

Oxford) contributes a paper on the thermal properties of diamonds; there is an important paper on the optical properties of diamond by Prof. E. W. J. Mitchell (J. J. Thompson Physical Laboratory, Reading); Dr. A. Van Valkenburg (U.S. National Bureau of Standards) discusses diamond high-pressure windows; and the concluding paper by Dr. E. C. Lightowers and Dr. P. J. Dean (King's College, London) deals with measurement of nitrogen concentrations in diamond by photon activation analysis and optical absorption. This new magazine is well presented and illustrated, but it may be doubted if only an annual appearance will adequately record much of the progress of work being carried out on diamond research throughout the world; more frequent issues may perhaps be expected in the future.

### Sounding the Ionosphere from Above

AMONG the more successful applications of Earth satellites for scientific purposes is the technique of sounding the ionosphere from above the region of maximum ionization, which began with the launching of the Canadian satellite *Alouette* on September 29, 1962. Some of the early results obtained in this way in Canada, England, and the United States have been described in *Nature* (197, 636; 1963). A simple telemetry receiving system designed to obtain topside ionospheric data directly from the satellite when it passes within range of the U.S. National Bureau of Standards at Boulder, Colorado, has recently been described by E. E. Ferguson and R. G. Green (United States Department of Commerce: National Bureau of Standards. Technical Note No. 222: *A Minimum Telemetry Receiving System for the Alouette Topside Sounder Satellite*. By Earle E. Ferguson and Richard G. Green. Pp. v+22. Washington, D.C.: Government Printing Office, 1964. 30 cents). A simple five-element aerial is used to receive the signals radiated from the satellite on a frequency of 136 Mc/s, and these are converted to 30 Mc/s, and passed to a commercial type of radio receiver. The resulting video signals are displayed on a standard type of 5-in. laboratory oscilloscope; and they are also recorded on a magnetic tape. In either case the records can be transferred to a moving photographic film to produce the normal type of ionogram over the sweep frequency range of 0.5–11.5 Mc/s, which is covered by the sounder in eighteen seconds. The system is operated by two persons; one identifies the signal from the characteristic sound of pulses in receiver headphones and orients the antenna to give maximum response in an output meter, while the second operator adjusts the main receiver, oscilloscope and magnetic-tape recorder. Following a command signal from a ground telemetry station, the ionospheric sounding equipment in the satellite will operate for nearly ten minutes, during which some thirty-two ionograms are obtained. The note also includes block diagrams of the equipment, together with a specimen table of the geographic position of the satellite at every minute during its orbital period of 15.5 minutes and two sample ionograms. The use of a simple semi-graphical method of determining the azimuth and elevation of *Alouette* is also described.

### Silver Diethyldithiocarbamate for the Determination of Arsenic and Antimony

E. MERCK of Darmstadt have issued a leaflet on silver diethyldithiocarbamate for the determination of arsenic and antimony. Silver diethyldithiocarbamate (AgDDTC) is a very sensitive reagent for selective spectrophotometric or colorimetric determination of arsenic or antimony traces. As the reliable detection of arsenic in foods, pharmaceutical preparations and fine chemicals is highly important because of its toxicity, and frequently is prescribed by law, the reagent may be a valuable aid in these and other fields of chemical technology. The method was described by V. Vasak and V. Sedivox in 1952 and is

considerably superior in several aspects to the much-used Gutzeit method as demonstrated by a comparative investigation recently published by E. Jackwerth. Of special advantage is that the reagent paper of the Gutzeit method has been replaced by a reagent solution, thus permitting an exact photometrical determination of the resulting colour with increased sensitivity. The leaflet described the method of arsenic determination and antimony assay. Further information and copies of the leaflet can be obtained from the distributors of Merck Laboratory Chemicals in the United Kingdom: Anderman and Co., Ltd., Battlebridge House, 87–95 Tooley Street, London, S.E.1.

### British Antarctic Survey: Antarctic Lichens

THE recent increase of scientific interest in the Antarctic has made available a quantity of plant material, which together with the material from previous expeditions has made possible *British Antarctic Survey, Scientific Reports*, No. 38 (*Antarctic Lichens. 1 The Genera Usnea, Ramalina, Himantormia, Alectoria, Cornicularia*. By Dr. I. Mackenzie Lamb. Pp. 70+9 plates. London: The British Antarctic Survey, 1964. 45s. net). The lichen flora of Antarctica is of considerable taxonomic and phytogeographical interest, and the appearance of a comprehensive treatment of the species and their known distribution in the Antarctic and elsewhere is especially welcome. Information on the morphology, chemical constituents, and geographical distribution of five genera is presented, together with distribution maps and locality details of each specimen examined. The publication of subsequent papers in this series on the lichen flora will be looked forward to with interest.

### Plant Nutrition

THE Fertiliser Society has made a practice of publishing its lectures, which are usually authoritative reviews of developments in fertilizer production and plant nutrition. The most recent publication deals with the present state of knowledge on the mechanism of absorption (*Proceedings No. 84. The Absorption of Inorganic Nutrients by Plants*. By J. F. Sutcliffe. Pp. 34. The Fertiliser Society, 44 Russell Square, London). It is 160 years since it was established that inorganic salts were essential for plant growth, and about 120 years since the fertilizer industry was started; but the process of absorption is not yet understood in spite of intense investigations. Water and salts are absorbed by different processes and there is a marked selectivity in the absorption of different ions. There is a passive permeation of ions by diffusion and exchange, and there is an active transport of ions through metabolic energy. Much has been learned from work on absorption by storage organs and by the large cells of some algae, and several theories have been advanced to explain the movement of ions across protoplasmic membranes. For example, a carrier mechanism involving an electro-chemical gradient or a redox pump or reversible combination with proteins has been proposed; there is also the possibility of invagination at the cell surface. There seems to be some connexion between protein synthesis and ion absorption and there is no doubt about the effect of non-ionic organic molecules on absorption. Complications inevitably arise when the entire plant is considered for such matters as the behaviour of different parts of the root; the composition of the soil solution, the transport of ions through the plant into the shoot and their redistribution, transpiration and water loss are all involved. A great deal of research is still required to specify the optimum requirements of the plant under varying conditions.

### Natural History of the Buckingham Palace Garden

THE garden of Buckingham Palace covers an area of 39 acres. It is secluded, separated from the public world