been previously sprayed with alcohol and burned to kill most of the adhering spores of saprophytic fungi. In some 20-odd cases in different tubes, the coremial stage of *Graphium Ulmi* appeared on at least 75 per cent. of the twigs. In about a dozen different tubes, where such beetles from dying elms not killed by the Graphium were used, the fungus did not appear on any of the twigs. This does not mean, however, that such beetles might not carry the disease from diseased trees to those dying from other causes.

Our experiments, however, indicated that the *Hylurgopinus rufipes* is a probable carrier in nature. How much this beetle injures the young twigs in the early season we do not know, but in our experiments the beetles chewed the bark and even at times entered somewhat out of sight in the twigs. It is, however, up to the entomologists to show what injury this beetle does to the elm twigs in the early summer. It is also up to them to demonstrate how commonly beetles go from infected trees to those dying from other causes. If this can be shown as a common occurrence, then there is a more definite reason for getting rid of such non-infected trees, as far as control of the fungus is concerned. In Europe besides *Scolytus scolytus* and *S. multistriatus, S. sulcifrons* has recently been claimed as a carrier of *Graphium Ulmi* to elms in Italy.

The station's scouts, in the state outside of the infected area in Fairfield County, reported over 50 dead or dying elms showing tunnels of either Hylurgopinus or Scolytus. We examined practically all these, and as many more with or without beetle tunnels, for indications of *Graphium Ulmi* in the dead bark, but in no case was this found. However, we did find in some of them a saprophytic Graphium, with spores finally dark in mass, and in one or two cases what seemed to be the immature asco stage of it. So far the asco stage of *Graphium Ulmi* has not been found in nature in this state; however, in cultures, imperfect developments of it have been seen rarely in certain test-tubes.

This survey of dead elms is valuable in what it may show later when *Graphium Ulmi* invades this free territory. A less extensive but similar examination in the infected Greenwich-Stamford area also failed to reveal the fruiting stage of *Graphium Ulmi* on the dead or dying bark of elms dying from other causes. Both inspections were made about the same time in the fall. Further observations, however, need to be made before we can be sure of the value or uselessness of removing dead trees or limbs, dying from other causes, as a means of limiting the direct spread of *Graphium Ulmi.*

We have been able in a fair number of the cases tried to produce the coremial stage of *Graphium Ulmi* by spraying pure cultures of the spores on the inner bark of the elm in moist chambers. So far, apparently, the healthy bark has given better results, though we have had some infections on beetle-injured, rotting bark.

Dr. L. B. Arrington was temporarily hired for superintending the tree survey work for the station and proved very satisfactory. All the infected trees found in Connecticut have been removed and destroyed. This eradication has been done under the direction of W. O. Filley, the station forester. Just how effective this apparently complete control work has been remains to be seen when possible new or undiscovered infections show next summer.

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## THE BELGIAN NATIONAL RESEARCH COUNCIL

AT a time when the support of scientific work and the place of science in national planning is a subject of discussion, the sixth annual report of the Belgian *"Fonds National de la Recherche Scientifique"* is especially interesting. This foundation, with a capital of approximately $6,000,000, was started in 1927 by contributions from many private and industrial sources under the enthusiastic support of the late king. To form an estimate of the relative importance of the foundation, the reader should multiply the figures in this review by fifteen, the ratio of the populations of the United States and Belgium. Of the income of $350,000 in 1933, about half was devoted to subsidies in aid of pure scientific and scholarly investigations (philosophy and letters as well as law are included). The industries were, however, not neglected, as grants of $55,000 were also made in aid of twelve projects. In general the foundation expected the industry interested to contribute half of the cost of the investigation on the theory that "a business man is apt to think that what costs him nothing is not worth much."

The $175,000 devoted to pure science was distributed in a manner that has many novel features. Forty per cent. or $70,000 was given for the equivalent of our national research fellowships. These fellows, 68 in number, are appointed for two-year periods, which are renewable up to six years. The stipend increases from $1,000 to $1,200, and the number of fellows shows a gradual and natural decrease for successive years of tenure (20, 16, 12, 8, 8, 4).

The policy guiding the foundation is stated as follows: "To endeavor to assure the continuity of scientific effort in our country, and to provide for the

recruiting and development of the personnel in advanced teaching and research positions." The support of selected fellows for long periods at a low stipend undoubtedly favors the gradual and natural absorption of these men into the various institutions of the country. How often have we seen a young man come to the end of a two-year fellowship with an investigation well under way, and then, for financial reasons, accept some position where his scientific work must be dropped!

The novel features are still more striking in the disposition of the remaining 60 per cent. of the funds. Subsidies amounting to $28,500 were granted to 23 "associates." These "associates" are men of an established scientific reputation who are on the regular staffs of universities or institutes, the subsidy allowing them to go on a "part-time" basis, so that they may have time and energy to continue their investigations. The total salary, however, is never allowed to exceed that of their colleagues on a full-time basis. In this way the foundation endeavors to counteract some of the undesirable results of the system of regular routine promotion and emphasis on teaching which has ruled in the Belgian universities.

Partly due to the policy of the Fellowship Board of the National Research Council, we have tended to concentrate scientific work in a few institutions. This is doubtless a wise policy in dealing with young men who gain very much from association with a group of active co-workers. But science can not exert the proper influence on the educational life of the country if it is confined to a few research institutes. It is easy to imagine the effect of a policy such as that followed by the foundation with its "associates," in giving prestige to serious, scholarly and scientific work in all the institutions of the country and weaning them gradually from contentment with lesser ideals.

A third category contains subsidies to investigators "who have won distinction by their scientific work." Thirty-two received $25,300 for financial assistance in carrying out various investigations; $10,400 was distributed to 32 applicants for expenses in traveling and visiting laboratories in different countries, and $10,000 was used in paying technical assistants for 13 scientists.

In addition, apparatus costing $26,500 was purchased and loaned to various investigators. This apparatus remains the property of the foundation which, as the result of purchases in preceding years, now has at its disposal apparatus valued at $160,000.

The foundation also provides annually a sum of $31,250, which is devoted to paying life annuities, not exceeding $1,250 each, to certain distinguished scientists, selected apparently on the basis of the prizes and honors that have been awarded to them. As the report explains: "The council considers it its duty to create for certain particularly eminent men of science a position worthy of the rôle that they play in the moral and material development of the country." The recognition of such a group probably emphasizes the diversified character of scientific advance and the fact that constant effort is called for on all fronts.

It is apparent that in Belgium the national importance of sustained scientific work and the continuous selection and development of able men in the institutions of the country is vividly realized, and measures are being taken which far exceed in relative magnitude any analogous ones in our country.

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## OAK TREES AND THE WHITE GRUB MENACE

THE southern half of the state of Wisconsin is characterized by an oak-hickory climax forest. This area coincides closely with the estimated areas of severe grub damage to pasture and corn land. Further, most of this injury is caused principally by the grubs of four species of June beetles which have a marked preference for certain varieties of oak, notably bur oak. It would appear that a correlation exists in nature between the abundance of certain injurious species of white grubs and certain preferred adult food plants.

In the choice of trees for propagation, either on a small scale or on a gigantic scale such as the U. S. Shelter Belt project, each variety should be considered in relation to its relative attractiveness as June beetle food not only from the standpoint of the successful establishment of the young trees but also from the standpoint of the possible associated increase of harmful insects, such as white grubs. The same extremely harmful species of June beetles so abundant in Wisconsin which have predominant oak feeding preferences are now present in small numbers in at least part of the area to be crossed by the proposed shelter belt. If conditions are made more favorable for these and other pests future farmers may face conditions just as serious as drought.

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## THE BIOLOGY OF THE BLACK WIDOW SPIDER, LATRODECTUS MACTANS[1]

DURING the past three years the writers have made numerous collections of the black widow spider in Ravalli County, Montana. During this period there

[1] Contribution from the Rocky Mountain Laboratory of the U. S. Public Health Service, Hamilton, Montana.