

in this field. The 153 choice instruments which have now come to Britain, together with the museum collections at South Kensington, the National Maritime Museum, the British Museum, the Whipple Museum at Cambridge and the Museum of the History of Science at Oxford, constitute a tremendous national heritage. Nowhere else in the world is such an aggregate of fine collections available for study. Dr. Josten's article is well illustrated with photographs of many of the instruments, including six of the twenty-one astrolabes and an interesting selection of sundials. A fuller account has been given in a printed Catalogue of the Billmeier Collection, which was exhibited in May 1954 by Messrs. Frank Partridge and Sons, London.

Mycorrhizal Uptake and Translocation of Phosphorus

In investigations of the uptake of phosphate by excised mycorrhizal roots of the beech, J. L. Harley and J. K. Brierley have obtained evidence of the active transport of this nutrient from the fungal sheath into the host tissue (*New Phytol.*, 53, 2, 240; 1954). They point out that movement of substances from the external solution might be by way of the inter-hyphal spaces, or the walls of the fungal tissue, or through the living hyphae themselves. In critical experiments, excised mycorrhizal roots were allowed to absorb radioactive phosphorus during the first phase while, during the second phase, the distribution of the radioactive phosphorus in the fungal and host tissue was determined after known time periods under conditions in which the rate of metabolism was varied. The rate of movement of phosphorus-32 from fungus to host was at first rapid, but became slower after 10-15 hr.; it was sensitive to temperature and oxygen supply. In low oxygen concentrations and in anaerobic conditions especially, phosphorus-32 was lost from the roots into the washing solution at normal temperatures. No such losses occurred at low temperatures in either aerobic or anaerobic conditions nor at normal temperatures in air. The loss of phosphorus-32 from roots in anaerobic conditions was entirely from the fungal tissue and resulted from a process which had a high temperature coefficient. In roots which had been returned to normal temperatures after a period of washing at low temperatures or returned to aerobic conditions after a period of washing in anaerobic conditions, transport of phosphorus from fungus to host, temporarily prevented, was resumed at an undiminished rate. The authors conclude that active transport of phosphorus from fungus to host occurs in mycorrhizal beech roots. The mechanism of transport is dependent upon aerobic metabolic processes in the fungal tissue as well as upon the absorptive processes of the core. The phosphate which is lost from roots kept in low oxygen concentrations is entirely released from the sheath and results from temperature-sensitive anaerobic processes occurring in that tissue. (See also *Nature*, October 9, p. 684.)

Abnormal Plant Growth

THE Brookhaven National Laboratory, Upton, New York, has rendered a useful service to botany by bringing together a number of leading research workers interested in the phenomena of abnormal and pathological plant growths and their causation ("Abnormal and Pathological Plant Growth", Brookhaven Symposia in Biology No. 6; pp. 303, Office of Technical Services, Dept. of Commerce, Washing-

ton 25, D.C., 1954; 2.10 dollars). While the subject itself is not new, it is evident from a reading of this report that the application of recent and new techniques has resulted in the acquisition of many new and interesting facts and in a persistent analytical approach to the underlying causation of the several manifestations of abnormal growth. The symposium covers a wide field, and abnormal growth developments induced by physical, chemical and biological agents are described and discussed with special reference to their genetical, physiological and morphological aspects. In this diverse assemblage of new information the reader may read at large or he may read selectively, paying special attention to such major topics as differentiation and organogenesis, tissue culture and tumour formation as induced by genetical, bacterial, virus or insect agencies. Some of the investigations are reported in considerable detail, special reference being made to the method of induction of the abnormal development and to the related nutritional aspects. The substance of the discussion on each of the papers is also given.

Notes on Nuclear Science

A SET of notes on nuclear science, mainly factual and explanatory, providing reliable data and references suitable for lecturers and teachers has been compiled by the Atomic Sciences Committee of the Association of Scientific Workers. The notes, which are in loose-leaf form, are in three sections, of which Vols. 1 and 2, dealing with scientific and industrial aspects, and the military aspect, respectively, have recently been issued; and Vol. 3, on international control, is to be issued shortly. In order to keep the notes up to date, it is intended to issue annual supplements to the respective volumes as the necessity arises. Vol. 1 is of a general nature and summarizes the basic elements of nuclear science, the large-scale release of nuclear energy, nuclear energy programmes in different countries and the production and uses of radioactive and stable isotopes. Vol. 2 deals with the effects of atomic weapons, in particular with the physical and biological effects of the bombs dropped on Japan in 1945, and with the problem of civil defence. A very detailed bibliography is a feature of this volume, and an addendum brings the information and data, on thermonuclear bombs, for example, up to the date of publication, September 1953.

South African Museum: Report for 1953-4

THE report of the South African Museum, Cape Town, for the year ended March 31, 1954 (from the Museum; pp. 28), records that, with the prospective legislation repealing the South African Museum Act of 1857 and the proposal to include museums and other organizations as State-aided institutions, it is hoped that the future of the South African Museum will be as progressive as it has been in the past. A preliminary survey of the site for the extension of the east wing has been made, and the trustees hope for the erection of this long-deferred addition. It is intended that it shall provide extra space for the larger mammals and also for historical objects. In Britain all strandings of whales are immediately reported by the coastguards to the British Museum (Natural History). Unfortunately, in South Africa there are long stretches of coast where such occurrences are never seen or reported, and the Museum is taking active steps to remedy this position. Research is now considered to be a major function