hours of labor. Ordinarily, we would take this fact for granted. Does the labor leader want to be told that it is 6:00 P. M. and his agonized appendix can wait until 9:00 A. M. or burst because the surgeon's hours are over? Or his nurses and anesthetist left at 5:30. No, his appendix is removed even if he hasn't a nickel in his pocket and can not speak the language to promise a fee. The sulfuric acid manufacturer whose new plant mysteriously refused to function properly and pours forth clouds of noxious gas on its surroundings faces the same kind of critical emergency. No code of competition can safely tamper with the duty of an honest professional man to his stricken client.

So much for the professional man's wares and the broad obligations under which he sells them. What are his relations with his assistants? They may be called his employees, but they should be vastly more than that. If he is worth working for and they worth hiring, he is also their teacher and they students, apprenticed to their profession in office, laboratory, operating room, sick room or plant. Brilliant youngsters often have the sense to offer to work for nothing under certain men and feel highly paid, as in fact they are, merely by what they are able to learn. The relationship, often quasi-paternal, readily extends itself to more personal affairs—education, financial matters, home relationships. Thousands of men owe their ambition for a higher education and hundreds their actual tuition expenses to the interest of such professional employers. What have the labor union provisions of maximum hours, minimum wages to do with such a relationship?

What advantage does a code for any type of professional offer the general public? Economically, their numbers are too few to tip the national balance, insignificant compared to any major national industry. Their wages can not be raised or lowered arbitrarily—for the sake of all, they must sometimes sell below cost. Their work can not be delegated to spread employment—who would consider hiring two lawyers to work for him in shifts? Mr. Average Citizen, as well as every major industry, is dependent on some form of professional services not only for the conduct of daily affairs but for special emergencies. Cripple the professional man and you threaten the safety of the unforgetable "Forgotten Man"—his client.

W. M. GROSVENOR

GENETICS AND COLORS OF THE SIAMESE FIGHTING FISH, BETTA SPLENDENS

THE Siamese fighting fish, *Betta splendens* Regan, which is at present popular among fish fanciers, has been the subject of breeding experiments in our laboratory during the past three years. A demonstration of various color varieties was given at the Genetics Congress of 1932. These types fall into two groups which may provisionally be genetically distinguished by the presence in one of a color factor C, which is dominant to condition c, in which much less pigment is developed. The first group (C) includes those highly colored fish known to the fanciers as *Betta splendens;* the blue Betta, *B. cyana;* the green Betta, *B. smaragdgreen;* the red Betta, *B. rubra;* and a light blue Betta. *B. splendens,* which is the only specific designation having taxonomic recognition, is the normal wild type, and the body color is of a deep brown and red mixture and the fins may be either red and green or red and blue. The blue Betta is a brilliant blue, often with considerable red in the fins. The green Betta is a blue-green, quite variable in tone. The red Betta is similar to splendens but with a greater development of red and blue. The light blue Betta are a pale blue, with less color in the fins. The colors are produced by combinations of black, red and yellow chromatophores and by reflecting cells or guanophores. The latter appear to be especially important in the blue and green types. These colors are apparently due in large part to the refraction and interference of light from thin hexagonal crystals. The thickness of these crystals can only be approximately determined, but results have indicated a range of from probably less than .3 to .5 micra. These crystal plates then are of such a thinness that refraction and interference of light may account in part for the blue and green colors.

The second group (c) is represented by the type known as *Betta cambodia,* which is predominantly a light yellow with varying amounts of black melanophores sparsely scattered on the body and with red and blue or red and green fins. Crosses of cambodia and cambodia have always produced cambodia only. Cambodia crossed with any dark-colored type usually give approximations of mono-hybrid ratios. In many cases, however, the proportion of cambodia somewhat exceeds expectations, as in crosses between a heterozygous colored type by cambodia the sum of all ratios is 751 dark : 930 light. Crosses between two heterozygous dark types gave total ratio of 1891 dark : 731 light, but in many individual crosses the ratio is closer to two dark to one cambodia. These may indicate the existence of a more complex factorial situation. Homozygous dark by cambodia always give an F_1 which is all dark. Evidence indicates that the relation between the dark types is more complex.

Betta spawn readily in captivity. Adults can be kept in small aquaria, but the rearing of the young requires best of food conditions and large aquaria, as

otherwise mortality is high and ratios rendered unreliable.

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"ALFALFA YELLOWS"

In a recent issue of Science (78: 385–386) there appeared an article under the title of "Alfalfa Yellows"[1] which reported that the simple agronomic procedure of deferring the cutting of the first crop of alfalfa until it showed abundant blossoming, or from June 9 to June 21, had proved during the past season to be an effective remedy for preventing the stunting and yellowing of alfalfa caused primarily by leafhoppers, *Empoasca fabae* (Harris). It is not the purpose of this note to minimize the value of this observation, which applied to Wisconsin conditions, but to report some of the results of our five years' studies on this problem—one that is of the utmost importance to growers of alfalfa in the northeastern part of the United States.

As a result of these studies some significant leads have been obtained on the control of this injury by varying the cutting schedule of alfalfa. However, in the latitude of Arlington Experiment Farm near Washington, D. C., and of Columbus, Ohio, the problem of control of this injury by cutting is much more complicated than the writers of the recent article in Science infer. Experiments over a period of years will be required to permit specific recommendations for control of this injury by altering the regular cutting schedules of alfalfa, and it is probable that the recommendations will vary according to conditions in different localities. It was generally true during 1933 that where the first crop was not cut until 10 or more days after the usual date the more serious injury to the crop following this delayed cutting did not appear. This, however, is not always the case. From the standpoint of the insect alone many factors enter into the problem of controlling by a cutting schedule the extreme losses to alfalfa by this leafhopper. Each year at Arlington Experiment Farm, from May 10 to 16 until July 1 or later, there appears to be a continuous and general migration of this species into alfalfa, after which special periods of migration take place as potatoes or other favored hosts become less attractive as food plants. Of more importance to this phase of the problem is the fact that this leafhopper, under the most favorable environmental conditions of weather and food plants, can build up its populations to tremendous proportions within a comparatively short time. It seems fairly certain, therefore, that the period of ideally favorable environmental conditions for the development of this leafhopper, combined with the amount of migration from nearby maturing or harvested crops or from more distant areas, as well as the stage of growth at which the crop is attacked, are extremely important factors in determining the amount of injury to alfalfa that will be caused at any one time by *E. fabae*. The importance of all these factors must be taken into consideration and their influence determined before any cutting schedule for alfalfa is adopted for controlling the injuries caused by *E. fabae*.

[1] It is preferable to refer to this disease-like injury caused by *Empoasca fabae* (Harris) as potato-leafhopper-injury, since the term "yellows" carries the inference that a virus or bacterial disease is involved, and also because various shades of pink and red as well as yellow colors are usually present.

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EXPERIMENT ON THE EFFECT OF FATIGUE IN INSOLATION

One factor in the effect of insolation on rock exfoliation has not yet been determined. That is the fatigue due to repeated temperature changes acting over a period of centuries. An experiment designed to test this factor was begun at Ohio State University in 1932 by the author in cooperation with Mr. Alfred Holmberg and is being continued at Harvard University. A block of coarse-grained granite, polished in the quarry, is being subjected to alternating periods of heating and cooling, repeated ninety-six times a day. A temperature change of about 120° F. is induced in the surface of the rock. Thus, the effect of exposure to insolation for one century in an arid climate is accomplished in a little more than a year in the laboratory. The effect should be much greater than would be true in nature because of the rapidity of the heating and cooling. Photomicrographs of the specimen are taken at intervals as the experiment progresses, providing an accurate record of the position and size of surface cracks. Cooling is accomplished by a current of dry air, so that the effects of water are avoided.

The rock has already been subjected to changes in temperature corresponding to a period of more than a century with extremely small effect. A slight development of cracks along cleavages in the feldspar is the only observed change. Present plans are to continue the experiment for a number of years (corresponding to centuries) in an attempt to measure quantitatively the factor of fatigue over a time interval which will be comparable to those in which the break-up of rocks is accomplished in nature.

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