

is no generally applicable solution to problems of this kind, and each of them must be considered individually on the same level as the malariological and entomological investigations that are now regarded as an essential part of malaria eradication programmes. Population distribution, settlement patterns, types of housing, farming practices, communications, water supplies and other relevant factors vary so much from one area to another that generalization is impossible. Geographical reconnaissance, as it now exists in eradication programmes, does not cover every aspect of population movement. Where necessary, it will have to be expanded to collect much wider information on the factors described, in

order to understand the whole complex of physical environment, malaria parasites, vectors and people. It may then be possible to evolve the correct technique applicable to each individual local situation. The inclusion of professional geographers in some malaria teams for full-time work at the outset of a programme would be valuable; when they had collected the required information, it would not be necessary to retain their services, since the geographical data could afterwards be kept up-to-date by a specially trained sanitarian. There is also a need for detailed individual study of every migration problem arising in the course of malaria eradication in tropical Africa.

POLLUTION FROM REFUSE TIPS

TWO problems associated with modern living conditions are the disposal of house refuse and the reclamation of land from which chalk, gravel or other material has been removed. The possibility of solving these two problems at one blow by tipping the refuse into worked-out pits is attractive, provided that this can be done safely and without nuisance.

One of the dangers of this procedure, which is widely practised, is that water supplies may be contaminated by drainage from the refuse. To study this problem the Minister of Housing and Local Government, in 1953, appointed a technical committee to supervise experiments on the tipping of refuse, with special reference to the pollution of underground water. These experiments were carried out in the Laboratory of the Government Chemist, and the report on the results has recently been published, together with the conclusions and recommendations of the Committee*.

Two series of experiments were made: one on refuse tipped dry and the other on refuse tipped into water. The volume and composition of the liquid draining from the pits were determined, and the purification effected by passing this liquid through sand and gravel was studied.

The Committee points out that the matter is complex, and is careful to avoid over-simplified

* Ministry of Housing and Local Government. *Pollution of Water by Tipped Refuse*. Report of the Technical Committee on the Experimental Disposal of House Refuse in Wet and Dry Pits. (H.M.S.O., London, 1961.) 7s.

conclusions in its report. It appears, however, that the results of the experiments are reasonably encouraging and that, provided certain precautions are taken, the practice of tipping refuse may safely be continued and even extended. Although a highly polluting liquid is produced by percolation of rain-water through refuse, the amount of organic pollution falls off relatively rapidly with time. In addition, when refuse is tipped dry, a considerable amount of rain has to fall on it before any drainage water is produced. Thus if the amount of rainfall reaching the refuse can be reduced by covering the material with an impermeable layer as soon as possible after tipping, the total load of pollution discharged from the pit will be decreased. This is one of the reasons why the Committee considers that, under comparable conditions, dry tipping is less likely than wet tipping to affect water supplies adversely. It does not, however, rule out the use of wet sites, for the experiments showed that considerable purification of the liquid can be effected by percolation of the water from the pit through the surrounding ground. One suggestion of the Committee is that refuse might be tipped first into a dry pit, where initial decomposition would occur, and that after about two years it should be transferred to a wet tip, leaving the first site to be used again.

It is not claimed that the experiments described were exhaustive, and several lines of investigation remain to be followed. NORA H. JOHNSON

TOXICOLOGY OF *PENICILLIUM ISLANDICUM*

TOXICOLOGICAL research into the methanol extract of the fungus *P. islandicum* has been carried out since the spring of 1954, with collaboration in the fields of mycology, chemistry and medicine. In five biological testings, methanol extract prepared from the fungus mat of *Ub*, *Uc* or *Ea* strains was administered in the form of oil solution or water suspension to 150 mice and 10 rats, orally or subcutaneously, to observe pathological changes; in chemical testings, chemical fractionations of the methanol extract were carried out.

Biological data observed a few days after a single or several doses of the methanol extract had been administered have been summarized by K. Uruguchi,

T. Tatsuno, M. Tsukioka, Y. Sakai, F. Sakai, Y. Kobayahi, M. Saito, M. Enomoto and M. Miyake of the Departments of Pharmacology and Pathology, Faculty of Medicine, University of Tokyo, Bunkyo-ku, Tokyo, Japan (*Jap. J. Exp. Med.*, 31, No. 1; 1961), as follows: Acute symptoms of poisoning are developed in mice and rats, but their life-time is prolonged with reduced doses. Poison damages show that abnormal function of the liver is detectable by the bromsulphthalein retention test, and autopsy shows, in most of the liver, centrolobular necrosis, fatty metamorphosis of liver cells and interconnexion between the necrotic areas with subsequent collapse; in part of the liver there is vacuolation of liver cells

on peripheral parts of the lobules and hæmorrhage among liver cell trabeculæ.

From these results the investigators came to the conclusion that the extract must contain certain toxic agents injurious to the liver and acutely fatal to animals.

Before and after the twenty-fourth hour the symptoms differ from each other in a marked fashion. Pathological changes observed in the liver are of two kinds. It would appear that the biological response to the methanol extract must be a manifestation of two actions essentially different in properties but each injurious to the liver. Convincing evidence of this is obtained from the data concerning the solvents used for the methanol extract; rapid action seems to be detectable when the extract is

suspended in water while delayed action is detectable when this extract is dissolved in oil.

With regard to the toxic metabolites of *P. islandicum*, the investigators concluded that, in the methanol extract of the fungus mat, two liver-injurious components co-exist which act fatally within a short time; one is a hydrophilic compound relatively rapid in action and the other a lipophilic compound which is much slower.

Chemical fractionation of the constituents in the methanol extract of the fungus mat indicated that lipophilic fractions, sterols and several pigments of the polyoxyanthraquinone group are obtained; among the latter is found a yellow pigment 'luteoskyrin', which has been unknown hitherto.

ICSU REVIEW

THE *ICSU Review* was initiated in 1958 as a new enterprise of the International Council of Scientific Unions, with the strong interest of the past president of Union, Dr. Lloyd Berkner. The intention was to have a publication especially devoted to the affairs of the Council with its thirteen federated scientific unions and its special committees. The *Review* would bring the progress now being made in the co-operation of working scientists from all over the world to the notice of specialists and a wider public which is not well informed on these activities. The new *Review* was edited by Sir Harold Spencer Jones.

After the death of Sir Harold, the position of the *Review* was considered and certain changes were thought to be desirable. The scope of the *Review* could be expanded so that it could cover even more effectively the full activities of the Union's constituent organizations. This objective could be reached only if the *ICSU Review* presents theories, projects or discoveries of world-wide importance, and is directed towards international science. It should bring members of the scientific community a knowledge of movements and trends in other sciences in a more

comprehensive way than is done in the present scientific journals. To this end, the publication will in future include short articles from different branches of science, written in a style suitable for the non-specialist and the generally educated public. This will give a better presentation of the work of the scientific unions in its relation to the progress of knowledge and to world affairs; thus international co-operation will be presented in a living perspective.

The new issue (3, No. 1; 1961) is a first step towards realizing this goal and contains articles on AGK3—a co-operative programme in astronomy by F. P. Scott; international research programmes in oceanography by Dr. G. F. Humphrey; the world land use survey by Prof. L. Dudley Stamp; changing views on the Earth's crust by Prof. J. Tuzo Wilson; the mixed commission on the ionosphere by Prof. W. J. G. Beynon; biophysics by Prof. A. Engstrom; fluorine and African plants by Sir Rudolph Peters; a European project for a large observatory in the southern hemisphere by Dr. J. H. Oort; the international latitude service by C. A. Murray; and geophysical and space-tests of gravitational theories by Prof. R. H. Dicke. Dr. Donald Fraser has been appointed editor.

SYNTHESIS AND X-RAY ANALYSIS OF DIAMOND

By H. LI. D. PUGH and J. LEES

Plasticity Division, National Engineering Laboratory, East Kilbride, Glasgow

AND

J. A. BLAND

Research Department, Plastics Division, Imperial Chemical Industries, Ltd., Welwyn Garden City, Hertfordshire

THE recent development of relatively simple ultra-high pressure equipment has stimulated research effort in this field. To the engineer the field is of importance because of its potential in producing a range of new materials, probably characterized by hardness and good refractory properties. A small team in the National Engineering Laboratory, East Kilbride, is investigating the synthesis of such new materials, and has constructed an ultra-high pressure apparatus capable of subjecting specimens to pressures

of approximately 75,000 atm., and temperatures of approximately 2,000° K. In the proving of this apparatus, synthetic diamond crystals were produced. A detailed X-ray analysis was made of one of these, by the Plastics Division, Imperial Chemical Industries, Ltd.

The National Engineering Laboratory (U.K.) apparatus is based on the National Bureau of Standards (U.S.A.)¹ modification of the tetrahedral anvil apparatus². In this apparatus the high-pressure cell