

June 2. "Vacant-lot Gardening," by Mr. Carl Bannwart.

June 9. "Garden Roses," by Professor A. C. Beal.

(Exhibition of Roses and Peonies, June 9 and 10.)

June 16. "The Seaweeds of New York and Vicinity," by Dr. M. A. Howe.

June 23. "Lillies for Everybody," by Mr. Arthur Herrington.

June 30. "The Food Value of Wild Mushrooms," by Dr. W. A. Murrill.

WE learn from the *Fisheries Service Bulletin* that in the early part of September the *Fish Hawk* made another cruise in Chesapeake Bay for the purpose of ascertaining the abundance and quality of the hydroid, or "sea moss," material available at this season. A Baltimore manufacturer of sea-moss articles accompanied the vessel. While the growth is not of the best quality at this season, abundant supplies were obtained, and the manufacturer expressed himself as well satisfied with the opportunity for a commercial fishery. On the conclusion of this trip the eighth regular cruise of the Chesapeake Bay investigation was completed. During the latter part of August the schooner *Grampus* left Norfolk, Va., to continue investigations in Atlantic coast waters, in charge of W. W. Welsh. A line of hydrographic stations was first made from Cape Henry to the gulf stream. About twenty miles southeast by east from Cape Henry a good haul of croakers was made with a small otter trawl, suggesting the possible use of this type of net for the capture of this species. Samples of sargassum weed were obtained for analysis in regard to the possible use of this material as a source of potash, and possibly of iodine and bromine. The vessel then proceeded to Cape May, N. J., and an examination was made of the pound nets in the vicinity of Five Fathom Bank. Observations were continued between Cape May and Gloucester, Mass. At the latter point a shortage of seamen made it necessary to tie up the vessel, and the work that had been planned for the Gulf of Maine was, therefore, abandoned.

UNIVERSITY AND EDUCATIONAL NEWS

PLANS are now being prepared for a new chemistry building at the Montana State Col-

lege to replace the one burned down last October.

FIVE departments of fellowships in mining and metallurgical research, each valued at \$720 for a year of twelve months, are offered by the College of Mines of the University of Washington in cooperation with the federal Bureau of Mines.

DR. EDWARD M. FREEMAN, assistant dean of the department of agriculture of the University of Minnesota, has been offered the deanship of the college of agriculture of the University of Arizona, at Tucson.

THE following instructors at Wellesley College have been advanced to assistant professorships: Mabel A. Stone, botany; Helen S. French, chemistry, and Sarah R. Davis, hygiene.

DR. HOWARD PARSHLEY, who has been working at the Bussey Institution, Harvard University, has been appointed assistant professor of zoology at Smith College.

FRED T. ROGERS, Ph.D., assistant professor of physiology in Baylor University, Waco, Texas, has been appointed to an instructorship in physiology at the University of Chicago.

J. F. REILLY has been promoted to an associate professorship of mathematics at the State University of Iowa.

VICTOR E. RECTOR, principal of the Antioch Industrial School near Hartsville, S. C., and a member of the House of Representatives, has been elected professor of agriculture at the University of South Carolina.

DISCUSSION AND CORRESPONDENCE THE VARIETAL RELATIONS OF CROWN GALL

THE disease known as crown gall and hairy root has been the subject of much experimental inquiry. It has long been known that there were several forms of this disease appearing on apple trees and for some time it was a question whether these several forms were due to the same causal organism. There have been recognized a hard and a soft form of crown gall and the simple, woolly knot, broom root and aerial forms of hairy root.¹

¹ Hedgecock, Bureau of Plant Industry, Bulletin 186.

The writer has during the past few years propagated several thousand apple trees of many different varieties on their own roots by means of the common whip graft, but cutting off the seedling nurse root after two seasons' growth and replanting those trees which had thrown out roots from the scion, thus establishing the variety on its own roots. Many of these trees have been more or less troubled with the crown gall and hairy root. It has been observed that there is a tendency for a given variety to have only a single form of the disease. Thus the Jewett apple shows usually if not always the hard form of the gall, the Red Astrachan the simple form of the hairy root and the Oldenburg the woolly knot form with many soft fleshy root growths. Other varieties show the broom root form and still others often the aerial form.

In the ordinary method of propagation of apple trees the root systems are of seedling origin and from a pomological viewpoint the root system of every tree is a different variety. May not this be the reason for the various forms of crown gall and hairy root?

Some varieties on their own roots seem to be largely if not entirely immune to this disease. If this proves to be really the case, here may lie the solution of the problem of the prevention of crown gall. If a resistant variety is selected as the root variety, and the variety desired propagated on it, trees immune to the disease may presumably be secured. Probably the economic advantage would warrant the extra effort necessary to propagate such trees, only under conditions where the crown gall was especially troublesome.

There are other root diseases which are injurious, especially through the southern part of the apple belt, that might possibly be avoided in a similar fashion.

J. K. SHAW

MASSACHUSETTS EXPERIMENT STATION

WHEN A FORCE IS A FORCE

REFERRING to the perennial discussion of the meaning of force and of the law of action and reaction, lately revived in the pages of Sci-

ENCE,¹ I venture to suggest that the essential point of the alleged difficulties which have been raised is covered by the following simple propositions:

1. A force is a *push* or a *pull* exerted upon a body (portion of matter) by another body.
2. Whenever a body *A* pushes or pulls a body *B*, then at the same time *B* pushes or pulls *A* equally in the opposite direction. Such a pair of forces is an "action and reaction." *An action-reaction pair concerns two bodies and only two.*
3. The two forces of an action-reaction pair never balance each other; a force acting on *A* can not balance a force acting on *B*.
4. To balance a force acting on *B*, another force must be applied to *B*.

One who keeps these simple facts in mind will, I believe, find it easy to decide whether an alleged force is really a force in the meaning of the Newtonian laws. He will also see that there is no contradiction between the statement that forces always occur in action-reaction pairs and the statement that forces are often unbalanced.

L. M. HOSKINS

STANFORD UNIVERSITY,
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SCIENTIFIC BOOKS

The Potato. By ARTHUR W. GILBERT, assisted by MORTIER F. BARRUS and DANIEL DEAN. New York, The Macmillan Co., 1917. Pp. i-xii and 1-318, Pl. XVI.

The author states in his preface that the book is intended to give brief and practical suggestions on the growing, breeding and marketing of potatoes, and the subject-matter amply substantiates the statement. This publication, in addition to being up-to-date in its cultural directions, devotes considerably more attention to the subject of potato breeding than any of our preceding American treatises on the potato. Conveniently arranged statistical data are presented in Chapter I. under the caption of Acreage, Distribution, Production and Valuation. Chapter III. em-

¹ See articles by Gordon S. Fulcher (November 24, 1916), and Andrew H. Patterson (March 16, 1917). Mr. Fulcher's discussion seems to me to be entirely sound.