

the structure and control of thin films, ultrasonic and electromagnetic flowmeters, applications of semi-conductors, and the design of a specific microscope objective. These formed but a part of the seventy-seven exhibits, covering many aspects of the Association's work. Of particular interest, as indicating the importance of giving as much freedom as possible to the individual scientist, was the demonstration of a chemical balance which used flexure pivots in place of knife-edges. This development had no place in the research programme, but although the investigation is still in its early stages, a promising degree of robustness and sensitivity has been achieved. Another exhibit of potential value was the moisture-sensitive ceramic element. This was demonstrated, measuring humidities in the 0-1 per cent region to about 0.02 per cent. The instrumental applications of gratiules, devices which started as scales and now form an essential part of certain automatic control processes, are becoming more numerous every day. The exhibits concerned with gratiules covered the whole field of their manufacture and application. British thermometer manufacturers now have at their command a method of making permanent markings on many of their products. The process for doing this, developed by the Association, was the subject of another exhibit. Pneumatic gauging, as developed by the Mechanical Department, excited considerable interest.

The extent of the services provided by the Information Department came as a surprise to many visitors, particularly the range of technical inquiries handled by the scientific staff of the Department. Working models of flexure pivots, illustrating devices described in one of the Department's publications, aroused much interest.

The speaker on October 7, Dr. T. E. Allibone, took as his subject "Black and White Elephants at Aldermaston". In the course of his lecture he described many discoveries and inventions made in his own laboratories which were apparently of little use, but had afterwards turned out to have considerable value. On October 8, Sir John Cockcroft spoke about "Nuclear Instrumentation" and directed attention to the enormous field for instruments which was being created by the planned reactor programme. On October 9, Prof. Casimir, from Holland, gave his audience a peep into the future by discussing "Atoms as Units", describing how atomic properties could be used as standards of length, time, electric charge and magnetic induction. Dr. Ponte, of Paris, gave a more detailed account of a particular branch of instrumentation on October 10. His subject, "Quartz Oscillators and their Limitations", was illustrated by slides of modern time-measuring equipment. He showed that an accuracy of 1 part in 10^8 was now feasible with small, robust equipment. On October 11, Prof. S. Tolansky demonstrated the power of phase-contrast microscopy by means of many photographs of the detail of crystal structure in metals, convincingly illustrating that for the detection and measurement of the contours of a surface the optical method is comparable with the electron microscope.

A noteworthy feature of the open days was the exhibition of members' products to which the Research Association had made some contribution. It was a kind gesture on the part of the members and one which is bound to have a good effect on the morale of the staff thus to acknowledge some of the benefits which have accrued as a result of the Association's work.

CONTROL OF ADMINISTRATIVE TRIBUNALS

IN opening a debate in the House of Commons on October 31, in which the House took note of the report of the Franks Committee on Administrative Tribunals and Enquiries, Mr. R. A. Butler said that the Government is concerned to accept as many of the recommendations of the report as possible. Nevertheless, it wishes to obtain the views of members on certain of the findings and particularly in the light of the three guiding principles of openness, fairness and impartiality. The Government believes it would be possible to accept wholly or substantially the majority of the detailed recommendations, while striking a just balance between the rights of the citizen and the efficient discharge of the country's business. The Government proposes to set up a single Council on Tribunals which will be appointed jointly by the Lord Chancellor and by the Secretary of State for Scotland, with a special committee or panel of the Council to deal with matters of special concern to Scotland. The Council would be consulted before establishing any new tribunal and the Government would refer to the Council various recommendations made by the Franks Committee.

It is also proposed that, in general, chairmen should be appointed by the Lord Chancellor in England and Wales, and by the Lord President of the Court of Session in Scotland, and the Government agrees that for the most part it is desirable that chairmen of tribunals should have legal qualifications. The opinion of the House of Commons is to be obtained regarding the proposal to entrust adjudicating functions of county agricultural executive committees to new independent tribunals, with appeal to the Land Tribunal or to the Scottish Land Court. In future, it is proposed to appoint inspectors only after consultation with the Lord Chancellor, and the Minister would be free to dismiss chairmen only with the Lord Chancellor's consent. Mr. Butler said that the Government is also prepared to arrange for publication of inspector's reports and promised that in future responsible Ministers would ensure that more is done to make the policies for which they are responsible more widely understood, that people are told where they can find the information which may help them, and that authorities will be required in future to see that their case is properly set out before an inquiry opens. The statement was generally welcomed, and in replying on the debate the Attorney-General stressed the advisory functions of the proposed Council.

EFFECT OF RADIATION ON HUMAN HEREDITY

A STUDY group, set up by the World Health Organization in Geneva to consider the effect of radiation on human heredity, has presented its report to the United Nations Scientific Committee on Atomic Radiation; in shortened form, the report has been prepared as a special feature of the *Chronicle of the World Health Organization* (11, No. 8; August 1957).

Each member of the group was acutely aware of the existing gaps in knowledge and drew up an inventory of problems which will need to be investigated by geneticists, nationally or internationally.

Spontaneous and artificially induced mutations, particularly the kinds of mutation produced by various doses and types of radiation, applied at different stages of the life-cycle under a variety of conditions and utilizing different kinds of organisms, need further examination. The role of changes in the hereditary material of somatic cells in the genesis of leukaemia and various neoplasms could be elucidated. This is now possible owing to the recent developments in tissue-culture techniques. The means of protection against mutagenic agents needs attention. New and improved techniques for the identification of mutants, many of which remain unrecognized at the present time, need development. The manner of gene action is of importance. Dominance, synergism and other forms of gene interaction, including the role of the environment, are important in appraising the effects of radiation and should be further studied in both man and animal.

Factors such as natural selection in populations through the collection of demographic and experimental data should be studied. This type of research is indispensable if the genetic structure of past and present human communities is to be understood and future trends are to be predicted.

Patterns of mating in human populations, such as inbreeding and their genetic implications, are important problems which need solving.

Twin studies in man which are known to be helpful for the understanding of many problems of human heredity offer a large field for research.

The frequency of diseases with a significant genetic component, with particular reference to their epidemiology, needs to be determined. Central registration of data on human inbreeding and hereditary diseases is believed to be of the utmost importance.

Populations of special genetic interest, such as relatively stable, primitive communities, long isolated by geography or culture, and communities exposed to unusually high background radiation should be studied.

The genetic mapping of human chromosomes is also of importance. Cytochemistry and human cytology, particularly investigation of the ultra-microscopic structure and chemical composition of the hereditary material and of the manner in which

this is altered by irradiation and other mutagens, and the development of new statistical methods for analysing the results obtained from research in human and experimental population genetics are also valuable fields for further research.

Investigations capable of throwing fresh light on all these problems will involve great effort in many countries and a great expansion of general and *ad hoc* research in genetics and other fields of biology with the closest possible collaboration between those working in the experimental and human fields. The report of the study group emphasizes that "there is at present an insufficient number of institutions where an adequate training in genetics, particularly in human genetics, can be given". The group believes that "medical undergraduates should all receive training in genetics and teaching should be co-ordinated with that in radiology and in the use of radioactive substances in medicine, so that the genetic hazards of diagnostic and therapeutic procedures are thoroughly understood. Medical men training as radiologists should have specific, more advanced, instruction in genetics. Health physicists, radiological physicists and radiological technicians should also receive instructions in genetics as part of their technical training".

The study group was particularly concerned about the genetic hazards of radiation from sources used in medicine, industry, commerce and experimental science. As the report puts it: "Both as an approach to control and as providing basic background information for relating quantitatively radiation exposure and effects on man, it is essential that methods be found of recording exposures to individuals and populations however difficult this may prove.

"There is reason to believe that radiation exposure can be much reduced; those in charge of sources of ionizing radiations should always ensure that there is adequate justification for exposing individuals to doses, however small. On account of the danger to offspring resulting from irradiation of the gonads by X-rays, consideration should be given to determining what efficient means of shielding the gonads could be devised and brought into general use. In addition, in every exposure, the X-ray beam ought as far as practicable to be directed so that a minimum of radiation reaches the gonads."

MEASUREMENT OF SMALL QUANTITIES OF FLUORIDE WITH THE HELP OF FLUORINE-18

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IN the course of investigations of the uptake of fluoride ions by teeth, we wish to measure the concentration of fluorine in small samples of enamel and of various aqueous solutions. Colorimetric methods will work at low concentrations (down to less than one part per million) but need samples of at least several millilitres. The more convenient methods may be upset by the presence of phosphates and other salts.

We have developed an isotope-dilution adsorption method which we can use with samples of a milligram

or less of solution at the lowest available concentrations. The method is based on the adsorption of fluoride from acid solution by glass. The procedure is as follows. To the solution for analysis is added a small known quantity of fluorine-18 as fluoride, as nearly carrier-free as possible. *N* nitric acid is then added to give a pH close to 2. The mixed solution is applied to a defined area of a glass surface. (We have found good-quality microscope slides satisfactory; these are cleaned for a few seconds with dilute nitric acid followed by distilled water.) Fluoride ions are then