

of angina to spasms of the coronary arteries of the heart, but discusses it as "generally applicable to spontaneous cramps of any artery of the body".

We hear much nowadays about arteriosclerosis and high and low blood-pressures; but Prof. Plesch thinks that the danger of arteriosclerosis, at any rate, is over-estimated. Post-mortem examinations, made in different countries, of healthy young soldiers who fell in the First World War, show that 44.5 per cent of soldiers between the ages of twenty-one and thirty years of age and 62 per cent of those between thirty-one and forty years bore evidence of arteriosclerosis. These figures are surprising; but the mortality from this disease is only 6 per cent of the total mortality, and Prof. Plesch concludes that arteriosclerosis is not necessarily progressive and that it can be cured. During his valuable discussion of the general and symptomatic treatment of angina pectoris, he makes interesting observations on diet, the consumption of alcohol and smoking. Smokers will be especially interested in his analysis of various tobaccos and their effects.

An appendix discusses the use of the tonoscillo-graph and the interpretation of tonoscillograms, the author's techniques of auscultation and borderline percussion, the use of the blood-gas analyser with an absorption cell, and his experimental work on the immunization and sensitization of patients by injections of their own urine.

The book is well produced, and the photographic and other illustrations add much to its value.

THE BEHAVIOUR OF SEEDS

Twenty Years of Seed Research at Boyce Thompson Institute for Plant Research

By Lela V. Barton and William Crocker. Pp. 148 + 22 plates. (London: Faber and Faber, Ltd., 1948.) 21s. net.

FOR more than twenty years workers at the Boyce Thompson Institute at Yonkers, New York, have been publishing papers on the factors influencing the germination and continued viability of seeds. Their investigations have been not only of academic interest, but also of practical significance to people who produce, market, and sow seeds; and presumably it has been with this in mind that two of the senior workers concerned have now written a very brief summary of the Institute's work in this field. Farmers, gardeners and seedsmen will find this book giving, with a minimum of scientific terminology, confirmation, explanation and extension of much that they have discovered and guessed, and also some suggestive new facts.

Part 1 of the book reviews various types of delayed germination, due to the need for after-ripening, by drying, or by 'stratification' at low temperatures while moist, or to resistant seed coats, or to internal 'physiological' dormancy of root or shoot rudiments. The examples given underline the survival value of many of these peculiarities, and emphasize that sufficient knowledge of a plant's life-history and wild environment will provide a good basis upon which to forecast the conditions required for the most speedy and complete germination of its seeds. Apart from this, general principles are not easy to formulate. Although the seeds of related plants naturally tend to show similar behaviour, considerable variation can be found within the genus or even between varieties

of the same species. In this wet harvest season of 1948 the British farmer is, once again, having thrust upon his notice the unfortunate readiness to 'sprout out' of the otherwise admirable wheat Holdfast, and the more stubborn initial dormancy of, for example, some varieties of Scandinavian origin. The same phenomenon is seen from another angle in the seed-testing laboratory, where freshly harvested wheats of the latter type are artificially dried at 40° C. as a matter of routine, or they tend to grow slowly and erratically in the test dishes.

A chapter, with the only plate in colour, is devoted to ways in which the capacity of seeds to germinate can be ascertained quickly without waiting for normal growth. The summary dismissal of chemical tests in favour of an excised embryo technique is unjustified. Unless the seed is large, the latter method requires a considerable amount of time and manipulative skill, and only yields results after some days; whereas sectioning of the soaked seed followed by treatment with a dilute aqueous solution of triphenyl tetrazolium chloride or bromide, a technique developed in Germany during the recent War, can give information in less than two hours, and has proved so practicable and reliable, at any rate with seed grain, that it is now regularly utilized by at least one commercial house.

Part 2 is concerned with the life-span of seeds and the effect on it of storage conditions, and here the authors are able to make the general recommendation that "rather low moisture content and/or low temperatures are effective for successful storage of vegetable seeds" and, in fact, of the majority of seeds. Here, again, generalization is unsafe. Barton and Crocker, for example, confirm the familiar observation that *Delphinium* seeds are short-lived unless specially stored. But 1938 seeds of *Delphinium denudatum* stored without special precautions and sown by the writer in 1939 and every year since, have shown the expected fall in percentage germination to very low in 1940, nil in 1941 and every subsequent year until, in 1948, the ten-year-old seed produced two sturdy plants! Storage of farm and garden seeds for a year or more is common commercial practice, but the normal 'carry-over' life of many seeds is insufficient to smooth out recurrent gluts and shortages, and it can be predicted that more experiment will almost certainly lead to the use of dried and thermostatically cooled air to increase the period of effective large-scale storage.

A number of photographs demonstrate impressively some of the points considered, and the frequent tables in the text are concise, easily interpreted summaries of the experimental results; although the serious student will note that many of them quote percentages only without actual numbers and are, therefore, not susceptible to statistical criticism. The references at the ends of the chapters appear to include only the papers by Boyce Thompson staff upon which the book is based, and might with advantage have been extended to include the more important relevant publications of other workers. A more serious limitation of this small book's usefulness may be imposed by the price, which even by to-day's standards is high. Perhaps its greatest merit is that it stimulates as well as illuminates, suggests not only how much but also how little is known, and this in one of the fields where a real contribution to knowledge can still be made by the enthusiastic individual with a minimum of time and equipment.

S. CLAY