



A course in landscape gardening.



A forester camp at Lake Wanakena.

## Teaching Scientific Forestry

### Valuable Work Done By a State Institution

By Dr. Hugh S. Baker

When the word "forestry" is used, most people think of the work of the Government Forest Service in the West, and its broad efforts in building up one hundred and sixty-three national forests, containing one hundred and eighty-six million acres of land, upon which timber is being raised for the benefit of future generations. The thoroughness and efficiency of this splendid body of men in planting trees and protecting the forests against fire, and in assisting settlers to obtain homesteads within the boundary of the national forests, is an object lesson in the management of natural resources.

Nevertheless, natural resources in general, and forestry in particular, are not entirely neglected in the East. One of our leading educational institutions, the New York State College of Forestry at Syracuse, is now endeavoring to solve the land problem, and to supply a scheme for the management of these natural resources within the Empire State.

The college, established by the Legislature in 1911, does not only teach at Syracuse, but carries its gospel of better forestry and love of the woods, the proper utilization of forest products throughout the State. A four and five-year professional course is given at Syracuse, and a one-year ranger course is given upon the college forest of 1,800 acres at Wanakena.

A State forest camp is maintained for four weeks of the summer in the Adirondacks, and in addition over two hundred popular lectures, illustrated with lantern slides, are given each season before clubs and associations throughout the State.

In the instruction of technical foresters at Syracuse, great stress is laid upon field work, and the training of the hand, for in addition to regular laboratory exercise with note-book and microscope, the boys are compelled to use the axe and mattock from time to time.

During the Easter vacation a number of students are accustomed to work in the State forest experiment station, about a mile south of Syracuse, upon which the college is growing over a million and a half of little trees for experimental purposes.

In fact, much of the labor during the rush season is done by the students themselves. They make the seed beds and plant them, pack the trees for shipment and set the seedlings out in transplant rows so they may

grow there a year or two before being sent out for field planting.

The general policy of the college is that men shall not only be theoretically trained, but receive a maximum of practical experience in all branches as well.

In addition to the regular course of training for technical foresters given at Syracuse, the college has made a noteworthy beginning in supplying men to occupy subordinate positions in the management of forest

least four, and preferably five, years for his proper education. In the work at the Ranger School, as well as at Syracuse, great importance is attached to the benefit obtained from manual labor.

Trees are felled, timber scaled, telephone lines are strung and fire trails cut. This labor constitutes an important part of the regular instruction, and no remuneration is given for it. On account of the demands of the course there is practically no opportunity for earning money to pay expenses while at the Ranger School, for it is felt that students should be able and willing to save sufficient funds to meet their expenses before beginning such a short course.

In addition to the practical work enumerated above, thorough courses in surveying, map making, timber estimating, etc., are given, and in every case classroom work and the actual practice go hand in hand.

The logging and milling operations of the Emporium Lumber Company are situated on the east side of Cranberry Lake, within a short distance of the Ranger School, and the holdings of the Higbie Lumber Company and the Newton Falls Paper Company are also a short distance away. These operations, carried on under skillful management, give the youthful forest ranger useful opportunity for the study of modern lumbering methods and close

utilization. The New York State College of Forestry is striving through research and co-operation with lumbermen and all users of forest products to make the best use of the forests now standing. In addition to the indirect influence of the forests—in controlling runoff, moderating climatic extremes, etc.—and the structural materials which it supplies, the forest yields large quantities of materials for the so-called minor industries. For instance, over 58,000,000 board feet of lumber are annually consumed in the Empire State for musical instruments, of which amount piano manufacturers consume the major portion. The Spruce of the Adirondacks is especially valuable in the manufacture of sounding boards of these musical instruments, on account of its resonant qualities. Over nine million board feet of spruce are consumed in supplying this part of the piano.

The manufacture of veneers is also an industry of increasing importance in this State. Formerly they



Spreading out pine cones for seed.

lands. For some years there was a gap between the technically trained forester and the lumber jack. There was no one to whom the consulting forester could intrust the carrying out of his plans, and it is this type of man that the New York State Ranger School at Wanakena is attempting to supply. The Ranger School gives an unusual, thorough and practical training of one year, with the idea of turning out men well fitted for such positions as rangers, guards, tree-planting experts and managers of forest estates.

Young men who have already had some experience in lumbering operations, or who are well trained in woodcraft, will find this course of material help to them in preparing for more expert service. The course is not intended to be an education in forestry, and the man who completes it will be fitted for a subordinate position only.

A practical man is turned out and not a professional forester, because the latter type of man requires at



Thinning a hard-wood sprout.



Students on a trip through the woods.



Learning to use an axe.

were made of such valuable woods as mahogany, walnut, rosewood, cherry, satinwood, etc., but with the growing scarcity of these expensive woods, the furniture manufacturer is now resorting to placing thin sheets of veneer upon the more common woods. In addition, other species of less value are being transformed into veneer, and red gum, yellow pine, hard maple, yellow poplar and cottonwood furnish the market with a considerable portion of the veneers used. The old prejudice against veneered furniture is passing because it is often stronger and more durable than furniture made entirely of the valuable species.

In its endeavor to make the practice of forestry as widespread as possible, the college is offering assis-

tance to owners of small tracts of forest land. Where the woodlot is more than 300 acres, and where there is assurance that the plans made by the college will be carried out, assistance is given gratis; but where there is less than this amount the owner is required to pay traveling expenses and sustenance of the forest expert. Very often the owners of timber land in a town or community may lump their holdings, and thus avail themselves of the free offer which is made by the college.

Reforestation is also advocated by this institution.

In spite of the campaign of popular education along forestry lines, which has been carried on for nearly forty years, the average citizen of to-day has little

clear knowledge about the meaning and scope of forestry. Forestry really means the raising of repeated crops of timber from non-agricultural soils. It is not agriculture, nor a part of it, because agriculture is concerned only with tillable fields, while the forester's aim is to raise repeated crops from the soils which the agriculturist cannot use. Neither is forestry lumbering, but conservative lumbering—the harvesting of the forest crops—an important phase of forestry activity. The city forestry, of which we hear so much at the present time, is in reality only a first cousin to forestry proper because in the cities shade trees for purposes of beauty are the prime consideration rather than timber for structural purposes.

### Museums as Aids to Forestry\*

By Harlan I. Smith, Museum of the Geological Survey, Ottawa

In gaining due recognition and support from the great mass of the people, museums may be great aids to forestry. Even the further application of museum methods in forestry may be of valuable service. The extent of the possibilities in these lines of recruiting aid by means of museum methods of publicity, recreation, instruction and research can hardly be forecast. Such museums or methods, however, must be properly administered to be effective. The methods used, for instance, in the large and costly Botanical Museum in New York would be of little or no avail to forestry. That museum may be of use to scientists, but is not of great human interest to me, and, therefore, I judge, not to the average citizen, lumberman or forester.

Vast expenditure of time and money is not necessarily needed to secure valuable aid by these means. Museum cases, if such are really required, may be made at a cost of less than four dollars per foot front, as I have pointed out in the *Ottawa Field Naturalist* of May-July, 1915, and the *SCIENTIFIC AMERICAN SUPPLEMENT* of May 29th, 1915. A large collection of specimens, maps, photographs and labels is not needed to inoculate whole regions with the germs of the ideas of the practicability and economic importance, to say nothing of aesthetic values and the love of forestry. A small exhibit may teach the general and valuable principles of forestry, perhaps even better than a complete exhibit of all kinds of trees, such as is shown in the American Museum of Natural History in New York. Such a complete exhibit might confuse or burden. The persons to be influenced to give aid to forestry might be lost in the woods, as it were.

In the Rocky Mountains Park Museum at Banff, Alberta, a beginning of a tree exhibit has been made. There are eleven species of trees in the park. Five

grow in the valley, but the other six are found only on the higher land. A complete collection of the trunks and leaves of the trees growing in the valley was made in two half days as a by-product of other work, and without any expense except for time in cutting the trunks to lengths for exhibition. At the same time two photographs were made of each of these five kinds of trees; one of a grove or group of each kind of tree from a distance, and one of the details of the trunk, bark, leaves and such flowers or fruits as were then in season. Later photographs are to be made of the parts

type the labels were printed for labeling the specimens in the museum. The museum labels were printed on cards of a yellow color to harmonize with the furniture of the museum and with a brown ink for the same purpose. They were framed and securely screwed to the trunks of the specimens so that they cannot easily be displaced. The glass covering them, which can be cleaned readily by any janitor, protects the label from dirt or defacement. When these labels are revised to include instruction and explanation of the most important of the forestry abuses and needs, and when speci-

mens of uses of the lumber and other tree products, such as wood alcohol, charcoal and turpentine, are added with full labels, this exhibit will be the beginning of a suggestion for a museum aid to forestry.

An example of the facts that should go in a label is that the obnoxious pitch of the balsam is so largely in the bark that the wood, formerly not used at all for paper pulp, is exceptionally valuable for this purpose.

The qualities of a great number of woods may be shown by the exhibition of the volumes of "American Woods," published by Hough, illustrated by cross, radial and longitudinal sections of actual trees. But certainly to accomplish the best results expert foresters who know the scientific facts must co-operate with those who understand people well enough to translate forestry facts into terms that not only can be understood by those whom forestry seeks to convert to its aid, but into terms that will also

attract those people to read the labels and study the specimens.

The same labels may serve as outlines for lectures, each label being illustrated by lantern slides made from the photographic negatives previously mentioned. It is part of the work of all progressive museums to give popular lecture interpretations of science as well as scientific lectures and recreation based on instruction. Then, too, the museum may send out both traveling exhibits of forestry and lecture outlines made up of the labels, together with loan sets of lantern slides. The great value of a museum is to supply practical facts and stimulate public interest.



Training in wood-craft. Putting up a forest telephone line.

of the trees not yet taken, and of uses and abuses of each tree and its products.

Tentative labels had previously been prepared at my request by the late Mr. Abraham Knechtel, chief forester of the parks branch of the Department of the Interior. These refer particularly to the park, and consequently are to be revised so as to serve as labels for the same trees in any other museums that may accept the labels. Supplementary labels describing the peculiarities of these trees as to the park are also in preparation.

These labels were printed in the "Handbook of the Rocky Mountains Park Museum," and from the same

\* Presented at seventh annual meeting of the Commission of Conservation, Ottawa, Canada, Tuesday, January 18th, 1916.

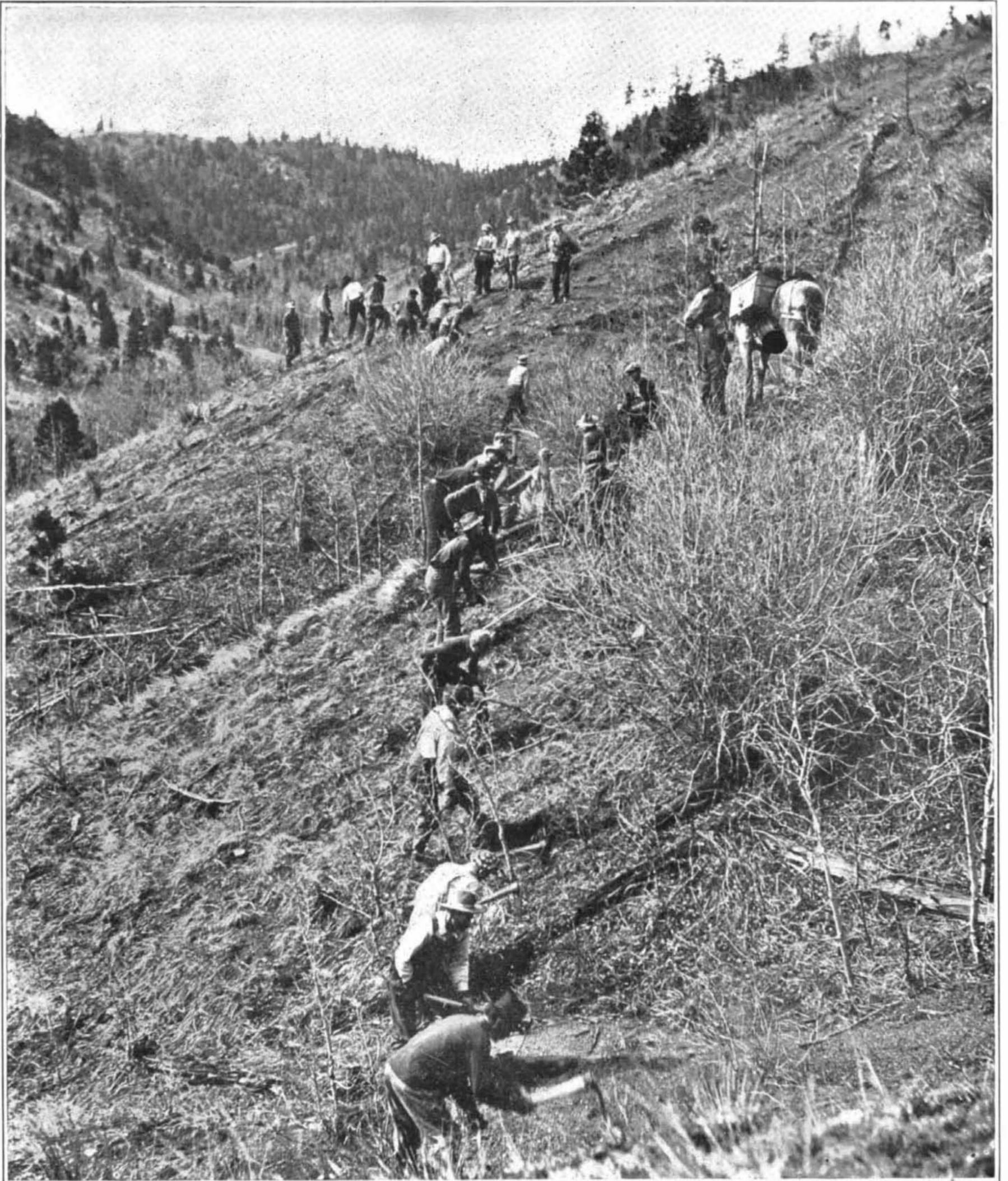
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Forestry students learning to plant young trees on a bare hillside.

TEACHING SCIENTIFIC FORESTRY.—[See page 296.]