

How Successful Have We Been in Fighting Cancer

By ETHLYN TRAPP

THE vital statistics of all civilized countries show cancer to be the second most important cause of death. As the average life span increases so does cancer. Public Health, after protecting the infant from the dangers of birth, the child from the ravages of infectious diseases and the adult from such previously devastating plagues as typhoid fever and pneumonia, now leaves at least one in ten of those who live to be over forty, to die of cancer. It has been maintained that cancer is not a Public Health problem because it is dangerous only to the individual who suffers from it; but any disease which carries off such a large proportion of the population at the age of greatest usefulness, is a public health problem. If it is not attacked on the humanitarian basis, it should at least be dealt with for economic reasons. Not only is the productive work of such individuals lost but the great majority of them become a public charge and must be cared for through weeks and months of suffering and destitution. It would be much better and cheaper to prevent this disease or to treat it in its early stages when there is a reasonable hope of cure. Even though the cause of cancer is not known we have at our disposal to-day sufficient knowledge to reduce its mortality by fifty per cent and adequate research would soon find means of lowering it still further.

Since cancer has been called the medical mystery of the ages, a backward glance should be of help in assessing the present position of the disease. The historical view is always important. It has been truly said that "people will not look forward who never looked backward." First, then, what is cancer, this disease which Hippocrates, the Father of Medicine, named for the crab, because

it stretched its tenacles in all directions? Boyd, a well-known Canadian pathologist, defines it as follows: "A cancer is a mass of new cells which proliferate without control, and which invade the surrounding tissue spaces and in some cases the lymphatics and blood vessels. All other biological processes have a meaning; cancer has none. Every ordinary cell has a two-fold object, function and reproduction. In cancer the idea of reproduction replaces that of function. There is a purposeless and never-ending cell division. Cancer cells may be termed the gangsters of the cellular community."

It has been said that cancer is a disease of civilization, but far from such is the truth. It is a disease older than man himself. Tumours in the fossil bones of extinct animals were first recognized among the cave mammals in Europe, who inhabited the earth twelve million years ago. The further evidence of bone cancer is found in every succeeding geological period. Its ravages may be seen in the bones of Egyptian mummies dating back 3000 years before Christ. The first mention of it in medical writing is in the earliest medical document yet discovered, the Ebers Papyrus, which was written about 1500 B.C. In the development of medicine through the succeeding centuries we find the problem of cancer compelling the attention of the leaders of medical thought. Indeed, one of the many interesting things about cancer is the enormous number of earnest students who have worked on the problem; since the time of Hippocrates each century has produced original theories on cancer and its treatment. Galen, an early Roman physician, even stressed the importance of early diagnosis.

Great Britain made important contributions in the late 18th and early 19th centuries. The great English surgeon, John Hunter, was responsible for the

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formation of the first society for investigating the nature and cure of cancer. It comprised a company of the most outstanding physicians of the day. This society was, however, about one hundred years ahead of its time and dissolved through lack of co-operation. Shortly before this the first cancer service in a general hospital was established, when some unused wards in the Middlesex Hospital were appropriated for patients with cancer, there they might remain "until either relieved by art or released by death."

During the 19th century cancer was being treated by surgery and various caustic pastes. Many theories were advanced as to its cause and great progress made in the description and classification of the disease. The great German pathologists came to the fore at this period and we have such names as Müller and his famous pupil, Virchow, whose book "Cellular Pathology" might well be considered the most important single work in the history of medicine. However, the modern era of systematic and scientific research only began about 1900, shortly after the discovery of X-ray by Röntgen and of radium by Marie and Pierre Curie. It is within the last forty years that the treatment of cancer, as we know it to-day, has developed.

In 1902, the Imperial Cancer Research Laboratories were opened, and institutions formed on similar lines have been established in all civilized countries. After the last War the formation of the Cancer Commission of the Health Committee of the League of Nations was a great impetus to cancer work throughout the world. Incidentally, the accomplishments of this Health Committee are one of the bright spots in the history of the League, largely because the scientific representatives approached their problems with a truly international outlook, the lack of which has caused the work of its political representatives to come to such tragic failure.

THE TREATMENT OF CANCER

Cancer is a lethal disease, no matter how innocent it may seem. If it is not

eradicated, it will eventually kill the patient. It is the only disease which does not tend to cure itself; unfortunately its early stages are painless and delay is all too easy. Treatment of any kind to be successful must be early and must also be adequate.

At present the three methods of treatment at our disposal are, surgery, X-ray and radium. Often a combination of the three is required. Surgery has been used since the days of ancient Egypt. X-ray and radium are discoveries of the last fifty years. The work of the first decade of the 20th century proved them to be radical additions to cancer diagnosis and treatment. Tage Sjogren, treated the first skin cancer with X-rays in 1899 and shortly after, radium was successfully used for the same purpose. These two new physical agents were at first hailed as the answer to the cancer problem but it was soon found that they were no more successful with advanced cancer, than was surgery; it was also learned that great harm could be done by the unskilled use of these new weapons. Too large a dose might cure the cancer but leave the patient to an even more miserable death; while too small a dose left the cancer to renewed activity. Thus it was only through a long series of trial and error that the most effective methods of treatment were evolved. In England, at least, radium and X-ray for therapeutic uses passed through a period of disrepute because of mistakes inherent in this method of evolution. Now, thanks to the work of the physicists, accurate and controlled dosage for both radium and X-ray are used in cancer centres throughout the world.

During the 19th century improvement in the surgical treatment of cancer advanced together with the increase in knowledge of the organs and tissues of the human body and their functions. The 20th century has brought the two new methods of treatment already mentioned and their development in conjunction with the time honored method of surgery. It has also brought the development of physical and biological research and this has been responsible

for the great improvement in radium and X-ray treatment in the past two decades.

In thinking of X-ray as a therapeutic agent one is apt to overlook its significance in the diagnosis of cancer; the discovery by X-ray of an early cancer of the stomach, for instance, is no less a life saving procedure than the early diagnosis of cancer of the breast. Cancer of the stomach comes outside the field of irradiation treatment, but if recognized early can be successfully removed by the surgeon. As early as 1906, Max Otter successfully diagnosed cancer of the lung by X-ray; at that time this could only be verified by autopsy. Here the picture has also changed and increasing numbers of successful operations are being performed every year.

The present era marks the convergence of all the different trends in cancer control to an unprecedented concentration on the subject. Research centres and special cancer hospitals have been established all over the world. Thanks to the League of Nations, cancer is now recognized as an international problem; congresses are held every three years; the last was in Atlantic City in September of 1939. Scientists and practicing physicians were present from all parts of the world. Those whom the outbreak of war prevented from attending, were represented by their papers. Recent research work as well as new methods of treatment were reported and discussed. Further such international meetings must await the coming of peace. In the meantime it is interesting to note what Great Britain is doing in spite of war-time conditions. The 18th annual report of the British Empire Cancer Campaign has just been published and demonstrates what can be accomplished in the face of great difficulties. The various research centres of Great Britain are continuing their work and no important investigation has had to be abandoned or seriously curtailed. Lord Horder, in moving the adoption of the report says,—“there is one aspect which is particularly pleasing to us as Britishers, viz,—that this docu-

ment demonstrates again the lead we are giving to the whole world in cancer research.” The study of cancer-producing and cancer-inhibiting subjects is predominately a British study and is a point of justifiable pride for British medicine. The clinical research commission of the Campaign has also been active and some 10,000 cases of cancer have been followed up at the London Hospitals in the past year. This is a great achievement when one considers the severe damage suffered by so many of these institutions during the blitzes. Lord Horder concludes his address as follows: “I think you will agree with me that a careful perusal of the whole report will strengthen the belief which we all feel that we are slowly approaching the solution of this great problem.”

Sweden probably has the most efficient cancer control organization in the world. It began in 1913 when King Gustav gave his million dollar Jubilee Fund to the Radiumhemmet in Stockholm and now all cancer cases in Sweden are being treated in two large centres. The United States accepted cancer as a federal problem by the passing of the National Cancer Institute Act in August of 1937. This set up a national advisory cancer council and a national cancer institute for the purposes of the initiation and co-ordination of research, the lending of radium, the training of cancer workers and the co-operation with State health agencies in the prevention, control and eradication of cancer.

In Canada there is the Canadian Society for the Control of Cancer and the Department of Cancer Control of the Canadian Medical Association. There are branches of each of these two societies in every province. These were made possible by the King George V Jubilee Cancer Fund and are purely educational in purpose. Several of the provinces, notably Ontario, Manitoba, Saskatchewan and Alberta have initiated programmes for the treatment of cancer. Each has a scheme designed to meet local requirements. In all four provinces, the government accepts the responsibility for

the treatment of the indigent. Alberta and Saskatchewan are working toward a scheme of free diagnosis and treatment for all. Canadian universities have research centres of their own and investigate detached problems as local interests dictate and funds permit; but there is no co-ordination of this work. The Federal Government has not yet taken an active part in cancer control.

Much remains to be done; research requires funds; hospital facilities are inadequate; diagnosis is too often delayed; and public apathy must be overcome. The proper diagnosis and treatment of cancer require groups of specialists and expensive equipment. Only centralization can provide these. The present trend is toward such group specialization, thus making possible the pooling of knowledge and skill.

What part can Canada take in this great campaign? It has been pointed out that centralization is the keynote to both treatment and research. From a practical point of view a good deal depends on our pending Health Insurance. Whatever form it eventually takes, it has been planned as a post war procedure. The problem of cancer is too urgent to be so postponed, surely the groundwork for a national scheme could be laid without detracting from our war effort. We have the glowing example of Great Britain carrying on and expanding this work in spite of the actual bombing and destruction of cancer treatment and research centres. What justification has Canada to lag behind? Although it must be granted that our procrastination has put us in a position to learn from the experience of other countries.

The State of Massachusetts has a cancer programme second to none on this continent. Wisely it has been developed around the family physician. Some similar programme modified to suit our own particular needs could well be used in Canada. Our National Research Council might suitably initiate and control such work in collaboration with one of the larger treatment centres such as the Ontario Radiological Institute.

Research is an important part of any scheme for cancer control and should include research on the medical, social and economic aspects of the disease as well as scientific investigation. Provincial cancer clinics should be maintained to serve every section of the population. These might be administered as they are in Massachusetts, by committees appointed by the local medical associations and they should provide at least diagnostic and follow-up services.

Facilities for X-ray and radium treatment are expensive and could only be made available in the larger centres. Arrangements would have to be made to bring patients to these centres. Standardization of X-ray equipment and the accurate physical measurement of both X-ray and radium dosage are essential. These require the services of a physicist. The National Research Council some years ago made available such service for the measuring of X-ray output. This service has not been widely used and it must be made compulsory, if the public is to be protected from the dangers of uncontrolled X-ray and radium dosage.

The Canadian National Research Council might suitably set up a committee similar to the National Advisory Cancer Council of the United States, a Federal project which co-relates the work done in the various States. The functions of such a committee might well be:

1. To conduct, assist and co-ordinate research;
2. To give advice on the setting up of cancer diagnostic clinics and treatment centres;
3. To set up a minimum standard of requirements for such centres and provide uniform records.
4. To require the services of a physicist in all centres using X-ray and radium.
5. To provide for the regular checking of X-ray equipment.
6. To provide for travelling clinics similar to those in tuberculosis control.

7. To provide for the post graduate training of suitable doctors in the diagnosis and treatment of cancer.
8. To arrange for fellowships in cancer research.

Any satisfactory scheme must provide hospitalization. It must also include the care of incurable patients. There should be a free tumour diagnostic service where any physician or hospital may have suspicious tissue examined to determine the presence or absence of cancer. This service would also be used by pathologists who desired confirmation of their own opinions.

Until we have found the cause of cancer and while the successful treatment depends so much on its early recognition, the education of the physician must remain the paramount factor in the control of this disease. Actually, as Ewing, the renowned pathologist of New York's Memorial Hospital, has so often reiterated—"There is no one cause of cancer. There are many causes, often preventable, and the public should ac-

quaint itself with the nature of these causes. Every community owes it to itself to support cancer control and to provide the means, the organization, and the moral support that will make it effective."

In conclusion, though cancer still remains one of the great problems of the age, we have at our disposal, means by which approximately one-half of the sufferers may be cured if diagnosed early and treated adequately. This still leaves one-half to be cared for through weeks and months of suffering. Research must eventually solve the problem and the annual report of the British Empire Cancer Campaign gives reason to hope that the time may not be too far off. At least a few more truths have been added to the whole body of truth—"dark hints may be; but who groping about in the greyness can picture plainly the glory of the rising sun?" So in this, as in other fields man fulfills his destiny, which is, as Pascal has said, the seeking of Truth.

Science Aids the Fisherman

By D. LEB. COOPER

EDITOR'S NOTE: The flakes covered with drying codfish which have been typical of many fishing communities in Nova Scotia will gradually disappear as the method of artificial drying discussed in this article is being accepted. Our fishing villages will lose in romance but gain in prosperity. Dr. Cooper at present associate professor of Chemistry at Dalhousie University is among those who have been instrumental in devising this new method.

THE purpose of this article is to describe, and discuss the effects of improvements in the method for the preparation of "dried salt cod".

The terms "salt cod" or "dried salt cod" include a number of products manufactured from the fresh fish with the object of producing an edible food capable of transport to, and use in, such localities that fresh fish would spoil. Other

methods of preservation are either impractical, too expensive, or unsuitable for markets accustomed to use the salted dried material.

A number of methods, or variants of a single method of preparation are in use. Common to most is a part in which the fish are salted, followed by a period of drying. Salting preserves the fish until the later treatment by drying is complete, for salting alone will not prevent deterioration in temperate climates. When natural means of drying are employed, it is clear that the locality in which the fish are prepared will, among other things, determine the proportion of salt that is used. Cool situations with dry winds will require less salt than warm, humid, localities. Excepting the northern