and at the same level of dosage. Over periods of time ranging from 30 to 45 days from the beginning of vitamin administration there was no significant change in the metabolic rate, although there was a tendency to a lower level.

A third series of 6 rats, 4 males and 2 females, was thyroidectomized under ether anesthesia, and after recovery the level of metabolic rate was established. Vitamin A was fed to these animals at the same level as in the previous experiments. There was no significant change in metabolic rates over periods of time ranging from 45 to 60 days from the time vitamin A was started, although again there was some tendency to a lower level.

From these results it appears that the effects of vitamin A on the metabolic rate of rats, even in massive doses, are questionable.

R. F. SHEETS, JR.
H. C. STRUCK
UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE,
CHICAGO

SCIENTIFIC APPARATUS AND LABORATORY METHODS

CONTROL OF BLUE MOLD OF TOBACCO BY A NEW SPRAY

BLUE mold or downy mildew of tobacco (caused by the fungus *Peronospora tabacina*) is one of the most difficult of all fungous diseases to control with fungicidal spray materials. During the five years that mildew has been prevalent in Connecticut the writer has tested many spray materials. None of them have been satisfactory; some failed to stop the disease, some caused plant injury, some were too complicated of preparation and the farmers would not use them.

On the other hand, fumigation of the seed beds with benzol or paradichlorobenzene has given excellent control, if properly manipulated in seed beds which are tightly constructed so that too much of the gas will not leak out during the night. But improper use of either chemical involves certain risks of plant injury. Both are expensive if continued through several weeks.

There exists, therefore, a definite need for a simple, safe, inexpensive but effective spray or dust for controlling mildew in the beds. In quest of such a material the writer has tried a long list of chemicals but only within the last six months has he found one which seems to fill all these requirements. This material is ferric dimethyl dithiocarbamate (under the trade name of "Fermate"). It was first suggested to the writer as a possible mildew remedy by Mr. Harry F. Dietz, of the Grasselli Chemical Department of E. I. du Pont de Nemours and Company, and we are indebted to him for a supply of the chemical and much helpful information on its use.

The first experiments were conducted in the greenhouse during the past winter. All experimental plots were artificially inoculated with spores and, as a result, 100 per cent. of infection on untreated crocks was the rule. Usually 100 per cent. of the unsprayed plants die from the severity of the attack and, therefore, any fungicide which will preserve the treated plants under these conditions must have real merit.

During the winter four crops of plants—eight or ten 10-inch crocks of 200 to 300 plants each—were grown to size suitable for setting in the field and were either kept sprayed during this time with "Fermate" or left unsprayed as checks. The detail of these and later experiments will be published elsewhere.

All unsprayed plants became infected and most of them died. The most successful dosage of "Fermate" was $1\frac{1}{2}$ to 2 grams in a liter of water with the addition of an equal amount of lime. When the plants were sprayed twice a week this treatment gave 95 to 100 per cent. of disease-free plants and they remained healthy until grown to transplanting size. At times there was a small amount of spray injury evidenced by chlorotic areas on the leaves, but this never caused serious detriment to growth and was lacking entirely in most of the trials.

In April of this year the experiments were repeated in the seed beds. The results fully substantiate those in the greenhouse in giving excellent control of mildew.

The results of these experiments, conducted during one winter in the greenhouse and one spring in the seed beds, appear quite encouraging and lead us to believe that we have at last found a successful, simple inexpensive prevention for tobacco mildew. Before drawing final conclusions, however, this treatment should be repeated over several seasons and by practical growers in different sections.

P. J. ANDERSON
CONNECTICUT AGRICULTURAL EXPERIMENT STATION

AN ELECTRIC RECORDING MARKING COUNTER FOR THE CONSECUTIVE COUNTING OF SMALL OBJECTS

A NEW application of an electric counter has been devised for counting the projected cross sections of wool fibers. When magnified 500 times, the average diameter of wool fibers is seldom more than one inch and often is less than 0.5 inch. This counter shows possibilities of further applications in science and industry where materials of small surface area are to be counted and identified. While elaborate counting procedures involving ruled-glass plates or chambers have been applied on bacteria, blood and particle counts, they are not applicable to fiber counts.

Only recently has projection equipment for enlarging microscopic objects found wide application. Much of the eye fatigue associated with techniques involving direct scrutiny of objects through a microscope is eliminated. The problem of counting the images still remains and while it may be possible to count mentally the number of objects occurring within a projected area, a direct marking counting device may be profitably applied. To fulfil the need for a counter that will mark small objects, an electric recording counter was designed. The marking is accomplished with large soft lead pencil. The motion involved in the marking closes a small switch causing the current to pass through a coil. The magnetic field set-up moves a small laminated steel armature directly connected to an ordinary ratchet counter. A spring assembly quickly returns the counter in readiness for the next count. The counter-actuating assembly may be likened to a small electric motor whose rotary motion is limited to an arc of 45°, just sufficient to bring up the consecutive figures on the counter. A number of ratchet counters are suitable which add one unit for each oscillation of the shaft through approximately 45°. It was found desirable to select a counter without the return spring and supply an adjustable coil spring of greater tension. After experimenting with a number of different solenoids connected by means of a lever system to the counter, the above arrangement, which gives a rotary motion, was considered the best. The laminated core and the high inductance of the field coil makes the use of electric supply from ordinary A.C. line feasible. A three-foot flexible cord is desirable to connect the switch marking assembly with the electrically actuated counter, see Fig. 1.

Fig. 1 is the wiring diagram of the counting assembly. Probably the most vital factor in the proper operating of the counter is the selection of a suitable micro-type switch. There are a number of these switches which are now available on the market. An adjustable metal band holds the pencil in contact with the small plastic pin operating the switch and permits replacement or removal for resharpening. A very slight movement of the pencil causes the circuit to be closed. The silver contacts within the switch permit long continuous operation. It is important to choose a pencil that will mark with slight pressure. The quality of lead should not be any harder than a No. 2. Colored leads or waxes may be substituted for differentiating between materials being counted and for marking various types of surfaces.

Rapid counting and marking of a series of items are possible. It is easy, for example, to count and mark 150 fiber cross sections in one minute. Utilization of the electric counter has greatly speeded up wool fiber analysis by the count method outlined by

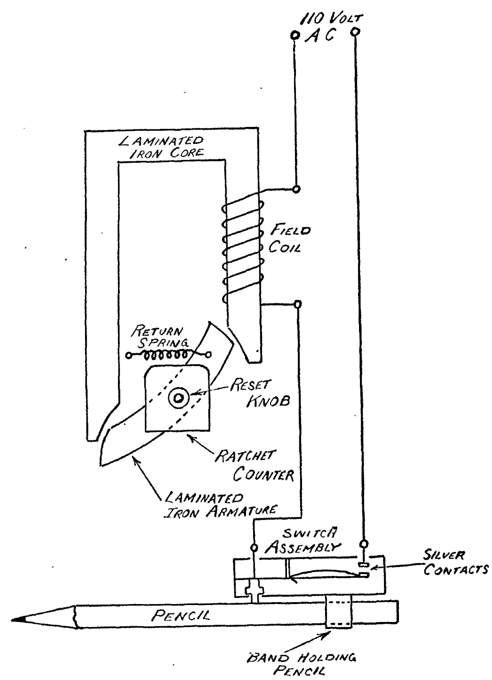

Fig. 1. Wiring diagram for electrical marking counter.

Hardy and Wolf[1]. This method consists in counting the number of wool-fiber cross sections included within a 125-square-centimeter area at a magnification of 500 diameters. Many applications could be mentioned, where advantages are possible by lessening the potential personal errors and speeding up tiresome routine procedures.

H. W. Wolf

[1] J. I. Hardy and H. W. Wolf, U. S. Department of Agriculture Circular 543, 16 pp., illus., 1939.

BOOKS RECEIVED

Bennett, Granville A., Hans Waine and Walter Bauer. *Changes in the Knee Joint at Various Ages.* Illustrated. 31 Plates. Pp. vii + 97. New York: The Commonwealth Fund; London: Oxford University Press. $2.50.

Campbell, Arthur Shackleton. *Scientific Results of Cruise VII of the "Carnegie," 1928–1929; Biology II: The Oceanic Tintinnoina of the Plankton Gathered during the Last Cruise of the Carnegie.* Illustrated. 1 Plate. Pp. v + 134. Carnegie Institution of Washington. $1.50.

Cheronis, Nicholas D. *Semimicro and Macro Organic Chemistry.* Illustrated. Pp. xiii + 388.

Dunlap, Orrin E., Jr. *The Future of Television.* Pp. xi + 194. Harper and Brothers. $2.50.

Wieting, C. Maurice. *How to Teach Consumers' Cooperation.* Pp. xv + 206. Harper and Brothers. $2.00.