

now proved Murban field, but at the time this fact was unknown to the prospectors. A second well was completed five years ago which, together with the sub-surface information already provided by Murban No. 1, threw more light on the character of the underground formations in this area and prompted the placing and drilling of Murban No. 3; this well penetrated two oil-bearing formations and produced about 700 tons of oil per day on test. By October 1960, the results of these discovery wells were considered sufficiently encouraging to justify commercial production and export. On December 31, 1963, the 36,000 ton tanker *Esso Dublin* discharged the first cargo of Murban crude oil at the marine terminal of the Esso Petroleum Co.'s refinery at Milford Haven, Pembrokeshire. As an article in the *Esso Magazine* (13, No. 4; Autumn 1964) states: "The discovery of this new source of oil follows hard on the heels of the important discoveries in Libya and provides not only another sizeable addition to world proved reserves of oil, but also a further diversification of supply".

Laboratory Guide to Ion Exchange

A USEFUL 42-page, illustrated manual entitled *Amberlite Ion Exchange Resins Laboratory Guide* was published in 1964 by the Rohm and Haas Co., Philadelphia, Pa., of which a brief summary appeared in *Rohm and Haas Reporter*, the periodical of the Company (22, 3; May-June 1964). Rohm and Haas pioneered development of ion-exchange technology in the United States and claims to be the first commercial organization in that country to produce synthetic, high-capacity ion-exchange resins on a large scale. The Company manufactures at present a complete range of laboratory and commercial ion exchange resins under the trademark 'Amberlite'. For laboratory use these resins are supplied in two different grades: chemically pure and analytical reagent. More than 30 different ion-exchange resins of varying porosity and particle-size are available in these grades, which are marketed by Mallinckrodt Chemical Works, St. Louis, Missouri. This manual describes "the many ways 'Amberlite' ion exchange resins may be used to eliminate difficult and time-consuming steps in laboratory work and explains how ion exchange operations are carried out. The manual emphasizes actual techniques for the use of ion exchange process in preparative and analytical work. . . . While primarily concerned with laboratory applications, the guide also reviews ways of using ion exchange resins in commercial processes". It is pointed out that these resins are exceptionally convenient to use; often, to make an analysis, the only equipment required is a glass column containing the resin beads. Separations can be performed more rapidly and determinations made more accurately by the analyst by this ion-exchange process than by the slower, often more cumbersome, methods of precipitation or crystallization. Copies of this guide can be obtained (gratis) from the Ion Exchange Department, Rohm and Haas Co., Philadelphia, Pa., 19105 (London subsidiary, Lemmig Chemicals Ltd., 26-28 Bedford Row, London, W.C.1).

Microbiological Contamination of Food

CONTAMINATION of foods by micro-organisms does not constitute the hazard that it once did; however, new methods in processing and distributing foods are introducing new problems in food microbiology. A publication from the U.S. National Academy of Sciences—National Research Council, entitled *An Evaluation of Public Health Hazards from Microbiological Contamination of Foods*, examines the present position (Publication No. 1195. Food Protection Committee of the Food and Nutrition Board. Pp. vi + 64. Washington, D.C.: National Academy of Sciences—National Research Council, 1964. 2 dollars). It is concluded that it would be premature to adopt legal standards but recommends several steps which should be

taken to prepare the ground for their eventual adoption. It notes the increasing disparity between technical change and the level of efforts made to evaluate and control the health hazards with new products and processes. Comment is made on the poor reporting (in the United States) of the incidence of food-borne disease, the inconsistency of such reporting being shown by the fact that one State repeatedly reports 30-50 per cent of all outbreaks recorded by the Public Health Service. Definitions for microbiological specification, recommended microbiological limit and microbiological standard are proposed. The basic principles on which these criteria should be based are given. It is recommended that, before microbiological criteria for a food are adopted as an administrative device, standard methods of sampling and analysis of the foods in question should be agreed on. For this purpose, an organization similar to the Association of Official Agricultural Chemists should be formed in the field of food microbiology. Limits suggested by various workers for nine classes of foods are tabulated in an appendix together with 90 references to their source.

Natural Radioactivity in Soils

THE dating of relics by radiocarbon analysis, which, in recent years, has come to be accepted as a most useful technique, is only one application of the measurement of the emissions from several radioactive elements. Obviously the principle might be used to estimate the weathering of soils from parent materials and the geological age of soils; moreover, the radioactivity of soils is affected by fall-out contamination from atomic explosions. A most useful review of present knowledge on this topic has been made by O. Talibudeen in *Soils and Fertilizers* (27, No. 5. Commonwealth Bureau of Soils, Rothamsted, 1964). He describes the properties of radioactive elements found in Nature and their contribution to the radioactivity of soils. About two-thirds of the total activity may be from potassium and thorium, and about 20 and 7 per cent from uranium and rubidium respectively. Carbon-14 contributes less than 0.5 per cent, and inorganic carbonate is more active than organic carbon of the same geological age, but carbonates may have isotopic exchange with atmospheric carbon dioxide, so that there are complications in the calculation of the age of organic residues in soil. The relative amounts of radionuclides in the soil are altered by such pedological processes as leaching, oxidation and reduction, and by the levels of sesquioxides, carbonates and organic matter, and the particle size distribution. The uranium in surface soils, for example, is related to their organic matter content, and the radium/uranium ratio is increased by leaching. The ratio of pairs of elements may help to assess the intensity of weathering in a soil profile, the thorium/uranium ratio being a more sensitive guide to leaching than the radium/uranium ratio. Short descriptions of the α -, β - and γ -assays of radioactivity are given, with notes on corrections and interfering unstable nuclides. There are 9 tables of data and 2 figures of spectra, and a comprehensive list of references.

Extraction of Forest Produce

THE British Forestry Commission Booklet No. 11 reviews extraction methods in use in Great Britain and also a few that have been tried but which have proved unsuccessful (*Extraction of Conifer Thinnings*. By R. E. Crowther. Pp. 74 + 15 plates. London: H.M.S.O., 1964. 5s. net). It is a timely publication because the extraction of forest produce is an important economic factor in forestry efficiency. Extraction is a costly business and it may account for 25-75 per cent of the total costs of production, excluding the cost of growing the trees. About two-thirds of the cut from State forests is made up of coniferous thinnings and at present some 40 million hoppers ft. of the latter are extracted in a year and the