lection of a final quotation to end his treatise. Dr. Pearl states it as his firm conviction that carefully conducted research with animals will in the long run produce more reliable and trustworthy evidence as to the effect of alcohol, as such, upon duration of life as such, including human life, than will any human data.

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REPORTS

THE WESTERN COOPERATIVE OIL-SPRAY PROJECT

THE use of oil as an insecticide has increased rapidly during the last few years. Much experimental work has been done by various agencies, but most of this work has not been coordinated in such a way that comparisons could be made. In order partially to overcome this difficulty, a conference of entomologists and chemists was held at Tacoma, Washington, June 30, 1926, chiefly at the instance of J. R. Parker, associate entomologist at the Montana Agricultural Experiment Station. At this meeting, the Western Cooperative Oil-Spray Project was formed. The participants in this project included the Canadian department of agriculture, the agricultural experiment stations of Washington, Oregon, California, Idaho and Montana and the United States department of agriculture. Mr. Parker was named chairman of the organization. As practically nothing has been published regarding the intentions or results of the project, this brief report is presented at this time.

A further conference was held in Spokane, December 5, 1926, which plant physiologists and horticulturists were invited to attend. The oil-spray problem is not merely entomological in scope. The physiological effects of oils on plants must be considered, as well as the chemical aspects of oil-sprays. It was decided to limit the project to work of a fundamental nature, that is, primarily to investigate the effect of various types of oils on insects and plants and to ascertain the best methods of emulsifying the oils. It is believed that work of this nature will be more valuable than work with oil emulsions that may be on the market. In order to coordinate the work, a definite plan was formulated and the investigators were supplied with uniform materials. This has made the work of the various investigators much more comparable than has been the case heretofore. And to quote from the memorandum of understanding between the various agencies, one result of the project has been "to broaden the knowledge of the individual worker by the exchange of ideas and brief annual reports on work accomplished and to establish mutual confidence and to avoid trespass in matters of credit."

One year's work has been completed, and the results have been discussed and further plans made at a meeting held in Spokane, December 17 and 18, 1927. As the agencies involved are chiefly interested in horticultural work, the investigations so far have been limited to fruit trees. Possibly the most striking feature of this work has been the need of careful observations on the part of plant physiologists and horticulturists as to the effect of oil-sprays on trees and their products. This has been more or less overlooked in the past by entomologists, possibly because of their inability to measure carefully such effects.

The project feels that the use of dormant oils is fairly well standardized, and recommendations can be made and have been made regarding their use for the control of the fruit-tree leaf-roller, scale-insects, aphids and red spider eggs. However, there is still much to be learned as to the best time for application and the effect of low temperatures following application, and this portion of the investigation is to be continued.

The use of oil for summer spraying is not well standardized. On account of this, manufacturers are continually changing their products. Good results have been obtained in the control of red spiders and the codling moth, but the application of a number of summer sprays of oil has often resulted in injury, in one form or another, to the trees. For example, the fruit of yellow apples is particularly susceptible to oil injury; and trees in poor physical condition may be more severely injured than those in good condition. Moreover, the use of oil with lead-arsenate may complicate the subsequent removal of the spray residue. For these reasons, aside from the use of a single application of oil of sufficient strength to kill red spiders, no recommendations for using summer oils can be made by the members of this project until further investigations have been carried out.

The members of the project engaged in the 1927 investigations were as follows:

Dominion of Canada, Department of Agriculture:
E. P. Venables, (Entomology), Vernon, B. C.

Washington Experiment Station:
Dr. R. L. Webster, (Entomology), Pullman
E. L. Green, (Chemistry), Pullman
Anthony Spuler, (Entomology), Wenatchee
F. L. Overley, (Horticulture), Wenatchee
W. A. Luce, (Horticulture), Wenatchee

Oregon Experiment Station:
D. C. Mote, (Entomology), Corvallis
B. G. Thompson, (Entomology), Corvallis
R. H. Robinson, (Chemistry), Corvallis
Leroy Childs, (Entomology), Hood River
R. K. Norris, (Entomology), Talent

California Experiment Station:
E. R. deOng, (Entomology), Berkeley
A. D. Borden, (Entomology), Sebastopol
Idaho Experiment Station:
Claude Wakeland, (Entomology), Parma
Montana Experiment Station:
J. R. Parker, (Entomology), Bozeman
Dr. W. C. Cook, (Entomology), Bozeman
H. E. Morris, (Plant Physiology), Bozeman
B. L. Herrington, (Chemistry), Bozeman
United States Department of Agriculture:
D. F. Fisher, (Plant Physiology), Wenatchee, Wash.
H. C. Diehl, (Plant Physiology), Wenatchee, Wash.
C. P. Harley, (Plant Physiology), Wenatchee, Wash.
L. E. Reeves, (Plant Physiology), Wenatchee, Wash.
L. A. Fletcher, (Plant Physiology), Wenatchee, Wash.
E. J. Newcomer, (Entomology), Yakima, Wash.
M. A. Yothers, (Entomology), Yakima, Wash.

At the present time E. J. Newcomer is chairman of the project and Anthony Spuler is secretary.

D. F. FISHER,
E. L. GREEN,
E. J. NEWCOMER, *Chairman*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A METHOD FOR CUTTING GLASS TUBING

A THIRD method for cutting heavy glass tubing may be added to those described by Seemann, SCIENCE, No. 1726, and Tolmachoff, SCIENCE, No. 1733.

A piece of stout string about two feet long is wound once and a half around the tube. The two ends are allowed to hang down on opposite sides of the tube. The tube is held in a wooden vise, clamped on a desk with a wooden clamp, or held by a fellow worker, so that the edge of the desk acts as a guide for the string at the point where the tube is to be cut. The two ends of the string are grasped firmly, one end in each hand. The hands are pumped rapidly up and down, keeping the string tightly pulled around the tube. This is continued a short time until the tube and string are hot enough so that the string begins to smoke. Cold water from a beaker is quickly poured on the hot tube causing a clean break. The entire process may be completed in two or three minutes.

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AN INEFFECTUAL ATTEMPT TO DEMONSTRATE THE VACUOME OF CERTAIN PLANT CELLS

IN an investigation concerning the nature of the plant-vacuole the writer had occasion to attempt a silver impregnation of the vacuome of various kinds of cells. The Golgi method of Da Fano was used because it is recommended by Guilliermond. This method involves the following steps:

(1) Fixation of the tissues in Da Fano fluid, a solution of cobalt nitrate in dilute neutral formalin. This fluid has a pH of 6.7.

(2) Impregnation of the tissues with a silver salt solution, silver nitrate.

(3) Reduction of the pieces of tissue thus treated by means of a modified photographic developer, Cajal solution.

(4) The customary procedure of dehydration, infiltration with paraffin, embedding, sectioning, mounting and counterstaining the tissues.

Root-tips of four-day-old wheat, barley and pea seedlings were used. Guilliermond recommends the use of root-tips of barley and pea seedlings.

By means of the Da Fano method, using the concentrations of Da Fano, Cajal and silver nitrate solutions recommended by Da Fano, the writer attempted to demonstrate the vacuome of the cells of the above tissues. In four of the experiments, the concentration of the solutions used was increased and the time of exposure of the tissues to the solutions was increased. Material on 153 slides, each containing from eight to ten sections, was subjected to the Da Fano procedure and examined carefully. In all cases examination of the sections failed to reveal the existence of a silver impregnated vacuome described and sketched by Guilliermond. In a few sections of wheat-root-tips examined, round black granules appeared in the vacuoles of 80 per cent. of the cells of the meristem. These granules resembled very closely in general appearance, distribution and occurrence the granules described by Guilliermond.

Changes in hydrogen-ion concentration of the fixative used, cobalt nitrate in dilute formalin, were tried. This modification has not been recorded by Guilliermond. The solution was brought to pH 2.4, 3.0, 4.6, 7.0 and 8.0 by the use of potassium acid phthalate and potassium dihydrogen phosphate buffer mixtures. The root-tips fixed in these solutions were then submitted to the remaining steps in the Da Fano procedure. Examination of sixty-two slides, twenty-three of barley containing the sections of ten root-tips and twenty-seven of wheat, containing sections of eight root-tips, revealed empty vacuolar spaces. Nuclei of cells of material fixed in solutions of pH 7.0 and 8.0 contained more granules of reduced silver than did those of material fixed in more acid solutions. The cytoplasm of the former cells also contained a much heavier deposit of silver than did that of the latter cells.