

Cancer Research.*

THE British Empire Cancer Campaign continues to subsidise a great variety of investigations into the cause and treatment of cancer, and the progress which is being made is summarised fairly fully in the recent annual report.

The greatest practical advance in the cancer problem which has been made in recent years is the cumulative demonstration that tar and soot and, generally, the products of burned coal, together with certain mineral oils, have an exceptional efficiency in causing malignant tumours when they are applied to the tissues of men and animals over long periods of time. The evidence comes partly from experiments on animals and partly from studying the relation of cancer to occupation and mode of life. The two lines of inquiry are entirely concordant in implicating burnt coal, and they provide sanitarians with a clear indication for preventing some forms of cancer.

For experimental purposes tar has generally been used as a carcinogenic agent, and a good deal of research has gone into the obvious question as to what particular substance in that complicated mixture is responsible. Most of the components have been tried and found to be inert, and no pure substance has been found which had anything like the effect of tar. It seems now, however, that Mr. I. Hieger and Dr. J. W. Cook, at the Fulham Cancer Hospital, have made substantial progress by following up the observation that benzantracene and cancer-producing tar have similar fluorescent spectra. They have since found that 1:2:5:6-dibenzanthracene in a high state of chemical purity readily produces cancer when applied in quite small concentrations to the skin of mice, and they have thus provided a most valuable method for the analysis of the precise mechanism by which such cancers are produced. Whether this or some analogous compound is in fact the active agent in tars and mineral oils is not known.

There is at any rate no obvious justification for the statement made in the Report of the Grand Council (though not, we notice, by the workers themselves) that "the essential molecular structure of the cancer-producing agent in tar and other cancer-producing substances" has been determined. It may well be that the agent is not the same in all tars and carcinogenic oils. Cancer of the skin may

be produced experimentally by X-rays, freezing, burning, acids, and other procedures which irritate the skin and have no 'substance' in common, though they may be similarly active because they all lead to the tissues producing the same active agent.

Another inquiry which relates the chemical constitution of a substance to its capacity to cause the growth of cells has been carried out by Dr. J. S. Young at Leeds. Solutions of simple salts injected into the pleural sac stimulate the cells lining the marginal alveoli of the lung to proliferate, and their efficiency in a general way varies with the valency of the metal: aluminium is more effective than calcium, and calcium than sodium. To these interesting facts he has now added the observation that cells which have reacted once are refractory to a further application of the stimulating salt for about three weeks. This resistance may also be induced by a series of injections of gradually increasing strength such that no reaction is at any time produced: ultimately the cells tolerate a concentration of the salt twice as great as that required to cause a reaction in a normal animal. This kind of cellular immunity to irritating substances is little understood and needs further investigation, possibly on simpler material than that used by Dr. Young.

While these and other data indicate quite clearly that cancer is essentially a local disease due to local causes, it is also evident that general or constitutional factors may be involved. In the present report, for example, it is shown that some strains of mice respond more quickly to the application of tar than others, and mention is made of a breed in which tumours appear 'spontaneously' in an extraordinarily large percentage of animals. Dr. C. E. Dukes also presents the pedigrees of a number of human families in which a hereditary predisposition to the development of multiple innocent tumours of the bowel is plainly shown: in many cases these growths form the starting point of cancers which appear at an exceptionally early age. It may probably be presumed that by deliberate dysgenic mating, strains of men might be produced with a special tendency to respond to external irritants by the growth of cancers, but there is no evidence that the constitutional factor is of any substantial importance in an ordinary human society, except in a few special instances such as that studied by Dr. Dukes.

* British Empire Cancer Campaign, Eighth Annual Report of the Grand Council, presented at the meeting held at the House of Lords on July 20. (London: British Empire Cancer Campaign.)

Obituary.

DR. JOAN B. PROCTER.

SELDOM has the triumph of force of mind over physical weakness been more vividly illustrated than in the case of Dr. Joan Beauchamp Procter, curator of reptiles and amphibians in the Gardens of the Zoological Society of London, who died at her residence in Regent's Park on Sept. 20, at the age of thirty-four years.

Fragile from birth, she still persisted in her duties, first at the Natural History Museum and later at the Zoo, when the majority in like position would excusably have retired.

From quite early days she had dedicated her abilities to the subject which was to become her life's work. As a child she showed an extraordinary interest in reptile and amphibian life,

snakes, lizards, and frogs taking the place of diversions more usually associated with the nursery—and often causing consternation and alarm amongst her relatives and visitors. Whilst still at St. Paul's Girls' School, she called upon my father, Dr. G. A. Boulenger, F.R.S., who at that time was in charge of the reptile and amphibian collections at the British Museum. He at once perceived in her the makings of a brilliant herpetologist, and when she left school he invited her to work under his direction. Her special capabilities found full vent, and so valuable was her assistance that when my father retired, in 1920, Miss Procter was given the management of the vast collection. She proved not only an admirable systematist, but also an accomplished draughtswoman and modeller, and was responsible for some of the showcases in the Reptile Gallery in the Natural History Museum, and for a large series of coloured postcards of reptiles on sale at the Museum.

In 1923, Sir Peter Chalmers Mitchell, secretary of the Zoological Society, asked her to assist me in the design of the rockwork of the new Aquarium, then in course of construction, and later invited her to take over the curatorship of the Reptile House—the Aquarium at the time monopolising all my attention. As curator of reptiles she was an unqualified success, her great knowledge of reptiles coupled with her remarkable manual dexterity enabling her to perform many surgical operations on her charges that had not hitherto been attempted. The new Reptile House, opened in 1927, may fairly be regarded as a lasting monument to Miss Procter and her work. It combines the most modern developments of heating, lighting, and general hygiene, all of which she was quick to appreciate. The house, moreover, blends scientific requirements with artistic embellishment in a manner that had not hitherto been attempted in any zoological collection. During her curatorship at the Zoo she turned her artistic abilities to full account, and the majority of the more modern buildings and enclosures in the Regent's Park menagerie bear her stamp. The Reptile House, however, is pre-eminently her achievement and a worthy climax to an all too brief career.

Amongst her many contributions to scientific literature, her monograph on that remarkable tortoise *Testudo loveridgei*, published in the *Proceedings of the Zoological Society* in 1922, may be specially mentioned.

Miss Procter will be mourned by all those who were privileged to come into personal contact with her. A larger number outside her immediate circle will miss an artist and a valuable contributor to knowledge—one who did so much and in so brief a period.

E. G. BOULENGER.

SIR GREGORY FOSTER, BT.

SIR GREGORY FOSTER, whose death occurred on Sept. 24, at the age of sixty-five years, was a singularly able and devoted worker in the cause of education and of university education in particular. He entered University College, London, as a student

in the 'eighties, graduating in 1888. He studied afterwards under ten Brink at Strasbourg, obtaining the degree of Ph.D. He was for some time professor of English at Bedford College, which was then situated in Baker Street, London, and he returned to University College as secretary and lecturer, becoming principal (afterwards provost) of the College in 1900, and holding that appointment until his retirement in 1929. In 1928 he was elected vice-chancellor of the University of London and was re-elected to that office in 1929. The greater part of his life was therefore spent in connexion with University College and the University of London.

The period during which Foster was provost of University College was one of the most notable in its history. The status of the College was altered by its incorporation in the University in 1907. Under his guidance its position was extended and consolidated in a remarkable degree. Existing departments were strengthened and new departments created, new chairs were established, and many additions of great importance were made to the curricula. The School of Librarianship and the Department of Scandinavian Languages owe much to him. The magnificent range of laboratories in connexion with the Department of Chemistry, the great buildings devoted to the medical sciences, and the Architectural and Engineering Departments are among the most important university buildings erected in England in recent years. Foster would have been the last to claim that he was primarily responsible for this remarkable growth in the equipment and resources of the College, for he preferred to give the credit to others. The College is not likely, however, when honouring his memory, to forget the part he played or the great gifts of leadership which he displayed.

Foster was devoted to the interests of the students, and he carried on and developed the work begun by Henry Morley, for whom he had a great admiration, in fostering a corporate life in the College. He was a strict disciplinarian, but his innate kindness brought instant and unobtrusive help to many, of all nationalities, who were in difficulty. Thus, in spite of the reserve which gave him his dignity of bearing, he won the popularity which comes to fearless and humane men who do not seek it. He gave himself without stint to the College, and its welfare and advancement were ever in his thoughts. He never spared himself. Possibly he worked too hard, for he was unwilling to delegate to others any duty that he thought important, and in the opinion of his friends he would have been wise to have 'let go' when, a few years ago, his health showed serious signs of strain. He never lost his early interest in philological studies, in which he doubtless would have made his mark had not other duties engrossed his attention.

Although primarily concerned with University College, Foster was interested in many educational questions generally. He was always a staunch friend to the cause of women's education, and when he became vice-chancellor of the University of