

species produced in irradiated water, and at Cambridge this problem is being attacked in an ingenious manner using hydrogen atoms produced directly in a high frequency discharge. Both at Mount Vernon and the Christie Hospital, irradiation of tissue culture media has given rise to substances toxic to mammalian cells, but their nature is as yet quite unknown.

Biochemical lesions in irradiated cells or subcellular particles continue to be observed, but their significance remains obscure. The release of enzymes from mitochondria and lysosomes and the enzymatic formation of organic peroxides is reported from St. Bartholomew's Hospital. In lymphoma cells *in vitro* the rate of uridine incorporation into RNA is decreased within a few minutes of a dose as small as 200 r. This proved not to be a lesion involving RNA synthesis—which was quite normal—but an effect on the ribose nucleotide RNA precursor pool. A similar pool effect was also found for DNA precursors with lymphoma cells, but not with HeLa cells (Chester Beatty Research Institute).

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Clinico-pathology

The clinical diagnosis, surgery, radiotherapy and chemotherapy of cancer have shown no noteworthy advances in the past year.

A number of interesting reports are presented under the heading of clinico-pathological studies including the (invariably) first class study from St. Mark's Hospital. From their work it appears that the incidence of a second (metachronous) carcinoma of the large intestine is too low to justify more extensive operations for the treatment of rectal and colonic cancer. Cases with polyps in the first specimen have a greater chance (approximately twice) of developing cancer in the residual bowel than cases in which such polyps are not found. Their results in early cancer of the rectum show the rarity with which it is diagnosed and show further that the disease is being diagnosed no earlier today than 35 years ago. In half the "early" rectal cancers, origin from a pre-existing benign tumour was shown histologically.

Several other clinical studies serve merely to confirm our general experience of the factors involved in the prognosis of cancer. The later the stage, the less differentiated the tumour, the more silent and inaccessible the tumour, and so on—the worse the outlook. Another study, involving the perfusion of operation specimens, confirms the vascular nature of tumours of the large bowel, and that perfused cytotoxic drugs would only reach the periphery—surely a most elaborate demonstration of a commonplace of pathological and surgical knowledge. In some studies, however, new data are presented—information not available from reshuffling the old pack of cards, so to speak. The review of forty-six embryonal sarcomata by the Hospital for Sick Children, Great Ormond Street, reveals a better prognosis when the genito-urinary tract is the primary site, compared with the other major location, the head and neck. This type of behaviour is neither predictable nor explicable.

Lane-Brown and Melton, starting with the clinical observation that regression of malignant melanoma can occur in association with vaccinia infection, have made an electron microscope study of oncolysis in a malignant melanocyto-vaccinia system *in vitro*. They found that the virus enters the cell, and that the optimum temperature for cell destruction was 33° C rather than 37° C. This probably explains the dermatropism shown by the virus.

The Bristol Bone Tumour Registry report is interesting, as are all well documented series of rare tumours. Price recounts the difficulties in the histological diagnosis of giant cell tumour of bone (osteoclastoma); although six of the forty-two behaved in a malignant manner, in only three were the original histological appearances sufficiently

indicative of malignancy for the diagnosis to be made. (It is not so long ago that, in England, the osteoclastoma was classified as a benign tumour, adequately managed by curettage and packing the defect with bone chips.) In a further five cases a necessary amputation of the affected limb was carried out, although not for malignancy. A quarter of the patients in this series required amputation, and the tumour is clearly one that should command respect. Price recommends radical excision, particularly for giant cell tumours of major long bones.

At the cellular level of research Sylvia Lawler's group present the results of chromosome studies in forty-three patients with polycythaemia vera. They found aneuploid cells in the bone marrow in untreated patients, but treatment with phosphorus-32 caused a partial reversion to euploidy in some cases. In the cases treated the bone marrow may be normal, show sporadic abnormalities of the type induced by radiation or show the evolution of stable clones of abnormal cells. Patients who developed a leukaemoid state may have a grossly abnormal chromosome complement.

Work on spontaneously occurring tumours in domestic animals is still lagging. The Glasgow Veterinary School has continued its study of lymphosarcoma in domestic animals. Their aims are to establish the national incidence of lymphosarcoma in each species, to determine whether "multiple case herds" exist here, as they do in Denmark (Bendixen), and to determine whether changes in blood leucocytes occur in each herd. So far no virus particles have been found in electron microscopy in field cases of lymphosarcoma in cats, dogs and cattle. They are continuing their transmission experiments in cats and tissue culture in the same animals.

Greenwood (Edinburgh Centre of Rural Economy) has completed his study of the possible effects of various contrasting environments on tumour incidence in domestic fowl; his results suggest that the differential response encountered may be due to genetic differences in susceptibility to adenocarcinoma existing in stocks of different origin.

Thompsett of the Royal Veterinary College and Allison of M.R.C., Mill Hill, are studying virus papillomatosis in a range of domesticated animals.

As soon as a new environmental carcinogen is proved to be a potent cause of malignant disease in man, no effort should be spared to eradicate the danger where practical. In the past few years the relationship of the absorption of asbestos to the subsequent development of malignant mesothelioma has become widely accepted and we may expect that workers in the social medicine field among others will now be active in clarifying the overall pattern of the disease. The Department of Therapeutics and Pharmacology of Queen's University of Belfast, investigating disease in the pipe-covering trade, in which asbestos is used, found that half the 105 deaths they studied were due to cancer; carcinoma of the bronchus was the most common, but mesothelioma of the pleura was unusually common.

Controversy on the status of the Burkitt lymphoma is still active. Briefly, this lymphosarcoma is frequent in certain geographical locations in Africa and most commonly presents with a dramatically large tumour of the cranial and facial skeleton. Children and adolescents are the victims, and despite regression with chemotherapeutic agents like vincristine, or irradiation, the disease pursues a fatal course. When the lymphosarcoma first came into prominence, it was thought to be a newly defined entity, and restricted to Africa; but a viral cause has not yet been demonstrated. The histological appearances are those seen in the lymphomata of childhood in white children in England and North and South America. It is interesting that this pattern is also frequent in canine or feline lymphoma; nevertheless the clinical presentation and the frequency of the disease in Africans are as yet unexplained.

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