boy, I used to look with wonder and curiosity at the large blank spaces on the map of Africa. I was quite old enough to have been present at the discovery of Lake Kivu, had I been exploring Africa at that time. These regions were either inaccessible, or were only reached at the cost of much time, labor and money, with some risk to life. Now we go with comfort and speed, and the cost is quite moderate. But the fauna and flora are still there, excepting only some of the larger animals which have been decimated or exterminated by hunters. It is true that many of the more interesting discoveries have already been made and recorded, but the wealth of novelties still remaining is almost beyond belief. Field observations on the habits of many groups of invertebrates have scarcely more than begun. It does not in the least detract from the scientific results of an expedition that it is far easier and cheaper than formerly; on the contrary, the harvest is likely to be greater and more valuable, because the conditions are better.

As Mr Clark rightly insists, there should always be "definite purposes and objectives." Those who have no such purposes rarely accomplish much of value. Nevertheless, it is important to be prepared for the unexpected. I am constantly asked, when about to start on an expedition, "What do you expect to find?" I often answer, "I expect to find what I do not expect to find," a seeming paradox explained by referring to the enormous complexity of nature and the innumerable surprises it affords.

Thus it appears that amateurs, without very much training or large resources, can do important work for science. They can also get a great deal of pleasure and interest for themselves, and may take a justifiable pride in the results. It is necessary, however, to get the materials worked up and the results published. Collectors must be content, as things now are, if by far the greater part of their collections reposes on the shelves of museums, awaiting the touch of a posterity perhaps not yet born. I have had occasion to describe bees collected on the famous voyage of the *Beagle*. But it is often possible to find specialists who will more or less promptly attend to the groups they are interested in, so that the members of an expedition will not have to wait too long to ascertain whether they were successful. Better organization is needed in respect to these matters. Thus, it would seem worth while for any large museum to issue a circular or pamphlet, setting forth the desiderata which could be dealt with promptly. Yet even in the case of groups which find no students, an active worker may appear at any time and utilize all that has been gathered up to date.

One thing reacts on another. If there were more amateurs, anxious to collect scientific materials and study them, as far as their training and circumstances might permit, there would be more interest in and support for the specialists whose cooperation is needed. There would be better chances for publication, and books would begin to appear, which would make many matters intelligible to those having a reasonable amount of scientific curiosity. The general result would be an increase in the cultural level of the people, something sorely needed at the present time.

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ALFALFA YELLOWS

Because the extent of the injury sustained by agronomic plants from insects is governed by a complex of factors involving environmental reactions of the host plants and their relations to the habits and populations of the parasites, there are, at times, simple agronomic procedures that prove to be effective remedies. Such is the case with the stunting and yellowing of alfalfa that is caused, primarily, by leafhoppers (*Empoasca fabae*). In Wisconsin this injury appears primarily in the second growth, and that it is definitely associated with increased populations, resulting from early cutting of the first crop, is made clearly evident by cutting trials of alfalfa and population counts of leafhoppers during the past two years.

Since leafhoppers do not usually appear in alfalfa fields in large numbers until the plants are near blossoming, their injury is not, as a rule, of great importance with the first cutting of hay. When this cutting is deferred until the field shows abundant blossoming the adults will have laid in the green tissues of the alfalfa the major portion of the eggs of this brood. Such eggs are removed in the first crop of hay before they hatch into nymphs, thus greatly reducing the populations in the second growth. With earlier cuttings of the first crop, egg deposition, not being completed, is continued by surviving and migrating adults, often resulting in large populations of nymphs, which in specific trials this past season reduced the productivity of the second growth of alfalfa from 66 to 75 per cent. Thus, cutting one half of each plat of a series on June 9 resulted in a stunted yellow growth of the second crop in which, on July 15, there were present 29 times as many nymphs as were found in the healthy growth of alfalfa in the adjacent areas where the first crop was removed on June 21. Since these nymphs are relatively static and do not begin to migrate until they have approached the adult stage, alfalfa prevailed in adjacent areas of the second clear-cut contrasts of short yellow and tall green growth with only twelve days difference in the time of cutting the first crop. A few days prior to the cutting of the second growth on July 31 the nymphs had largely become adults and through migration caused a yellowing of all the alfalfa. However, they disappeared rapidly after this cutting. It does not appear that conditions are favorable for their propagation during the period of the third growth—at least, this crop is rarely injured seriously by them in Wisconsin.

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CONJUGATION IN RHIZOPUS INHIBITED BY FEMALE SEX HORMONE

ALTHOUGH the female sex hormone has been isolated from various plant tissues, the authors have been unable to find any reference to experiments as to its effect on plants.

For a preliminary test of the effect of estrin on plants, *Rhizopus nigricans* was selected because of its rapidity of growth and conjugation. Estrin used in this work was prepared from human pregnancy urine by R. G. Gustavson and his coworkers at Denver University. Parke, Davis' commercial theelin preparation was also used.

All cultures were grown on standard potato dextrose agar, in petri dishes. The agar substrate was divided into two parts by a groove about an eighth of an inch wide. One side of the plate was inoculated with + strain of *R. nigricans* and the other side with – strain.

An initial concentration of about 5 Coward-Burns rat units of estrin incorporated in the agar was found to be more satisfactory. In some cases, estrin was added after the colonies had begun to grow. A total of over 300 cultures have been studied in the several tests and in every case the estrin or female hormone inhibited zygospore formation, while accompanying untreated check cultures conjugated profusely. With the initial treatment the formation of gametangia was delayed from four to six hours. With continued dosage the sexual fusion was delayed for longer periods of time. The same effect was observed in the case of theelin.

The results of these experiments are comparable to those of D'Amour and others, who found that estrin terminates pregnancy in rats. Agreement with his work was also found in that one Coward-Burns unit is the equivalent of about 12 Allen and Doisy units.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ELECTRICALLY DRIVEN CONTACT BREAKER CAPABLE OF DELIVERING GALVANIC SHOCKS RANGING FROM 0.000,01 TO 1.0 SECOND DURATION

THIS contact breaker, designed primarily for research, has been used in the student laboratory for several years in a class experiment on the correlation of duration and strength of galvanic stimulation. Its ruggedness and dependability for student and research purposes, its convenience of manipulation and long range of shocks may be of interest to those contemplating a similar device.

The construction is simple and most of the details are apparent in Fig. 1. It consists of two essential parts—a heavy iron flywheel carrying a knock-over and an automatically advancing carriage for moving the knock-over keys into the path of the knock-over.

The flywheel (7.5 cm × 21 cm) is revolved at a rate of 1,200 r.p.m. by a lead screw serving as a connecting shaft to the motor. The employment of a synchronous motor and a heavy and well-balanced wheel and motor insures a uniform velocity of movement of the knock-over. Note that a dummy knock-over is mounted in the opposite face and circumference of the wheel.

Two keys are mounted on the carriage. The key at the left is for coarse adjustment of 0.05 of a second intervals. By separating the keys 20 scale divisions (each division is equivalent to 1 thread of the lead screw), the maximum interval of 1 second is attained. The key at the right is mounted on a disk, also 21 cm circumference graduated into 500 equal parts. This disk is in turn attached to a heavy vertical support fixed to the horizontal bar and sliding in a snugly fitting way in the supporting base. A vernier permits setting of the keys at intervals of 0.000,01 second.

The carriage is operated by a swinging quarter nut clutch which is thrust into position as the motor is turning. Just as the clutch is completely engaged, a spring operated latch pops out of the free end of the clutch to the inside of a guiding bar and keeps the clutch engaged for the entire excursion (Fig. 2). Towards the end of the excursion it passes between the guiding bar and another bar mounted on a steel spring, and as it clears the guiding bar it is thrust