Experimental Work on Cancer

IN the recently issued annual report of the Imperial Cancer Research Fund[1], Dr. J. A. Murray records the main properties of twenty-eight different strains of animal tumours which are maintained in the laboratories of the Imperial Cancer Research Fund. He appeals to other institutes to publish similar "statements of the significant characteristics of the tumour strains maintained by them so that investigators throughout the world may more easily compare their material and results".

Rous and Murphy showed that fowl tumours transmissible by cell-free material retain their individual properties, in appearance, rate of growth and distribution of secondary tumours. In the first paper of the scientific report[2], Dr. Foulds describes such characteristics for six different chicken tumours, and concludes that the behaviour of these tumours is parallel to that of metastases in human cancer. In a supplement to the report[3], Dr. Foulds gives a detailed summary of the work on the properties of the filtrates which produce tumours in fowls and on the characteristics of such growths. The specificity of the malignant tissue produced by filterable agents and the multiplication of such agents with the growth of the tumour differentiates them from the chemical carcinogenic agents. On the other hand, the 'organisers' induce embryonic structures, the growth of which then appears to increase the amount of organiser.

The fourth and fifth papers of the report deal with investigations carried out by Dr. A. F. Watson on the effect of liver diet on tar cancer. Maisin showed that when either fresh or cooked liver was fed to mice, they became more susceptible to painting with carcinogenic tar. Watson has shown that a preparation of hog's stomach containing the hæmopoietic factor did not have the same effect as liver. The results of liver feeding show that the mortality of the control mice is much higher than that of the liver-fed animals; this effect seems to be greater than the influence on tumour production.

Dr. E. S. Horning has developed a technique by means of which the distribution of inorganic matter in tissues can be studied. The fixed and sectioned tissue is heated to 650° C., after which the distribution of the ash can be seen by means of dark-ground illumination. From this, the form and character of the original cells can be seen. Hypertrophied stroma and most malignant cells appear to contain more inorganic matter than normal cells; in this respect, however, tar tumours seem to differ from other tumours. The method has shown that radium treatment causes redistribution of the inorganic matter; changes are shown within six hours of irradiation and continue for six days. There seems no doubt that micro-incineration is a valuable histological and chemical method.

Mr. H. G. Crabtree and Dr. W. Cramer show that treatment of transplantable tumour tissue with the maximum concentration of poisons producing reversible inhibition of the respiration will also allow the tissue to grow when implanted in a host. If the poison is used in a higher concentration, the tissue will not grow on transplanting. They also show that the physiological environment affects the susceptibility to radium; in general, lowered respiration causes increased susceptibility. Dr. Cramer has been able to demonstrate that the differences in sensitivity to radium of spontaneous mammary carcinomata in mice are partly due to variations in the extent of macrophage invasion. He points out that effective radiation need not kill all the cells directly, but only cause temporary but specific damage.

The last two papers of the report are by Dr. R. J. Ludford and deal with the structure and behaviour of cells in tissue cultures of tumours. Macrophages, polyblasts, lymphocytes, giant cells, fibroblasts and malignant cells, all of which occur in such cultures, are described. Apart from their morphology, the cells can be differentiated by their movements and reactions to vital stains. Careful subculture has given almost pure cultures of malignant cells. Ludford has been able to use colloidal solutions of fat-soluble dyes as a vital stain for the fatty parts of cells. All cells are stained by such dyes, but as malignant cells are not stained by the water-soluble trypan blue, it is suggested that the plasma membrane of malignant cells is relatively rich in fatty substances. In this respect, the membrane resembles that of the tubercle bacillus.

Many of the papers are fully and beautifully illustrated, and the descriptions immediately below the plates themselves are a great help to the reader.

[1] Thirty-second Annual Report (1933–1934) of the Imperial Cancer Research Fund.

[2] Eleventh Scientific Report on the Investigations of the Imperial Cancer Research Fund. Pp. ix+177+58 plates. (London: Taylor and Francis, 1934.) 30*s*.

[3] Supplement to the Eleventh Scientific Report on the Investigations of the Imperial Cancer Research Fund. The Filterable Tumours of Fowls: a Critical Review. Pp. ii+42. (London: Taylor and Francis, 1934.) n.p.

Annual Meeting of the Science Masters Association

THE thirty-fifth annual meeting of the Science Masters Association was held on January 1–4 at Oxford under the presidency of Prof. N. V. Sidgwick. Some three hundred members were present, a number slightly less than the usual number for an Oxford meeting, although the membership of the Association has risen to within the region of two thousand.

A full programme of lectures, visits and demonstrations was arranged, together with the usual exhibits by manufacturers and publishers. Various departments of the University were open for inspection and special demonstrations were staged, particularly in the Astronomical, Biochemical, Botanical, Electrical and Chemical Departments.

The presidential address, under the title of "Real Molecules", was a lucid account of the modern physical conceptions of atoms and molecules developed as the result of the applications of the ideas of wave mechanics, which, in the opinion of Prof. Sidgwick, affect only to a slight degree the dimensions of atoms and their orbits as deduced from the classical theory, but give a much clearer conception of the mechanism of covalency. By assigning to every nucleus a sphere of influence, the dimensions