratory, including a blackboard ruled in squares for The heating pipes are placed against the walls, where they are not in the way. The floor is of cement, of course laid directly

FIG. 4. View in the Laboratory, looking toward the Greenhouse.

the plotting of statistical data, is of course present.

More important, however, is the greenhouse, which is illustrated by Figs. 5 and upon the ground. The shading is effected by screens of white cloth, resting upon wires; they are very readily drawn up for use or down completely out of the way.

Against the wall of the laboratory (Fig. 6) is a long porcelain-lined sink, with five taps, to which are attachable the tubes leading to a still, an exhaust (with manometer), and a blast, while the necessary funnels, graduates, etc., are arranged above and the pneumatic troughs, basins and the like, beneath it.

Of especial importance in such a greenhouse are, however, two things, the tables and the physiological dark room. There are sixteen tables. Each top is of a single thick, smooth slate, four feet by two, resting at the four corners upon adjusting screws by which they may be set level. The stand, especially designed for the purpose, is of cast iron, of such a pattern as to give the greatest possible rigidity, and of such a height as to bring the top of the table three feet from the floor, a height which experience has shown to be the best for the average student when working standing. They are proving perfectly satisfactory in use. The central table of the greenhouse is covered by a white wooden shelter, lightly built, under which are kept the autographic meteorological instruments, thermograph, hygrograph, etc., indispensable in such a laboratory. Finally we consider the physiological dark room, perhaps the most essential part of the furnishing of a laboratory of plant physiology. It is built of one thickness of brick against the wall of the laboratory (on the right in Fig. 6), but otherwise has an air space all around it whereby it is kept approximately at the average temperature of the greenhouse. It is nearly six by six feet in area, and from six to eight feet high inside. The ventilation is provided for by an arrangement of double-walled black boxes over

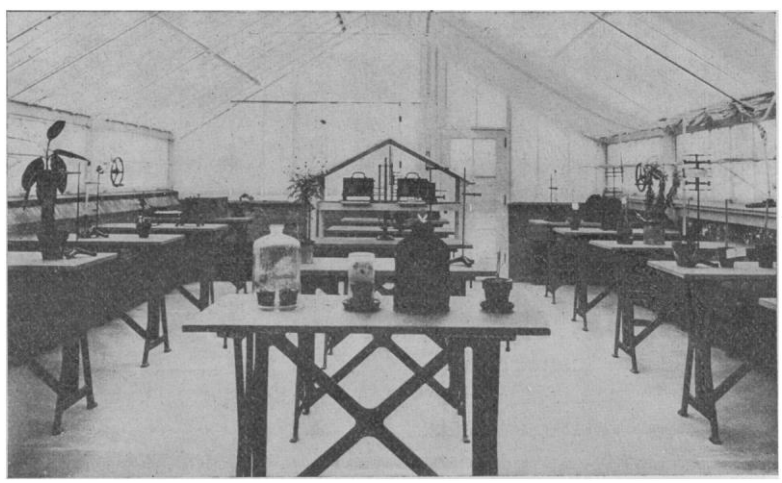

Fig. 5. View in the Greenhouse, from the door of the Laboratory.

openings left in the brickwork near the floor, and by a triple roof with communicating air spaces. The details cannot readily be briefly described, but the result is a perfect system of ventilation without the admission of the slightest ray of light. The door has an inner porchway with a second door, both made light-tight by rubber strips, so that by closing one door before opening the other, it is possible to enter or leave the room without the admission of any light. It is provided with shelves, and is entirely painted a dull black inside.

A point of much interest about this en-

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.'

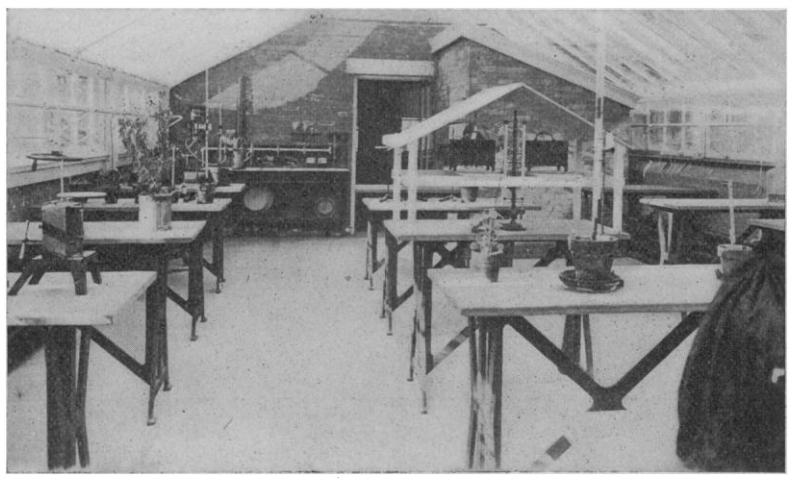

FIG. 6. View in the Greenhouse, looking toward the Laboratory.

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