of its exasperating aspects is that one cannot really apportion any blame for this. It is by no means yet clear which methods are going to be most fruitful in exploring vector space, and very little beyond an intuitive idea that the two methods are more or less equivalent has yet been said on the relation of vector methods to the alternative determination of phases by the statistical analysis of the raw data. In these circumstances, to have all the fundamental ideas on vector space and the various analytical methods brought together (and developed) in one book is really as much as one has a right to expect, and something for which all X-ray crystallographers owe Prof. Buerger a debt of gratitude. The criticisms that one has are largely silenced and, exasperating or not, this book will be required reading for all those concerned with Patterson analysis for a long time to come.

J. W. Jeffery

POTASH IN WET AND DRY SOILS

Japanese Potassium Symposium

Nine papers read at the First Japanese Congress, Tokyo, 1957. Pp. 137. (Berne: International Potash Institute, 1959.) n.p.

Potassium Symposium, 1958

Twelve papers read at the Fifth Congress of the International Potash Institute (4 Sessions), Madrid, 1958. Pp. 426. (Berne: International Potash Institute, 1959.) n.p.

SINCE its inception in 1952, the International Potash Institute (Berne) has rendered a valuable service to agriculture and agricultural research. As well as issuing the monthly *Potash Review* leaflets in four languages, the Institute has organized five potassium congresses in different European capitals over the years 1954–58. The Institute also instigated a Japanese potassium symposium, held in 1957; the nine papers presented in Tokyo are now reprinted in English. Four of the papers deal, not surprisingly, with potash and the rice crop. Students of rice culture will find factual articles which range from fertilizer usage to the relationships between potassium nutrition and the disorders caused by fungus and bacterium attacks on the crop. A paper on fruit trees deals specifically with the effects of fruiting on the composition of young orange tree leaves. The nutrition of tobacco is discussed in terms of deficiencies and excesses of potassium on the intake of other nutrients. Recent work on the distribution and lability of potassium in cells and the effect of different potassium-levels on respiration is also described. The reasons for the variations in the potassium-supplying power of volcanic ash soils are examined; usually the parent volcanic ash contains rather little total potassium, which is lost rapidly on weathering. The main products of weathering, allophane, halloysite and gibbsite, do little or nothing to help the potassium economy of such soils. All the papers seem to be well documented.

The volume entitled "Potassium Symposium, 1958", contains the proceedings of the fifth congress of the International Potash Institute, held in Madrid. Following an introductory paper on Spanish agriculture and the use of fertilizers, most of the contributions impinge on the general theme of "Potash and Water". Special attention is given to the potash manuring of Spanish irrigated areas and potassium problems related to the mineralogy of Spanish soils. Three articles deal with potassium, the plant and the water regime; these include treatments of the morphological and physiological conditions associated with drought resistance, the influence of potash on the water economy of plants and the effects of extracts of rotted straw on the potassium uptake and physiology of plants. Other articles deal with potassium uptake and the moisture status of soils (England), potassium in saline soils (Spain) and the importance of potassium in saline irrigation water (Israel). The papers presented towards the end of the Congress allow comparisons of the problems of potash fertilization in temperate, arid and wet-tropical climates. The development of fertilizer usage in the Hawaiian sugar industry is also described; here potash-urea pellets are now hailed on the cane from the air. Readers will find short articles on the use of potash in Portugal, chlorosis and calcium/potassium ratios and the use of potash on rubber trees.

The main articles, which are well documented, are all summarized in four languages.

Having circumscribed the globe, one's thoughts gravitate towards the numerically enormous number of the world's farmers who have yet to open their first bag of potash. The International Potash Institute will, year by year, make these fewer and so help mankind towards a happier existence by encouraging the proverbial two blades to grow where one grew before.

P. W. Arnold

PLANT TISSUE CULTURES

La Culture des Tissus Végétaux

Techniques et Réalisations. Par Prof. R. J. Gautheret. (Ouvrage publié avec le Concours du Centre National de la Recherche Scientifique.) Pp. iv + 884. (Paris: Masson et Cie., 1959.) Cartonné toile, 10,500 francs.

FOR a considerable time following the first successful culture of plant tissues in 1934, further studies of such materials were carried out mainly by a few pioneer workers. During recent years, however, there has been a great widening of interest in plant tissue cultures, which are now no longer treated merely as curiosities but are utilized in the investigation of a wide range of botanical and related problems. The scattered information obtained from these recent and earlier studies has now been collected in one comprehensive volume, and it is fitting that this task should have been carried out by Prof. Gautheret, who was not only the first worker to achieve the culture of plant tissues but by his own work and that of his pupils has also continued to make notable contributions in this field.

As the title indicates, the book deals only with tissue cultures, and the allied subject of organ culture is mentioned only incidentally. The first section, of more than 200 pages, covers the important topic of technique. The media and methods employed by various workers are described in full detail, perhaps even unnecessarily so; the reader is given several plans of the arrangement of instruments on the work table. However, such detailed instructions have the advantage of giving even the beginner in this line of work a good chance of success.

The second and largest part of the book is concerned with morphogenesis in plant tissue cultures. A detailed description is given of the behaviour of