The originals need take no offense. Throughout the book, however, are numerous entirely new illustrations, mostly the work of the junior author.

The text of Part I opens with an introductory chapter on cell structure, cell division, maturation, types of cleavage and related subjects. Then follows a chapter presenting a general outline of the "typical" development of an insect, giving the student a preview of the whole subject before going into details. The next seven chapters take up individually the various phases of insect embryogeny or the development of the anatomical systems of organs, including such subjects as fertilization, maturation and cleavage, blastoderm formation, differentiation of the germ cells, formation of the germ band, metamerism, the budding of the appendages, embryonic envelopes, dorsal organs, blastokinesis, differentiation of the germ layers, development of the alimentary canal and organs derived from the ectoderm and the mesoderm. "Polyembryony and Parthenogenesis" and "Microorganisms in the Egg" are the subjects of Chapters X and XI, and the concluding chapter of Part I gives a brief review of the methods and results of experimental studies on insect development. A full discussion is given in Chapters IV and VI on the vexing subjects of the segmentation or lack of segmentation in the region of the cephalic lobes and of the origin of the definitive mesenteric epithelium. Both sides of the controversy are fairly presented in each case, but the authors do not attempt to draw conclusions, nor do they venture any opinion of their own. It is to be regretted that there is not a fuller account of the development of ocelli and compound eyes, and the examples given of ocular organs are not representative of the usual type of insect eye structure. It is true, of course, that most information on the development of the compound eye of insects is based on holometabolous species and involves post-embryonic rather than embryonic development.

Part II, the larger part of the text, treats of the orders or major groups of insects separately, and ends with Chapter XXI on the Myriapoda. From the contents of the chapters in this section it would appear that there is now no order of insects in which something is not known of its embryonic development, but the authors point out that "many problems, both theoretical and factual, have not yet been solved." The bibliography contains close to 900 references, and an excellent feature of the book is the inclusion at the end of each chapter of author-date citations on the chapter subjects, which are given in full in the general list.

Insect embryology is well along in its second century, and has grown in an unorganized way to such proportions that few teachers have the courage to include it in their entomological courses. Both teachers and students from now on, therefore, will be fortunate in having not only an assembled text, but one so admirably composed and illustrated from the wealth of available material.

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REPORTS

THE BANTING RESEARCH FOUNDATION

THE annual report of the Honorary Secretaries of the Banting Research Foundation for the year 1939–40 discloses that its income, as provided for in its charter, was distributed in two ways. A block grant of slightly less than one half its income was made to the Banting and Best Chair of Medical Research of the University of Toronto, and eighteen individual grants were made to research workers in various parts of Canada who submitted problems to the foundation which were approved by the trustees. These grants were for either living expenses of the applicant or salaries for assistants, or materials, or combinations of these. Summarized reports of the results obtained on these eighteen individual grants follow.

Four grants were made for studies on chemotherapy. On one, Dr. W. J. Auger, Hospital for Sick Children, Toronto, found that sulfapyridine and sulfapyridine plus Type I antipneumococcic rabbit serum caused a marked reduction in the incidence of empyema in Type I pneumonia. He also devised a plate method for determining the relative potencies of various chemotherapeutic agents against pneumococci. He also found that novocaine in body fluids has a powerful antichemotherapeutic effect. An assistant was provided for Dr. P. H. Greey, department of bacteriology, University of Toronto, to enable him to test some seventy sulfanilamide compounds synthesized in the Department of Medical Research, University of Toronto, as to their therapeutic effects in combatting staphylococci. Some gave promising results in the test tube but failed to protect animals against staphylococcus infection. Dr. W. Hurst Brown received a grant to allow x-ray studies to be made on a large group of patients who had previously received large doses of sulfapyridine, in order to see whether any of them had developed urinary calculi owing to the deposition of the acetylated sulfapyridine. As only two out of 30 patients had any suspicious findings, danger of calculi formation in properly handled patients does not seem great. Dr. Karl Sternbach, department of hygiene and preventive medicine, Uni-

versity of Toronto, tested the chemotherapeutic effects of many new organic compounds on meningococci and gonococci. Seven new drugs tested were found to be as potent as sulfanilamide in combatting meningococci in mice, and some of these were less toxic than sulfanilamide.

Five grants were made for various researches on hormones. M. M. Hoffman, Department of Biochemistry, Dalhousie University, with Dr. Heard isolated a hitherto undescribed member of the female sex hormone series in equine pregnancy urine. A. F. McKay, in the same department, discovered a previously undescribed isomer of the male sex hormone. Dr. A. W. Ham, department of anatomy, University of Toronto, is investigating the effect of anterior pituitary extracts on bone repair. Extracts containing the growth principle were not observed to have any stimulating effect on the repair of fractures in young animals. Their effects on repair in older animals, and the effect of hypophysectomy on bone repair are still under investigation. Dr. P. G. Weil, University Clinic, Royal Victoria Hospital, Montreal, continued studies on the relation of the cortical hormone to shock. With Dr. Rose it was found that giving desoxycorticosterone and adrenal cortical extract together significantly reduced the mortality from experimentally produced surgical shock. H. C. Read, department of pharmacology, Dalhousie University, performed experiments in the hope of clarifying the respective rôles of the testes and the adrenal in maintaining prostatic and seminal vesicle structure. The results are now being studied.

Two grants were made for research on vitamins. Dr. D. G. H. MacDonald, department of physiological hygiene, University of Toronto, found that supplying fat did not prevent the slow heart rate that develops in vitamin B deficiency, although fat will prevent or cure other manifestations of B deficiency. Thiamin was found to be the only pure substance which affects the heart rate. A liver factor is also concerned in the slow heart rate observed in B-deficient diets. Thiamin was found not to affect the tone of the large intestine, but evidence was obtained of some unidentified member of the B complex altering bowel tone. The thiochrome procedure for the assay of thiamin was found accurate for pure solutions, but unsatisfactory for the measurement of thiamin in urine. Miss H. M. Perry, department of physiological hygiene, University of Toronto, investigated vitamin C and P deficiency with regard to hemorrhages. In guinea pigs vitamin C prevented hemorrhages, but vitamin P did not. Evidence was found that vitamin C is not the only factor needed to prevent capillary hemorrhages in man, hence estimation of vitamin C needs or deficiency should not be based on tests depending on the strength of capillary walls.

Seven other grants for various other researches were also made. Dr. Edith Anderson, department of chemistry, University of Toronto, prepared and investigated the physiological actions of L-sugars. There was reason to hope that these might inhibit the anaerobic fermentation of cancer cells but on testing, L-sugars proved to be inert biologically. Dr. K. C. Fisher, department of experimental biology, University of Toronto, investigated the relation of anesthesia to cell anoxemia. It has appeared from the effects of ethyl carbamate that it is possible to divide the normal oxygen consumption into two fractions which presumably represent two separate enzyme systems. These are depressed by different concentrations of narcotics. This finding removes certain objections to the hypothesis that narcosis is due to an inhibition of oxygen consumption. Miss E. G. Huntsman, department of anatomy, University of Toronto, received a summer grant to study the cause of hyaline degeneration of arteries in experimental hypertension. A new method for estimating blood pressure which depends on the observance of color change in the tail was devised for use in young rats. Hyaline degeneration of arteries was found to develop as soon as the seventeenth day. The work is still in progress. Dr. E. E. Kuitunen continued her studies on the incidence and types of intestinal parasites in Toronto. Twenty-eight per cent. of 324 patients in the Toronto Western Hospital were found to harbor some species of protozoa or helminth. Fresh pineapple juice was found *in vitro* to be an effective anti-helminth, but in the presence of gastric juice of 0.2 per cent. HCl and on administration to two cases, it was ineffective. Three hundred diaphragms from autopsies at the Toronto General Hospital and the Hospital for Sick Children were examined for trichinella spiralis. Seven positive results were found, all these unrecognized clinically. Drs. T. F. Nicholson and D. L. Selby, Department of Pathological Chemistry, University of Toronto, found on causing degeneration of the distal tubule of the kidney by uric acid that no decrease in the clearance of inulin, creatine or urea resulted, but that the ability of the kidney to reabsorb water and salt was impaired more markedly than when the proximal tubule was damaged. Experiments on the effect of sulfanilamide on the kidney showed that no damage was produced when concentrated solutions were injected directly into the renal artery. Dr. Bram Rose, University Clinic, Royal Victoria Hospital, Montreal, found after experimental surgical shock that there was a decrease in the blood histamine and an increase in plasma histamine. After anaphylactic shock in the rabbit, a rapid and marked decrease in the histamine content of blood and plasma occurred. A decrease in the blood histamine has been found in human cases of acute angio-neurotic oedema. Dr. E. G. Young, with Miss H. P. Wentworth, in the department of biochemistry,

Dalhousie University, worked out a method for the assay of allantoin in blood in which the Rimini-Schryver reaction for allantoin was applied to its colorimetric estimation. This method allows the estimation of allantoin in 5 ml of blood with a probable accuracy of within 10 per cent., using an ordinary colorimeter.

V. E. HENDERSON,
A. W. HAM,
Honorary Secretaries

SPECIAL ARTICLES

BREEDING A DISEASE-RESISTANT RED CLIMBING ROSE[1]

NOTWITHSTANDING the great popularity of "everblooming" small, bush roses, climbing roses have a greater range of usefulness in making the roadside, home and its adjoining grounds more attractive. The chief hindrance to a greater utilization of climbing roses has been a lack of disease resistance, although many climbers are far more tolerant to disease than small bush roses as a group.

Two of the most common diseases afflicting climbers over large areas in the United States are powdery mildew and low-temperature injury. (The parasitic disease, black spot, is not so destructive on most climbers as it is on small, bush varieties.) Of the two serious diseases, powdery mildew is frequently so abundant on Dorothy Perkins, Crimson Rambler, Excelsa and other varieties having small blossoms in large clusters (multiflora types), that their usefulness as decorative plants is seriously impaired. Thus, while this type of climber possesses a considerable degree of hardiness and remarkable beauty when free from powdery mildew, the necessity of frequent dusting or spraying with fungicides to control mildew imposes a task which often is not very successful.

Contrasted with the multiflora-type of climbers, those with large blossoms generally show a greater freedom from powdery mildew but are more subject to low-temperature injury. Thus among large-blossomed, red climbers, Paul's Scarlet Climber, Dr. Huey and Climbing American Beauty, three of the hardiest and best known red climbers, frequently suffer considerable injury either from low winter temperatures or from late spring frosts, unless they are partly protected by a building or by covers.

The problem of breeding a red climbing rose to combine disease resistance with good blooming qualities has resolved itself largely in attempts to find disease-resistant parents. Other qualities are not difficult to secure. To find such parents, the writer has investigated many different varieties and species of roses, including our own wild roses. In the latter group, two species are outstanding for vigor, hardiness and tolerance of heat and drought in Arkansas. They are *Rosa setigera* and *R. Eglanteria* (*R. rubiginosa*). In addition, both of these species possess marked abilities to escape from attacks of powdery mildew, although when artificially inoculated, they become subject to infection. *Rosa setigera* has also shown a fair degree of resistance to black spot in some individuals but not in others, while *R. Eglanteria* appears to be uniformly susceptible to this disease.

Among the plants under observation for disease resistance were 100-odd hybrids, very kindly sent by the pioneer rose breeder, M. H. Horvath. This group largely represents crosses between *R. setigera* and various cultivated varieties, and four of them were found to combine resistance to or escape from both powdery mildew and black spot. Although not outstanding in floral qualities, they are very hardy and possess much vigor. The most disease resistant of these is a pink-blossomed climber, which unfortunately was received without designation of parentage or name or number (writer's acc. No. 31). It is probably a hybrid of *Rosa setigera* and offered, for breeding purposes, a distinct advantage over the original wild parent. Its blossoms possess some 30 attractive petals. Its main disadvantage is that it is not homozygous for resistance to either black spot or to low-temperature injury, since selflings show much variation in these characters.

Utilizing No. 31 as the female parent, and Black Knight, an exceedingly beautiful red Hybrid Tea, "everblooming" small bush variety, as the male parent, a climber has been obtained which combines, under Arkansas conditions, mildew-escaping qualities and hardiness with attractive red blossoms. However, like most large-blossomed climbers, it is not completely immune to mildew. While it has escaped this disease under natural conditions when nearby, highly susceptible varieties were severely infected, this hybrid showed some susceptibility when it was artificially inoculated. It is not resistant to black spot, although the effects of this disease are no more severe than on such varieties as Mary Wallace, Paul's Scarlet Climber, Dr. W. Van Fleet and Dr. Huey. Its fragrant blossoms are of a brilliant red color, approaching Ridgway's Tyrian Rose or Maerz and Paul's Plate 1 D6, the red being replaced by white at the extreme base of the petals. The stamens are very numerous and showy. The average blossom is large,

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