Several chapters are grouped under "Ecologie des Insectes," and treat ecology as a science, insects in their relation to plants, insects in their relation to other animals, interrelations among insects, insects in their relation to environmental conditions, psychology of insects, insects in their relation to man, the war against insects—the latter a discussion of economic poisons.

A number of chapters are grouped under "Ordres des Insectes," and here Dr. Wolcott follows Comstock in a general way, though giving prominence in tropical forms.

The last group of chapters has the heading, "Entomologie pour le Fermier," and after a brief introduction we find discussions of insects which attack sugar cane, coffee, tobacco, fruit, truck crops, stored products; then household insects, parasites of poultry, insects attacking animals, insects attacking man.

The reviewer ventures to think that Dr. Wolcott's book would be of value not only in Haiti but in other French colonies as well. An English translation would, he feels sure, be of use in this and other countries.

Both Dr. Wolcott and the department of agriculture of Haiti, which made the work possible, are to be heartily congratulated.

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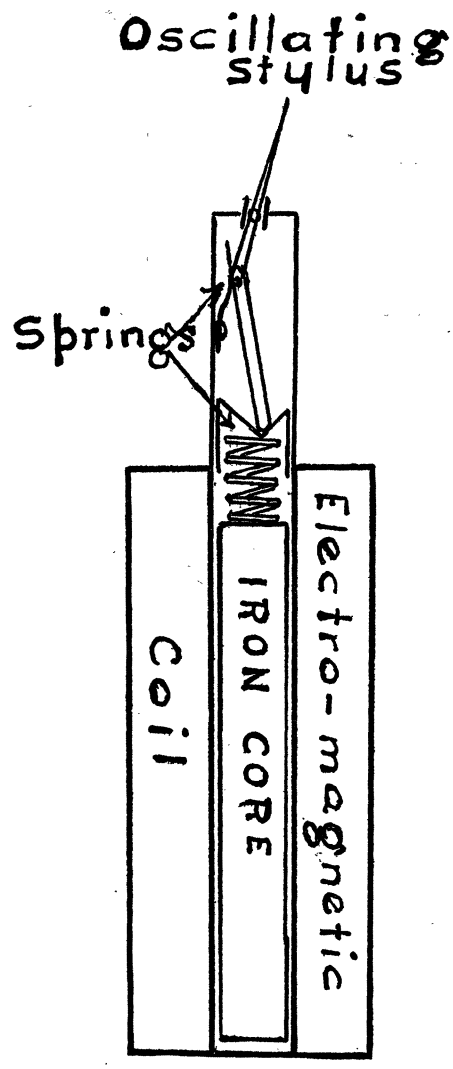
SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE AND ACCURATE TIME MARKER

THIS time marker takes advantage of the fairly constant frequency of the ordinary alternating current lighting circuit. There are three forms of it that we have considered. The first and simplest consists of a single light reed whose period of vibration is the same as the frequency in the A.C. line. The reed is actuated by a suitable small electromagnet.

The second form of this time marker, which is depicted in Fig. 1, may be looked upon as a modification of the synchronous reed. It consists of a system of levers and a movable soft iron core in an electromagnet. One or more springs, helical or linear, furnish restoring forces. This second form may be designed to be quite powerful. The mechanism which we have modified and used was obtained in the market in the shape of an electric safety razor. It is shown schematically in Fig. 1. These time markers, which may be constructed in the form of a pencil, will require little space and may be readily mounted with any desired freedom of adjustment. It is not easy to construct such a system as that shown in the drawing to have a natural frequency equal to that of the A.C. line. Furthermore, its wave form may not very closely approach a simple sine wave. There are



advantages and disadvantages in having harmonics present in the time graph.

Applying a somewhat different mechanism from the two forms just described for the registration of time intervals of the alternating circuit, we have attempted to employ as the third form of time marker a synchronous motor such as is used in the electric timepiece which is sold under the trade name of Telechron. This apparatus can be made not only to indicate the smallest time interval that may be estimated on the drum, but also, by proper gearing, it can be made to indicate on the graphic record each tenth of a second or other desired interval. It is this form which we hope to set forth in greater detail in the near future.

We would like to emphasize that such synchronous A.C. timing devices are extremely convenient and sufficiently reliable for many ordinary laboratory purposes. In the Cleveland district the potential cycle known as the 60 cycle circuit is constant within a quarter of a cycle from day to day. This means that

the time intervals might be accurate to within 1/240 of a second from day to day. For a matter of a few hours during the course of an experiment the time as indicated by such a synchronous device is considerably more accurate. Depending upon the speed of the drum, upon which the time graph is made, the time may be read to something certainly less than 1/280 of a second, possibly quite readily to within 1/600 of a second. This accuracy of timing refers to relative time intervals and not to any accuracy of synchronism with ordinary clocks. The so-called "60 cycle circuit" may actually have been controlled at any frequency other than 60 per second, as was the case in our local circuit, where the frequency was 59.6.

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BACTERIAL FILTERS

IN a previous communication[1] I described experiments in which it was shown that by the use of filters made of basic materials having a positive electric charge, bacteria, viruses and colloids, which pass through a siliceous filter made of materials of negative electric charge, are held back.

I have devised a filter which will remove both positive and negative colloids, *i.e.*, one which may be described as amphoteric.

This is accomplished by adding to the siliceous material in the filter compound a basic material carrying a positive electric charge, one which is comparatively insoluble in water and is not destroyed nor altered by heat sufficient to harden clay.

Such a material is magnesium oxide calcined at 1300° C. By combining equal parts of this material and Florida kaolin in the filter compound and firing at a temperature not exceeding 900° C. an amphoteric filter is produced.

A temperature higher than this must be avoided, since it will bring about a combination of the magnesia and the siliceous material used and the resulting filter will act as do other siliceous filters.

Filters made as described above will remove both acid and basic colloid dyes.

They will remove bacteria which do not pass a siliceous filter, as well as the so-called filterable bacteria.

The bacterio-phage and the virus of Mosaic disease of tobacco do not pass through these filters.

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[1] SCIENCE, Vol. LXV, No. 1672, p. 45, Jan. 14, 1927.

SPECIAL ARTICLES

THE OXIDATIVE DESTRUCTION OF THE AGENT OF THE CHICKEN TUMOR I (ROUS)[1]

FROM the time of the first work on the filterable agent of the Chicken Tumor I (Rous), it has been recognized that candle filtrates rapidly lose their infectivity when incubated at 37°. No adequate explanation for this loss appears to have been put forward, although Gye, in his paper of July, 1925, inclined to the view that it might be oxidative. He stated, however, in several lectures given during his recent visit to America, that this auto-inactivation is prevented, or greatly retarded by low concentrations of HCN, and explained this as being due to a poisoning by the HCN of certain proteolytic enzymes which destroy his hypothetical protein "specific factor." The literature, however, contains no evidence that HCN in minute amounts has any effect, except perhaps one of slight acceleration, on tissue proteases. On the other hand, from the work of Warburg and others it is known that certain types of oxidases are inhibited specifically by this reagent.

It occurred to the writer that if the loss on incubation were oxidative, it should be possible to prevent it by some other means than a poison such as HCN, and a number of experiments have been carried out in which cystein in a dilution of 1–2,000 has been added to freshly prepared filtrates of the Rous tumor, and the tubes promptly sealed with vaseline. This has invariably resulted in delaying the loss of infectiousness over control aerobic tubes by many hours. Similarly prepared tubes kept at 4° C. have retained practically their full original potency for several weeks.

One of the annoying features of work with this virus is the great variability in effective strength of different filtrates. Tumors may be produced by one filtrate with 0.001 cc of Mandler filtrate, while on the following day a filtrate made in exactly the same way may fail to infect in a quantity of 1.0 cc. Since there is no method known for determining the properties of such filtrates except to inject chickens and wait two or three weeks, obviously it has always been necessary to set up complex experiments with filtrates of entirely unknown strength, which has led to tremendous waste of time and material. It is hoped that the method of preservation of filtrates with cysteine at low temperatures may find some application in further experimental work with the tumor.

It may also be stated that the initial variation in potency of filtrates is probably due, in part at least,

[1] From the Department of Bacteriology and Immunology, Harvard University Medical School.