What we know about cancer

author. Ontario

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A Handbook for the Medical Profession

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Published by
The Provincial Board of Health, Ontario

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A Handbook for the Medical Profession

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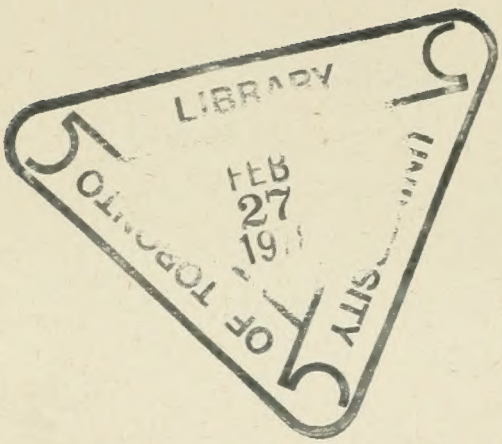

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FOREWORD

This Handbook upon Cancer is published by the Provincial Board with the consent of the American Society for the control of Cancer, for circulation among the members of the medical profession. The thanks of the Board to the Society are hereby acknowledged.

The Handbook is designed to provide in a brief and readily accessible form the important facts about cancer in general, and its manifestations in the different situations where it most commonly occurs. The critical and controversial review of published statistics as to the end-results of operative treatment could not be included without enlarging greatly the size and scope of the publication. It was decided, therefore, to present only in general terms the expectation of success attending the radical operative treatment of cancer in each of its different situations. It is believed that in these statements, as in other respects, a conservative view has been taken of the situation, and that the statements made can be thoroughly substantiated by the published experience of the foremost surgeons of the country.

JOHN W. S. MCCULLOUGH,
Chief Officer of Health.

I

GENERAL CONSIDERATIONS

PUBLICITY AND EDUCATION

As a result of the campaign which has been conducted by the American Society for the Control of Cancer for the education and enlightenment of the lay public on the subject of cancer, a greater and more accurate knowledge of this disease is already evident, and many fallacious ideas have been corrected. This has been the primary and most necessary step in the campaign to reduce the very great, and often unnecessary, mortality of this disease, for until the patient of his own accord seeks medical advice no steps can, of course, be taken toward making a diagnosis or applying the proper treatment. Much yet remains to be done in the way of education of the public, not only in the more remote rural districts but in the towns and cities as well, and it must be done wisely and temperately, and without producing so great a fear of the disease as to alarm people unnecessarily. It is the knowledge that the disease can be cured by radical treatment in its earliest stages that must be disseminated. Many laymen, and some physicians, find it hard to believe this fact. Cancer is not a disease that runs its course, like pneumonia or typhoid; it is an actual entity—as much a part of the individual as his finger or his nose, and it is either still a part of him and growing to a fatal termination or it must be removed entirely in order that he may be cured. The layman knows of the many cases that are not cured, whether an attempt at cure by operation has been made or not, but he rarely knows of the cured cases, for the reason that the individual who has been relieved of the disease by operation goes about his or her business as well as ever, and disguises, so far as possible, the loss of the organ or the scar of the operation by which life

has been saved. It is difficult to controvert this personal experience of the individual by assertions of the possibilities or probabilities of cure by operation, but it must be done if the public is to understand the actual facts of the cancer problem. Every physician should feel it his duty to make these facts clear to the laymen within his reach. The physician of the present day must do far more than care for the cases of disease that call for his help. He is the health officer of his own clientele, and they look to him for knowledge to protect them from disease. The instruction which has been given to the public is already bearing fruit, and from many communities comes the report that patients now present themselves to their physicians much earlier than in the past with symptoms that they consider suggestive of cancer. Under these circumstances it behooves us to consider, as members of the medical profession, the obligations which rest upon us as the nearest and the first sought source of scientific knowledge, to give to our patients that wise counsel which they have a right to expect.

RESPONSIBILITY OF PHYSICIANS

It is a well known fact that a considerable proportion of malignant tumors are not recognised by the doctor when the patient presents the indefinite early symptoms of the disease. Optimism too often replaces a careful physical examination. The great majority of cancers of the rectum are today treated as hemorrhoids for from one to six months. Uterine discharges are often not properly investigated, and curettings are not examined. Cancer of the tongue and mouth is permitted to advance because there is a positive Wassermann. Metastases are produced by repeated rough examinations. Malignant moles and epitheliomas of the skin are imperfectly removed. Clearly inoperable cases are operated on, thus bringing operation into disrepute.

These conditions call for a far keener appreciation of responsibility for the mortality from cancer than now generally exists in the medical profession. To collect and to make accessible to the physicians of this

country the most fundamental and essential facts about cancer of the different organs and regions of the body is the object of this pamphlet.

STATISTICS

Complete returns of cancer mortality are available only for the registration area of the United States, which, however, includes approximately 70 per cent. of the total population. On the basis of this information it is conservatively estimated that the mortality from cancer in the entire continental United States at the present time (1918) is approximately 90,000 per annum. According to sex, the mortality by principal organs or parts affected, based on the figures for 1914, is as follows:

ESTIMATED ANNUAL MORTALITY FROM CANCER
CONTINENTAL UNITED STATES
1914-1915

Organs or Parts	Males	Females	Total
Buccal cavity	2,725	570	3,295
Stomach and liver	15,787	15,056	30,843
Peritoneum, intestines, rectum	4,544	6,027	10,571
Female generative organs	.....	11,965	11,965
Female breast	.....	7,771	7,771
Skin	1,982	1,098	3,080
Others	7,838	4,637	12,475
All forms	82,876	47,124	80,000

The recorded mortality from cancer in this, as in other countries of the world, is gradually on the increase. The annual increase in the cancer death rate is approximately 2½ per cent. The recorded cancer death rate has practically doubled during the last forty years.

In Ontario during the last ten years the mortality for cancer has increased from 65 to 77 per 100,000 of population while in the same period the tuberculosis mortality has decreased from 102 to 78 per 100,000 of population. In 1920, 2,464 persons died of cancer in Ontario and at the same rate it is estimated that in the last ten years upwards of 20,000 persons have succumbed to this disease. The Board recently investigated the incidence of cancer among the Indians of Canada and

this investigation indicates very clearly that the disease is and has been comparatively rare among the Indian population.

EXPERIMENTAL WORK

During the past ten years commissions and laboratories for cancer investigations have been established in many places in the United States, as well as abroad. In all of these centers research work has been carried on on the tumors of animals as well as on human cancer. All of the resources of chemistry, physics, physiology and biology, and the study of immunity reactions have been brought to bear upon the problem, and the work is still being carried on; but, as yet, the ultimate cause of cancer is not known. Many important facts, however, have been discovered, and by every fact contributed the growing structure of our knowledge of the disease is built up until, for instance, we now know many things that cancer is *not,* and useless expenditure in investigation along these lines has ceased. We know that cancer is not due, in the sense that infectious diseases are due, to a parasite. We know that cancer is not communicated from one person to another, and that there is no danger of the nurse contracting the disease in caring for the cancer patient. We know that the influence of heredity in the incidence of the common forms of cancer in human beings is so remote that the factor of inheritance may, as a rule, be disregarded. We know that one form of cancer after another has been brought in relation to some form of chronic irritation, as a direct or indirect predisposing influence, and that cancer of the cervix, the lip, the tongue, the rectum, the stomach, and many of the forms of malignant disease of the external skin—Marjolin's ulcer, the Kangri cancer of Kashmir, the paraffin worker's cancer, and the roentgen-ray worker's cancer—are all closely associated in the inception with one form or another of chronic and repeated irritation. It has also been shown in the laboratory that rough compression and manipulation of a tumor are fully capable of setting its cells free to form metastases,

and from this we learn to use the utmost gentleness in the palpation of a tumor for diagnosis, as well as to avoid compression, dragging, and all unnecessary trauma to cancer tissue during the operation for its removal. All of these facts we owe to the laboratory investigation of cancer, and we may reasonably hope that the next decade will contribute as much, or more information concerning this disease.

IMPROVED OPERATIVE TECHNIC

In the great surgical clinics the technical details of the operative treatment of cancer of the different organs are constantly under investigation with a view to improvement and to greater effectiveness. For most of the common sites of cancer the operative technic of the so-called radical operation is practically standardized. The site of origin and the mode of dissemination of cancer in the different organs is well known, and each standard operation aims to remove the tissues of origin and the tissues suspected of secondary involvement, by a wide margin and *without cutting into cancer tissue or scattering it broadcast in the wound.* There are problems still to be solved along these lines, especially in the simplification of the operation and in the reduction of the mortality and the possible complications, as in cancer of the tongue or cancer of the uterus. It is possible, however, to give a fair and guarded estimate of the comparative mortality, and of the prospect of success of the operative treatment of cancer in different organs. A successful radical operation results in the cure of cancer. While it is everywhere admitted that no fixed limit of time exists at the expiration of which a individual patient may be said with certainty to be "cured" of the disease, yet it is a fact that the ordinary three-year period is sufficient for all practical purposes. While undoubtedly late recurrence may take place after the three-year period has elapsed in a small number of cases, especially in certain forms of cancer such as cancer of the breast and cancer of the stomach, in the vast majority of cases recurrence comes within this

period, if at all; and the radical operation may be considered practically, if not absolutely, certain of success if no signs of disease have developed within three years.

RADIUM, ROENTGEN RAY AND CAUTERY

Radium and Roentgen Ray.—The effects of roentgen rays and of the radiation of radium, and of other radioactive substances on cancer tissue, have aroused great interest and much experimental and clinical study of their action has been made. In general, it may be said that effects ranging all the way from retardation of growth to actual destruction of tumor tissue can be secured by radiation. Certain forms of cancer tissue appear to show a greater susceptibility to the action of these radiations than the norml tissues of the body; especially is this true in regard to lymphoma, lymphosarcoma, giant-celled sarcoma of bone and mixed tumors of the salivary glands. Cancer of the mucous membranes which is accessible to the direct application of radium radiation can often be destroyed by treatment. When metastatic deposits of cancer are present in the lymph nodes, however, by extension from the point of origin in the mucous membranes, radium cannot be counted on to destroy the disease, and a permanent cure is not to be expected. For these reasons radium is a safe method of treatment only for superficial cancer of the skin of the nonmetastasizing types, or for other forms of surface cancer which have been in existence so short a time that metastasis to the regional lymph nodes cannot possibly have already taken place. This period is at best an indefinite one; but we do know that in certain locations, such as the tongue or lip, early metastasis is the rule, while in other situations this period may be more prolonged. It is for these reasons that the proper treatment of established cancer of the lip, tongue, breast and other organs which are prone to cancer of the early metastasizing type is considered by surgeons to be by radical operation, with removal of the regional lymph nodes. The use of radium for treatment of local lesions of this

nature, unless accompanied by surgical removal of the suspected lymph nodes, is inadequate, and is not justified by our present knowledge of the effects of radium on cancer tissue. For superficial nonmetastasizing cancer, however, and for many superficial skin lesions, such as keratosis senilis, or papillomata, which have a precancerous tendency, treatment by radium is to be preferred to operation. In certain cases of extensive nonmetastasizing cancer, also, the combination of operative treatment and subsequent radiation is a recognized and valuable procedure, and in the treatment of inoperable and incurable cancer roentgen rays and radium offer a field of the greatest usefulness. Under heavy radiation a bleeding, ulcerated, offensive surface can often be cleaned up rapidly, even though the disease continues to infiltrate the tissues and the metastatic deposits increase until the patient dies. There is no question of the symptomatic relief and comfort afforded to the patient by palliative treatment with roentgen rays and radium.

Cautery.—A method of treatment of cancer which has a certain number of advocates is that of cauterization. For small, superficial lesions the actual cautery has long been employed, with some success. When the disease is entirely destroyed the method is satisfactory, although the healing of the wound is prolonged and painful, and the scars produced are far more unsightly than after operation. A special adaptation of the cautery to uterine carcinoma has been advocated in the use of low heat and prolonged treatment. This method is still under trial, and it would be premature at this time to pass on its merits. Other fields, however, are open to the use of the cautery in many forms of cancer: First, its use is strongly urged by a certain number of surgeons as the most effective method to seal the lymphatics immediately after excision of a portion of a tumor for frozen section diagnosis, and, second, the cautery may be employed for the palliative treatment of inoperable, ulcerated and bleeding tumors, often in association with radium or the roentgen rays. For the primary radical treatment

of operable cases of carcinoma of the deeper tissues, however, the use of the cautery must be condemned.

SERUM TREATMENT

There have been innumerable attempts to produce a cure for cancer by drugs or tissue products, instead of by the mechanical destruction or removal of the tissue which is obtained by radioactive agents, cauterization or surgical operation. Not one of these methods has withstood the critical test of time—the serum of supposedly resistant or cured human cases; the serum of animals subjected to innoculations of human cancer tissue; the injection of human cancer emulsions as a vaccine, or of bacterial toxins. Each method has been given fair scientific trial and has been found to be of insufficient value to warrant its continued use.

"CANCER CURES"

Drugs of all kinds have been employed, both for local administration by injection or as caustic pastes, and for more general constitutional effect. In some the active agent is known as creosote; in others the remedy is secret, and the compound is sold at a high price to physicians or to laymen who are sufficiently credulous to purchase. No series of authentic cures of cancer has yet been demonstrated by any of these methods. Finally, the fake "cancer cures," herb and Indian doctors, and Christian scientists, increase enormously the mortality from cancer. It is charitable to suppose that they do this rather from ignorance than by intention, but the result is the same in any case. The patient is encouraged to expect relief, until his money is exhausted and his disease is too far advanced for cure by operation, when he finally drifts to the charity hospitals, where his sufferings can be controlled only by opiates, and he dies a lingering death, offensive as well to himself as to all with whom he comes in contact.

II

EARLY DIAGNOSIS AND TREATMENT

The early diagnosis of cancer is recognized to be the one factor of the greatest importance in the successful control of the disease, and it is well for us to consider all of the conditions on which this early diagnosis depends. Unfortunately, cancer in the different organs and regions of the body presents itself by a variety of different symptoms such that they may be considered not as manifestations of one disease, but rather as of many different diseases. In most situations, however, the dictum holds true that *the more certain the diagnosis the less the probability of cure.* In one organ, as the breast for instance, the earliest symptom of cancer may be either a tumor, discovered by accident, or an indrawing of the nipple or puckering of the skin. In another, as the tongue, the first symptom noted by the patient is an ulceration which shows no tendency to heal. In other portions of the body, like the uterus or the rectum, the first symptom to attract the notice of the patient, or the physician, may be a discharge of blood from an internal ulcerated surface, which is only to be detected by a digital or visual examination. In all of these situations conditions other than cancer may give rise to similar symptoms—in other words, the symptoms of early cancer are not distinctive and serve only to arouse suspicion of the presence of that disease. When the abdominal viscera are affected by cancer the symptoms are still less definite, and the early diagnosis is made even more difficult. In these regions, however, the development of examination by the roentgen ray has given us a means of early diagnosis which is not to be neglected. When symptoms are present, suggestive of cancer but insufficient to make a positive diagnosis, two courses are open to the physician: The first to wait until more distinctive symptoms develop; the second is to proceed at once to an exploratory operation. The first method, that of waiting until a positive diagnosis can be made, is the

one that has been most commonly practiced. It is the easy way, and it is one of the factors most directly responsible for the present enormous mortality of this disease. It is in the hope that this waiting method may be abandoned that this pamphlet is prepared for publication.

EXPLORATORY OPERATIONS

Diagnosis by exploratory operation is the method which promises the greatest and most immediate reduction of the mortality of cancer. The exploratory operation must be adapted to the region or organ affected by the disease, and it must be emphasized that a procedure which is suitable in one situation may be extremely dangerous in another. The desirability of an early exploratory operation, herefore, varies with the situation of the disease.

BIOPSY

The operative removal of tissue for pathological examination (biopsy) is a measure open to discussion. Where a positive diagnosis can be made without this aid, the best and safest treatment is, undoubtedly, to proceed at once to immediate radical operation. To cut into cancer tissue "in situ," undoubtedly adds to the danger of dissemination of the disease. In certain regions, however, the radical operation for cancer involves such great operative risk and such serious mutilation, that it cannot with justice to either patient or physician be advised on anything but a positive diagnosis. In this class fall especially cancer of the larynx, cancer of the tongue and jaw, and spindle cell sarcoma of the long bones. Under these conditions, especially if the tumor is an ulcerated one, the removal of a superficial fragment for immediate frozen section diagnosis is held to be permissible, although no delay should be tolerated, and the radical operation should be completed under the same anesthesia. Many surgeons believe that in such an exploratory operation the wound in the suspected cancer tissue should be immediately

and thoroughly cauterized to prevent the operative implantation of living cancer cells during the subsequent stages of the operation.

The safest procedure to be followed in doubtful or suspected cases of cancer in each organ or situation is discussed in the subsequent sections of this pamphlet. It is sufficient here to urge on the practicing physician the dangers of delay, and the advantages to the patient of an early positive diagnosis.

EARLY OPERATION OFFERS THE BEST PROSPECT OF CURE

It is the well established opinion of the best medical authorities that at the present day early and thorough operative removal of the primary tumor offers the most certain cure for cancer. Other methods of treatment are of value in incurable cases, but to obtain a sure and complete cure of the disease the original focus must be eradicated, together with all of the tissues which are known in each region to be the ones earliest invaded with the beginning of extension of the disease. When the disease can be recognised in its early stages, and this thorough and complete operation promptly performed, the patient should, theoretically, be cured of cancer with almost as great certainty as a cure can be obtained in cases of appendicitis. Twenty years ago the early signs of appendicitis were little known. Cases came late into the hands of the surgeon, and the mortality was enormous in comparison to that of the present day when the public and the physician both recognize the importance of early operation. It is surely not too much to hope that a similar reduction in the mortality of many of the more favorable forms of cancer will take place when the imperative need of early operation for this disease is better understood.

CONDITIONS ESSENTIAL TO EARLY OPERATION

1. *The Patient.*—The first essential in procuring prompt treatment of cancer cases is that the lay public should be educated to understand, as they now under-

stand in the case of appendicitis, the need of early operation, and the importance of the early recognition of the disease. We live in a period of publicity, and medical matters are coming to be recognized as one of the subjects in which greater public knowledge works for the common good. The American Society for the Control of Cancer has done a great deal by circulars, public lectures, and by legislative and state committees, to promote this work. City and state boards of health and individual health officers in special districts have contributed the help of their official position to this work, and the daily press and the magazines have given their assistance in this worthy cause. A better knowledge of the disease is already evident in those districts where this publicity work has been carried on, but much remains to be done, and there are many people who can be reached only with difficulty who must rely for instruction on the only health officer with whom they come in contact—the family physician. It is on him that the duty finally rests to inform, to correct misapprehensions and obsolete ideas, and to teach his people the early and significant symptoms of the disease. Nothing can be accomplished in the individual case until the patient is sufficiently alarmed, by symptoms he has been taught to regard as suspicious, to consult his physician for examination and advice.

2. *The Physician.*—It might well be supposed that as soon as the patient consulted his physician his disease would be recognized and early and adequate treatment at once applied. Unfortunately this is not always the case. Most of the physicians of this country have been taught in their medical schools and their text-books of surgery the distinctive and typical symptoms of cancer, and by the extent to which they are typical they are the symptoms of cancer which is no longer early but has already progressed to the inoperable stage. It is the early and uncertain cases that must be recognized if any material improvement in the mortality is to be brought about.

3. *Examination.*—It would seem unnecessary to lay stress on so elementary a method as actual physical

examination as an aid to diagnosis, were it not for the fact that the neglect of a physical examination by the physician too often robs the patient of his or her chance to obtain a cure. Sometimes the examination is abandoned or delayed in the mistaken object of saving the patient's sensibilities. Sometimes it is neglected because the physician is not alert to the possible grave significance of the patient's symptoms. In any case, it may fairly be said at the present day that the physician *who fails, by a physical examination, to make sure that the symptoms complained of are not due to cancer fails to give his patient the chance of cure to which he is entitled.* Especially is this true in cases of cancer of the breast, of the uterus, and of the rectum, where the early diagnosis depends entirely on physical examination.

4. *Diagnosis.*—If cancer is to be detected in its early stages its earliest symptoms must be well known to the physician, and a large number of doubtful cases must be taken care of where positive symptoms are lacking but a strong suspicion of cancer exists. How are such cases to be handled? On the one hand the physician does not wish to let himself get the reputation of being an alarmist, and drive his patients to unnecessary operations on a mistaken diagnosis. On the other hand, he cannot, for the sake of the patient, wait for the more certain symptoms to develop, and for the disease in the meantime to become incurable. It is the physician's reputation against his patient's life. There can be only one answer—the life of the patient is the only consideration. Under these circumstances the physician deserves the aid and the sympathy of the community. The public must be taught that the physician who is alert to recognize and procure operative treatment in the early stages of the disease will undoubtedly at times cause patients the expense of an unnecessary surgical consultation—an expense that most persons will gladly bear if they can be assured that they are not afflicted with this terrible disease. It is the early cases that offer the difficult problems, and deserve the service of the very best ex-

perience. And, finally, there are very few regions of the body in which, in a doubtful case, with the laboratory facilities of a modern hospital, an exploratory operation cannot be performed to procure an immediate positive diagnosis by frozen section examination of the suspected tissues. The physician who is alive to his responsibilities in the early diagnosis of cancer and who brings his patient to operation during the early and uncertain stages of the disease, renders the greatest service to his community, and deserves that this fact be recognized.

5. *Consent of Patient to Operation.*—Granting that the patient seeks early advice and that the physician recognizes the early symptoms and advises immediate operative treatment, the consent of the patient to this operation must be obtained. In the experience of the older members of the community, and they are the ones concerned in the cancer problem, one after another of their friends and acquaintances has died of cancer, and many of them of recurrence after operation. Is it to be wondered at that they have little faith in the surgical treatment of the disease? They do not know that during the last twenty-five years the operations for cancer of different organs have been standardized, the patients have been operated on earlier, and the number of cures have been materially increased. They do not even know of the cured patients with whom they come in daily contact, for the cured patients do not tell, and the scars of operation are rarely visible. These are some of the facts about the disease which must be established with the laity. Such facts are given in this pamphlet, and may be used with confidence by any physician who wishes a fair statement of the situation.

III

"PRECANCEROUS" CONDITIONS

One factor which during the last ten years has proved to be of great importance in the origin of cancer is the element of chronic irritation. As the various theories of the parastic origin of cancer have been disproved, the element of chronic irritation has been found to become an increasingly important factor in the incidence of cancer, in one region after another. This fact has made it possible to give prophylactic treatment for the purpose of preventing the occurrence of cancer, a procedure which is exactly as rational as the prophylactic use of antitoxins in many of the infectious diseases, and in fact is perhaps a more effective life-saving measure. This prophylactic treatment consists of the removal by a minor operation, often under local anesthesia, of lesions such as keratoses, moles, fissures, chronic ulcerations and indurations, and the benign tumors, which so often precede the development of cancer itself. This prophylaxis further demands the avoidance of sources of chronic irritation, such as, for instance, the removal of an ill-fitting tooth plate which causes irritation of the gum, or the repair, at as early a date as possible, of the deeper lacerations of the cervix which occur at childbirth.

The more important lesions which may be regarded as of precancerous significance may be summarized as follows:

1. *Pigmented moles* have long been recognized to be the starting point of that most fatal form of malignant disease, the so-called melanotic sarcoma.[1] Not all moles, of course, undergo that transformation, but all must be held to contain that inherent possibility of development, and on the slightest sign of increase in size, irritation or induration, they should be widely

1. Melanotic sarcoma is believed by some good authorities to be in reality a form of epithelial tumor—i. e., carcinoma.

removed by radical operation. Pigmented moles on the hands and feet are especially liable to repeated trauma, and thus to malignant change.

2. The *senile keratoses,* or scaling patches of heaped up squamous epithelium, so common on the face and exposed parts of the body of those of advancing years, are among the most common starting points for cancer of the skin.

3. *Chronic ulcers and fissures of the skin* due to old burns and scars, the effects of the roentgen rays and radium, tuberculosis of the skin, and old syphilitic lesions often cause cancer. To this category belongs the "Kangri" cancer of Kashmir (squamous cell carcinoma of the abdominal wall), occurring at the site of chronic ulceration due to burning from the Kangri basket, or hot stove carried against the abdominal skin within the clothing of the natives.

4. *Gallstones* are accompanied by chronic irritation of the gallbladder, and in certain percentage of cases carcinoma of the gallbladder occurs.

5. A certain proportion of *ulcers of the stomach* are known to become the site of cancer of that organ, and a history which can be interpreted as evidence of previous ulcer is obtainable in certain cases of gastric cancer.

6. *Erosions and lacerations of the cervix* of the uterus, the almost inevitable result of childbirth, are the most common factors predisposing to cancer of the cervix. While it is customary for the physician to repair immediately the more serious lacerations of the cervix, less extensive lesions can be detected only at a later period after involution has occurred. The routine examination of all women for cervical lesions three months after labor has been advocated, that these lesions may be immediately repaired, and the predisposition to cancer avoided. It is advisable that all women who have borne children, as they approach the menopause, should have a vaginal examination and an inspection of the cervix at reasonable intervals until the menopause is well established, and the normal

atrophic changes have taken place. Deep lacerations should be repaired, and superficial lesions, if resistant to local treatment are sufficient indication for amputation of the cervix. The hyperplastic endometritis which accompanies fibromyoma of the uterus is also believed to be one of the most important predisposing causes of cancer of the fundus.

7. *Cystitis* of one form or another often precedes cancer of the bladder, and the irritation of Bilharzia parasites or of specific chemical irritants, such as anilin, are recognized as producing changes in the bladder mucosa which may go on to carcinoma.

8. Carcinoma of the buccal mucous membranes—the lip, tongue, cheek and jaw—have long been associated with one or another source of *chronic irritation*. In this country the most common source of chronic irritation of the buccal mucous membranes is the use of tobacco. It is significant, also, that in other countries, as the orient, cancer of the buccal mucous membranes appears to arise most directly as the consequences of the chewing of other irritants, such as the buyo leaf or the betel nut. Syphilis is also a recognized predisposing factor to cancer of the mouth, and the chronic hyperplastic condition of the buccal mucous membrane —leukoplakia— has repeatedly been observed to progress into carcinoma while under treatment. The irritation of ill-fitting tooth plates, or the chronic irritation of pyorrhea alveolaris occasionally can be recognized as forerunners of cancer of the alveolar processes.

9. *Kraurosis and leukoplakia of the vulvae* are forms of superficial lesions, benign in origin, which exhibit a definite tendency to subsequent malignant change. Suitable treatment and close and continued observation to detect the early signs of the development of cancer must not be neglected, in order that radical operative treatment may be instituted during the early stages when the disease can thus be cured.

10. *Involution changes* of a physiologic nature appear to predispose to cancer in certain organs, notably the female breast, and the male prostate. In

the breast the involution phenomena which give rise to the condition commonly known as chronic cystic mastitis show an incidence of carcinoma estimated at from 10 to 25 per cent., while in the prostrate chronic prostatitis and hypertrophy precede the symptoms of carcinoma in a notable proportion of all cases.

11. *Many tumors which are essentially benign* in character have been shown to be capable of malignant transformation, especially in the later years of life. These include papillomas, adenomas of the thyroid and of the intestines, villous tumors of the bladder, papillary and cystic tumors of the ovary and of the breast, polyps of the uterus or the rectum, and, in fact, all tumors in which the epithelial elements are in preponderance.

In all of the foregoing conditions the possibility, if not the probability, of cancerous transformation has been shown to be a serious element in prognosis. There can be no question that the cure or the removal of all such lesions is a vital indication. Removal of the predisposing causes of cancer, and the early recognition of cancer, when it is present, are the two measures which give promise at the present time of yielding the greatest results in reducing the mortality of the disease.

IV

CARCINOMA OF DIFFERENT ORGANS

1. CARCINOMA OF THE EXTERNAL SKIN

This is a common form of cancer found chiefly among persons of advanced age, and on the exposed parts of the body, especially in those who have long followed outdoor occupations. It is slow growing, usually only locally invasive and malignant, and rarely produces remote metastases. There are two main types: (1) those arising from the differentiated squamous cells, and (2) those originating from the less differentiated basal cells of the epithelium and reproducing themselves in the form of gland ducts or hair matrix cells. The squamous cell type is more likely to show extension to the lymphatic glands in the neighborhood, but not, as a rule, until late in the course of the disease. Carcinoma of the external skin is especially liable to occur as a secondary change in pre-existing fissures, keratoses, and chronic ulcerations and indurations.

Symptoms.—The development of a tumor involving the skin, or of a chronic ulceration covered with a crust and presenting an indurated base and periphery, is suggestive of carcinoma and demands investigation. Especially is this true when the lesion has been traumatized or subjected to chronic irritation.

Differential Diagnosis.—Differential diagnosis requires that syphilis, tuberculosis, and some of the rarer forms of skin disease be considered. In doubtful cases the operative excision of the whole lesion, with a wide margin, and the pathologic investigation of the tissue, is the safest course.

Precancerous Lesions.—Warts, keratoses and chronic ulcers, when possible, should be excised or destroyed before they have an opportunity to undergo secondary malignant changes and become cancer. This can usually be done by a very minor operation, often with

local anesthesia. Many of the more superficial lesions of this nature can safely be eradicated by radium, roentgen ray or even caustic applications, but the clean surgical excision is undoubtedly the safest method.

Standard Operative Treatment.—The standard operative treatment is total excision, with a considerable margin of healthy tissue. Where extension to neighboring lymphatic nodes is thought to have occurred, dissection of the affected territory with removal of the diseased nodes and those immediately beyond them, in one mass, should be performed. Superficial carcinoma of the face, especially in the region of the eyelids, may be subjected to treatment with roentgen rays or radium, in order that deforming scars may be avoided. While less certain than operation, treatment by radiation in suitable cases offers the prospect of a soft and less conspicuous scar, and the same may be said in regard to the treatment of very superficial lesions with the curet and caustic agents, but any application of such methods, especially freezing or electrolysis which does not insure the destruction of every malignant cell is to be condemned.

Results.—Statistics are difficult to obtain on cases of this character. On account of the relative infrequency or retardation of metastatic extension, cure by early complete excision should be obtainable in every case of non-metastasizing carcinoma of the skin. It is a fact, however, that an incomplete excision is often done in the effort to remove no more tissue than absolutely needed, whereas a wide margin is essential to a successful operation. In the few cases which do produce metastases the block dissection of the regional lymph nodes, together with the operative excision of the tumor should yield a very large percentage of cures in early cases.

2. CARCINOMA OF THE LIP

This is one of the more common forms of squamous cell cancer, especially in men and has been attributed to chronic irritation such as the use of tobacco in any

form, but especially in pipe smoking. It produces metastases in submental or submaxillary lymph nodes, after a brief period estimated at two or three months, but less early than in carcinoma of the tongue and jaw.

Symptoms.—Carcinoma of the lip occurs as an indurated chronic ulcer or non-ulcerated thickening on the free border of the lip; it rarely appears as a warty growth.

Differential Diagnosis.—Primary syphilis (chancre) is rare. Syphilitic fissures are more common, and may accompany cancer. A positive Wassermann does not prove that cancer is *not* present, and delay for a therapeutic test is not advisable.

Precancerous Lesions.—Chronic ulcers and scabs (keratoses) are to be regarded as precancerous conditions, and should be removed by excision, or in suitable cases by the use of radium. In doubtful cases operative removal is to be preferred in order that a pathologic examination of the tissue may be made, and the radical dissection of the regional nodes performed if a frankly malignant tumor is disclosed.

Standard Operative Treatment.—(1) Doubtful cases: Excise with a generous margin, and if the microscope shows carcinoma follow immediately with dissection and removal of the lymph nodes of the submental region and of the submaxillary region on the affected side. If the tumor is near the middle line, both submaxillary regions should be dissected. The whole of the submaxillary salivary gland must be removed. (2) If diagnosis is certain, excision by broad margin and dissection of lymph nodes, as above is indicated.

Results.—Cancer of the lip recognized and operated upon in its early stages at the time when the lymph nodes are not yet involved yields a high percentage of radical cures of the disease. The more extensive the glandular involvement, the less the prospect of success with operative treatment. Many cases are allowed to become inoperable by neglect of the regional neck dissection at the primary operation.

3. CARCINOMA OF THE TONGUE, MOUTH AND JAW

These growths are not rare, and are one of the most malignant of the accessible forms of carcinoma. They are of the squamous cell type, producing early metastases to the submental, submaxillary, parotid, and carotid nodes, and spreading rapidly by local invasion into the adjacent tissues of the floor of the mouth and across to the other side of the tongue, mouth and neck. The influence of tobacco as a form of chronic irritation is held to be of serious importance in the origin of cancer in this locality.

Symptoms.—This type of carcinoma begins as an indurated ulcer or thickening of the mucous membrane of the tongue or mouth, or on the alveolar border of the gum. Any such ulcer of two weeks duration should be regarded with suspicion.

Differential Diagnosis.—Chronic inflammatory conditions, such as ulcers due to jagged teeth, ill-fitting tooth-plates, pyorrhea, etc., may be predisposing causes. Late syphilis is often followed by carcinoma and a positive Wassermann test does not exclude carcinoma. Leukoplakia, or superficial milky glossitis, is also a predisposing cause. Tuberculosis has typical punched out and undermined ulcer, and is generally secondary to other tuberculosis. Actinomycosis of the jaw is rare; it is suppurative, and does not extend to the lymph nodes.

Precancerous Lesions.—To avoid delay, doubtful cases are best handled by excision of the whole lesion for microscopic diagnosis with cauterization to seal the lymphatics. In operable cases avoid removal of a single lymph node from the neck for diagnosis, as such an incomplete operation almost invariably leads to local implantation if cancer is present in the node.

Standard Operative Treatment.—Standard operative treatment demands removal of practically the whole tongue, together with the floor of the mouth, and block dissection of all lymphatic tissues of one or both sides of the neck, usually including the jugular vein and the greater part of the sternomastoid—a very

serious operation. If the jaw is divided, or removed, as is necessary in many cases, the mortality is estimated to be 25 to 30 per cent., owing to pneumonia or mediastinal sepsis. The operation can be done in two stages (Whitehead, Crile) with less mortality and slightly less prospect of cure on account of the danger of local implantation.

Results.—Only moderately good results are claimed for operation in the larger clinics. In cases that are recognized early and where the patient's constitution is such as to withstand the severe operation, a higher probability of cure may be expected, but in advanced cases the chances of cure by operation become extremely slight.

4. CARCINOMA OF THE LARYNX

This is not an unusual form of carcinoma affecting males more than females, generally in the later decades of life. Carcinoma of the larynx occurs especially in two regions: (*a*) in the region of the vocal cords, and (*b*) in the upper part of the larynx.

Symptoms.—Hoarseness and loss of voice are the characteristic symptoms; later dysphagia and pain may appear, and when persisting beyond a reasonable length of time demand investigation with the laryngoscope. The growth may assume one of several forms, sometimes as a localized hyperemia, sometimes as a distinct growth, and sometimes as a deep-seated infiltration, later becoming ulcerated, and surrounded by hyperemia and edema. Extension to the regional lymph nodes generally occurs late in tumors of the larynx, later when the tumor is in the region of the vocal cords than when in the upper parts.

Differential Diagnosis.—Carcinoma of the larynx must be differentiated from benign tumors (pupilloma, fibroma, etc.) of the larynx, and from syphilitic, tuberculous and other ulcerations. Removal of tissue for pathologic examination (biopsy) should seldom be practised, unless immediately followed by the radical operation. It should be avoided if the diagnosis can be made with reasonable certainty.

Standard Operative Treatment.—Thyrotomy with removal of the disease and of all adjacent tissues has given successful results in early cases, especially in cancer of the vocal cords. As a rule total laryngectomy with wide dissection of the regional nodes is the operation of choice. The operative mortality is considerable, due to infection of the air passages, and the mutilation is often serious, but is preferable to the otherwise certain fatal issue. Palliative tracheotomy and gastrotomy may be done, and radium and roentgen ray may prolong life and relieve pain for a limited period. The application of radium before and after the removal of the larynx has given good results.

Results.—Early partial, and later total operations have yielded many successful results, but the prognosis in any but early cases is very grave.

5. CARCINOMA OF THE THYROID

This is one of the less common forms of cancer, but is liable to occur especially as a late change in thyroid tumors of long duration which have previously been considered to be benign in character. Several types are recognized. The tendency to promote metastases in the lung, and especially in the long bones and skull is to be borne in mind, even in tumors in which the histologic picture shows only adenomatous tissue (malignant adenoma).

Symptoms.—An irregular nodular tumor of the thyroid, showing early fixation by adherence to surlaryngeal nerve, and extension to regional jugular lymph nodes.

Differential Diagnosis.—Typical cases are recognized only by symptoms of irregular induration, fixation, nerve involvement, dysphagia and dyspnea, which indicate an incurable condition. Early cases are recognized only as tumors of the thyroid of unknown nature, but are sufficient indication, after the age of 35, to demand radical operative treatment.

Precancerous Lesions.—Any rapidly growing thyroid tumor in an individual of 35 or over should be looked on with suspicion.

Standard Operative Treatment.—The standard treatment for carcinoma of the thyroid is radical thyreidectomy to the extent of total removal of the whole gland, and of the adjacent lymph bearing tissues on both sides of the neck. Thyroid extract may be administered to prevent myxedema, and parathyroidin has been recommended to prevent tetany for removal of the parathyroids.

Results.—Favorable results are obtained only in early cases before the capsule is invaded, and while the diagnosis is most uncertain. Prophylactic treatment by removal of benign tumors is the most effective measure.

6. CARCINOMA OF THE ESOPHAGUS.

This is a squamous cell and metastasizing carcinoma. It is rare and possibly related to chronic irritation. There are an equal number of cases among males and females.

Symptoms.—The first symptoms are usually dysphagia followed by progressive extension to the local lymphatics in the neck or mediastinum, local invasion of the trachea, or perforation into the pleura. The patient suffers gradual starvation.

Differential Diagnosis.—This type of carcinoma must be differentiated from benign strictures and pouches by esophagoscopy, bougies, and roentgen rays.

Doubtful Cases.—These must be diagnosed by esophagoscopy.

Standard Operative Treatment.—Radical operation is still in the experimental stage. Palliative operations —gastrostomy, jejunostomy—may be performed, or radium applications may be used.

Results.—These cases are practically always fatal.

7. CARCINOMA OF THE STOMACH

Carcinoma of the stomach is one of the most common manifestations of the disease. It is the most common form of cancer in males, and is only exceeded in frequency in females by cancer of the uterus and of the breast.

Symptoms.—The symptoms of cancer of the stomach are insidious. The patient appreciates only a progressive disturbance of gastric distress, with loss of weight, and increasing gastric distress. These symptoms sometimes follow the symptoms of long standing gastric ulcer—pain, hyperacidity, and the appearance of blood in the vomits or in the stools.

Differential Diagnosis.—The differential diagnosis of any but advanced cases can be made only with the aid of the laboratory analysis of the gastric contents, and the use of the roentgen ray.

Standard Operative Treatment.—The standard operative treatment of cancer of the stomach is by excision of the affected portion of the stomach with the adjacent lymph nodes. Only a small proportion of the cases submitted to operation are sufficiently early to permit an attempt at radical cure.

Results.—By a judicious selection of cases suitable for radical treatment, the operative mortality has been much reduced. In cases which are thus favorable for operation, cure of the disease is claimed in a large percentage in certain clinics. In general practice however, the figures are very much lower, and where the disease has developed to the extent of producing characteristic symptoms the outlook is distinctly unfavorable.

8. CARCINOMA OF THE COLON

This is one of the common forms of cancer in elderly persons.

Symptoms.—The symptoms are insidious—vague intestinal indigestion and discomfort and loss of weight in the early stages. The symptoms become more pronounced as the tumor produces intestinal obstruction, with distension, colicky pains, and blood in the stools. As a last stage the intestinal obstruction, which was chronic and partial in the beginning, may become complete and thus acute, with fecal vomiting, distension and severe toxemia.

Differential Diagnosis.—This requires that the causes of benign obstruction—scars, ulcers, the pressure of benign tumors outside of the intestine, inflammatory conditions, diverticulitis or appendicitis and the various forms of acute intestinal obstruction should be eliminated. This can be done only by exploratory operation. The use of roentgen rays is of assistance in the more chronic cases, and the examination with the proctoscope is of value in the upper rectum and sigmoid cases.

Doubtful Cases.—An exploratory laparotomy with an intestinal anastomosis or a colostomy, followed later by removal of the affected bowel, is the procedure to be advised.

Standard Operative Treatment.—The standard operative technic consists of removal, by a wide margin, of the affected bowel and its adjacent lymph nodes. If the disease is already in the liver radical cure is not to be attempted. In advanced cases palliative treatment by anastomosis is of great relief to the patient.

Results.—On account of the difficulty of early diagnosis, few cases are suitable for an attempt at radical cure. As patients present themselves at a general hospital the prospect of cure is distinctly unfavorable, although successful cases are obtained from time to time.

9. CARCINOMA OF THE PANCREAS, GALLBLADDER AND LIVER

(*a*) *Pancreas.*—Carcinoma of the pancreas is rare.

Symptoms.—These are chronic, progressive, painless jaundice, accompanied by loss of weight, disturbance of digestion, and fatty stools. The gallbladder is usually distended.

Differential Diagnosis.—Eliminate other causes of obstruction of the common gallduct, such as that due to a gallstone, or lymph nodes (lymphoma), or cancer in the region of the common duct and chronic pancreatitis.

Doubtful Cases.—Exploratory operation is indicated, but radical cure of cancer of the pancreas has not been accomplished.

Standard Operative Treatment.—Palliative operations by establishing an anastomosis between the gallbladder and the duodenum, or small or large intestine, give temporary relief to one of the most distressing symptoms—jaundice.

Results.—Patients may be relieved of distressing symptoms by palliative operations, but radical cure of the disease has not been claimed.

(*b*) *Gallbladder.*—Carcinoma of the gallbladder is rare.

Symptoms.—The symptoms are indefinite. There is usually a history of gallstone attacks of long duration.

Differential Diagnosis.—The differential diagnosis is between cancer of the liver or stomach and gallstone disease. This is rarely accomplished except by operation.

Doubtful Cases.—It is a well established fact that cancer of the gallbladder is to be feared in cases of long standing gallstone disease. For that reason in cases of gallstones, removal of the gallbladder is becoming the operation of choice.

Standard Operative Treatment.—When cancer of the gallbladder is evident, and its extension to the liver has not occurred, removal of the gallbladder is the standard operation.

Results.— A certain number of cases of cure of cancer of the gallbladder have been reported. The disease extends very rapidly, however, to the liver, and when this has occurred a cure is not to be expected,

(*c*) *Liver.*—Cancer of the liver is very common as a secondary manifestation of cancer anywhere in the intestinal tract, and in some cases of cancer of other organs, such as the breast or prostate, melanotic sarcoma and other forms of sarcoma. Primary cancer of the liver is extremely rare and so are other primary malignant tumors of the liver, such as hypernephroma.

Differential Diagnosis.—This depends, as a rule, on recognition of a possible primary focus of cancer elsewhere.

Standard Operative Treatment.—There is no operative treatment.

10. CARCINOMA OF THE RECTUM

This is a common form of cancer and especially one which is prone to occur not only in those of cancer age but in younger persons also.

Symptoms.—Tenesmus, bloody stools, loss of weight, and finally intestinal obstruction are symptoms of carcinoma of the rectum.

Differential Diagnosis.—Syphilis, tuberculosis and extensive chronic inflammatory processes with fistulae, must be considered. Digital and proctoscopic examination is *imperative.*

Doubtful Cases.—Benign polyps of the rectum and chronic inflammatory conditions must be regarded as predisposing to cancer of the rectum and should receive appropriate treatment. Many cases of cancer of the rectum are not recognized in their early stages because the physician neglects to insist on a digital or proctoscopic examination. Excision of fragments of tumor tissue for pathologic examination is in general to be condemned, but may occasionally be necessary for diagnosis and should be made at the time of operation.

Standard Operative Treatment.—This consists in the removal of the whole rectum and the pelvic lymphatic tissue on account of the disposition of the disease to spread in the coats of the intestine as well as to the lymph nodes. This is usually done by a two-stage operation—a primary colostomy, with examination of the liver and of the pelvic lymph nodes; and the secondary removal of the tumor and a wide margin of the adjacent rectum by the Kraske incision or by the combined abdominoperineal route.

Results.—In early cases successful results from radical operation may be expected. There is an inevitable

operative risk on account of the severity of the operation but when the constitutional condition is good and the disease has not had time to become too far advanced a reasonable percentage of cases should be successful.

11. CARCINOMA OF THE BLADDER AND PROSTATE.

(*a*) *Bladder.*—This is one of the rarer forms of cancer. It occurs in males and females. It often develops in the base of a supposedly benign papilloma.

Symptoms.—Frequency of micturition, bloody urine and tenesmus are symptoms of this condition.

Differential Diagnosis.—This is made by cystoscope. Tuberculosis, calculus bilharzia, and blood from renal tumors and calculi must be excluded.

Doubtful Cases.—The precancerous conditions are chiefly benign tumors and calculi.

Standard Operative Treatment.—Transperitoneal operation with removal of the affected portion of the bladder is the standard operation for radical cure. Where this is not possible, intravesical operations with the use of the cautery, radium or fulguration may be attempted.

Results.—A considerable number of successful cases of transperitoneal operation have been recorded. The use of radium or other cauterizing agents, however, can at present be considered only as palliative measures, although there is reason to hope that better results may ultimately be obtained with radium.

(*b*) *Prostate.*—Cancer of the prostate is one of the rarer forms of cancer.

Symptoms.—These are not materially different from those of prostatic hypertrophy—i. e., frequency of micturition, loss of power of stream, increasing to retention of urine, blood in the urine, tenesmus.

Differential Diagnosis.—This depends on the stony hard and irregularly nodular feel of the prostate on rectal examination. Positive diagnosis can only be made by microscopic examination of excised prostate.

Doubtful Cases.—These should be treated by prostatectomy. Only early cases can be cured by operation. In advanced cases radium may give some relief to symptoms.

Standard Operative Treatment.—The established operation is prostatectomy—suprapubic or perineal.

Results.—The radical cure of cancer of the prostate by operation is virtually confined to cases of prostatic hypertrophy in which prostatectomy has been done, and the early changes of carcinoma have been discovered only by the pathologic examination of the tissue. In certain clinics the treatment of cancer of the prostate by radium is claimed to have yielded more satisfactory results.

12. CARCINOMA OF THE UTERUS

This is the commonest form of cancer in the female. There are two varieties: (*a*) carcinoma of the cervix (*b*) carcinoma of the body.

(*a*) *Carcinoma of the cervix.*—This is the squamous cell type of carcinoma. It almost always occurs in women who have borne children, and especially if the cervix has been lacerated and the lacerations have been neglected or have become eroded, or subject to constant irritation.

Symptoms.—Earliest symptom is a bloody discharge not related to catamenia, or appearing after the menopause; any change in the character of the discharge, especially if it becomes more profuse, more foul, or more irritating; or if it appears irregularly after exertion, straining at stool, the use of a douche or after intercourse indicates carcinoma of the cervix. The appearance of a discharge even though not bloody in character, after a period of freedom from discharge, should be regarded as a suspicious symptom. An examination shows an indurated excoriation or ulceration of the cervix which may be within the os. Later there may be deep infiltration or a productive cauliflower growth, with ulceration, bleeding and offensive discharge. It extends early to tissues of broad liga-

ments and vaginal wall by direct extension, and to pelvic lymph nodes.

Differential Diagnosis.—The early diagnosis of cancer of the uterus demands an early digital and visual examination. Too often the disinclination of the patient and the indifference of the physician combine to postpone this examination until too late for cure of the disease. Early cases can be distinguished from nonmalignant ulcerations and lacerations only by microscopic examination.

Doubtful Cases.—Lacerations due to childbirth form the precancerous condition. For this reason all lacerations should be excised and repaired as prophylaxis, at least as soon as the probability of further childbearing is over. Some surgeons advocate the high amputation of the cervix in suspected cases, while others go so far as to advise an immediate hysterectomy, without the preliminary removal of tissue for pathologic confirmation of the diagnosis.

Standard Operative Treatment.—For established carcinoma of the cervix of the uterus the standard operation is total hysterectomy with the removal of the pelvic areolar tissues and lymph nodes. This is a very serious operation, and the results, except in very early cases, have been rather unsatisfactory. On this account efforts have been made in many clinics to combine the use of radium with a subsequent radical operation. Time has not elapsed at this present writing to permit a final judgment of the value of this combined method of treatment. For inoperable cases, however, treatment with radium gives most satisfactory palliative results, and in a few instances apparent freedom from disease has been obtained. The actual cautery is also employed in the treatment of inoperable cases, as well as caustic applications. Such measures, however, are only palliative.

Results.—In advanced cases the results of radical operation for cancer of the cervix are very unsatisfactory. In early cases a reasonable percentage of cures have been reported. The disease when established is

one of the most unsatisfactory forms of cancer for operative treatment, and the mortality of the radical operation is a serious consideration.

(*b*) *Carcinoma of the body of the Uterus.*—Adenocarcinoma is much rarer than that of the cervix, and more insidious.

Symptoms.—These are discharge of blood or bloody serum independent of catamenia, or after menopause and enlargement of the uterus.

Differential diagnosis.—Conditions to be considered in the different diagnosis are hyperplastic endometritis, polyps, cervical carcinoma, chorio-epithelioma. It may occur in cases of fibromyoma. Diagnosis is ordinarily determined by curettage and examination of tissue, although many surgeons believe it safer to avoid the chance of setting free cancer cells in the blood and lymph vessels by curettage, and to proceed at once to a total hysterectomy.

Doubtful Cases.—These are especially fibromyomas and hypertrophic and other forms of endometritis.

Standard Operative Treatment.—Panhysterectomy with removal of both ovaries and tubes, and the pelvic areolar tissue and neighboring lymph nodes is the standard operative treatment.

Results.—Prognosis for cure in cancer of the fundus of the uterus is better than that in cancer of the cervix. If the disease can be recognized before general extension to the peritoneum has taken place the radical operation is usually curative, and the symptom on hemmorrhage makes this early recognition a possibility. A routine examination of all curettings occasionally reveals an unexpected carcinoma.

13. CARCINOMA OF THE OVARY

This condition is not very rare. It occurs as a secondary manifestation of otherwise nonmalignant cysts, and cystadenomas of ovarian and parovarian origin, and as a remote metastatic implantation from carcinoma of other organs.

Symptoms.—These are abdominal swelling and feeling of weight. They are rarely rapid in onset.

Differential Diagnosis.—Early carcinoma of the ovary can be diagnosed only by operation on the supposed benign cyst; late carcinoma, after peritoneal involvement, by bloody ascites and ovarian tumor, or exploration.

Doubtful Cases.—Exploratory laparotomy should be employed. Precancerous condition is the benign ovarian cyst. All benign ovarian tumors should, if possible, be removed unbroken as papillary intracystic growths already may be present.

Standard Operative Treatment.—Ovariotomy should be done with great care to avoid rupture of cyst and dissemination of contents. Both ovaries should be removed.

Results.—Radical cure of carcinoma of the ovary when the cyst is unruptured and when the total removal of both ovaries can be performed, is very probable. It is the diagnosis of the condition which is difficult.

(Note: Some cases of ovarian carcinoma of papillary type are of a low degree of malignancy, and even after laparotomy has disclosed a widespread peritoneal implantation they may advance very slowly. Under radium and roentgen-ray treatment the progress of the disease may be much retarded.)

14. CARCINOMA OF THE BREAST

This condition is common in the female; rare in the male.

Symptoms.—The earliest symptoms are those of a tumor which is usually painless. The nipple may be drawn in, or the skin may early show loss of mobility over the tumor, or a definite adherence to it. This is usually the earliest distinctive symptom. Later the tumor enlarges, the axillary nodes show involvement, extending to the subclavicular, the supraclavicular and the mediastinal glands. Rarely the enlargement of the axillary nodes is the first noticeable symptom of the

disease. The tumor becomes adherent to the muscles of the chest wall, and may pass by direct extension to the ribs, sternum, mediastinum, or pleural cavity, or to the other breast. Ulceration may finally occur, or the disease may extend to the liver, spine, cranial cavity, or the long bones, such as the femur and the humerus. The "brawny arm" of breast cancer is a familiar late symptom, due to the blocking of the veins and lymph vessels by the axillary growth.

Differential Diagnosis.—Conditions to be considered are benign tumors of the breast—adenofibroma, papillary cystadenoma, and other rare tumors—cystic disease of the breast, and chronic inflammatory processes, such as syphilis, tuberculosis, or chronic abscess following lactation. The most significant facts in the diagnosis of cancer are the absence of pain, and the early adherence of the skin to the tumor. *A lump in the breast of any woman, particularly if over the age of 35 years, must be suspected to be cancer until pathological proof of some other disease is obtained.*

Precancerous Conditions.—As age advances practically every one of the supposedly benign tumors and diseases of the breast shows an increasing predisposition to malignant disease. Especially is this true of chronic cystic growths, such as papillary cystadenoma. Even the adenofibromas of adolescence occasionally show subsequent malignant characteristics, either as carcinoma or sarcoma. In any case benign breast tumors and diseases are best removed by operation if the patient is over 30 years of age.

Doubtful Cases.—Cutting into normal tissue to remove a suspicious nodule in the breast, and closing the wound to wait a week or ten days for a microscopic report, has been found to spread the disease and to make cure improbable by subsequent radical operation, if cancer is found to be present. For this reason the handling of doubtful cases is very difficult in diseases of the breast. Two plans of procedure can be recommended in doubtful cases: (*a*) Incision may be made directly into the tumor, with removal of tissue for frozen section diagnosis, if necessary, to be fol-

lowed *immediately* by cauterization of the wound, and by the performance of the complete operation if cancer is discovered. This method of procedure is applicable only where a sufficient knowledge of gross pathology, or the facilities for an immediate frozen section diagnosis are available, and it is recommended then only in cases where, from the clinical symptoms, the probabilities are against rather than in favor of the diagnosis of cancer, as in the case of women under 30 years of age. (*b*) In women of more advanced years, where the symptoms are suggestive of cancer, the safest procedure is to perform the radical operation at once without incision into cancer tissue. In some very small, and presumably very early cases, an amputation of the breast and dissection of the axilla, without removal of the pectoral muscles, may be permissable, but the complete operation will be found the safest method.

Stardard Operative Treatment.—The standard "complete" operation for cancer of the breast demands the removal *in one piece* of the whole breast, with the skin over it, the pectoralis major and minor, and the axillary contents, with the exception of the axillary artery and vein, and the brachial plexus. Some surgeons advise the supraclavicular dissection also. The incisions for this operation vary, and the defect to be closed is always large. If the skin cannot be brought together by plastic flaps a Thiersch graft may be necessary.

Results.—In favorable cases, with early operation, a considerable percentage of cures may be expected. The average case that comes to a general hospital, however, has only a moderate chance of cure.

15. CARCINOMA OF THE PENIS

This condition is rare. It is associated with chronic irritation, such as venereal warts or phimosis.

Symptoms.—These are papillary or ulcerated indurated tumor, and early extension to the lymph nodes of either groin, or both.

Standard Operative Treatment.—The standard operative treatment is amputation of the penis, and dissection of both groins. Prophylaxis, circumcision, cleanliness and treatment of venereal warts and sores should be employed.

Results.—Early radical and complete operation gives good prospects for radical cure.

16. CARCINOMA OF THE VULVA

This is the squamous cell type of carcinoma. It is rare and almost entirely limited to women beyond the menopause.

Symptoms.—These are pronounced itching, often for several years, before the ulcer appears, moderate bloody discharge, in some instances pain on urination, early glandular involvement of inguinal and femoral lymphatics.

Precancerous Conditions.—These are "kraurosis" or leukoplakia of the vulva. Treatment of these conditions by radiation may be advisable.

Differential Diagnosis.—Syphilitic ulceration, chancroid, erosions from prolapse, and polyp of urethra are to be considered.

Standard Operative Treatment.—Radical operation with removal of vulva, together with all of the deep and superficial inguinal and femoral lymph glands on both sides is the standard operative treatment.

Results.—Only with early and radical operation is the prognosis even moderately good.

V

SARCOMA

Sarcoma is a malignant tumor of connective tissue origin. Various types of rapidly growing connective tissue cells may occur, such as large and small round cells, spindle cells, giant cells, pigment cells, cells of the mucoid type found in the umbilical cord, lymphoid cells, and mixtures of all of these different types. Sarcoma may arise primarily in any tissue of mesenchymal origin, but in general the subcutaneous and submucous tissues, the fasciae, the bones and lymph nodes, are the more common points of origin. Sarcoma attacks persons at all times of life, from infancy to old age. It grows, as a rule, with great rapidity, as it is abundantly supplied with blood vessels. It infiltrates surrounding tissues, and through the blood vessels more than through the lymphatics, spreads to distant parts. So far as known there are no presarcomatous conditions, although trauma is believed by many writers to have significance in the etiology of bone sarcoma. We do not know what causes sarcoma, and we can do nothing to prevent its origin.

1. SARCOMA OF THE BONE

There are two main varieties: (*a*) spindle.cell, or periosteal sarcoma; (*b*) giant cell, or other medullary sarcoma.

(*a*) Spindle cell or periosteal sarcoma is a tumor of extreme malignancy. Its onset is insidious; its growth is rapid. Obscure pain or impaired function of a limb is followed by the development of a swelling of the bone. Rarely a spontaneous fracture is the first definite symptom. Extension to the viscera, the lungs, the liver and other organs may take place at any time. The diagnosis depends on the roentgen ray picture, which is practically unmistakeable. Treatment is by early and most radical operation—amputation. The results are very discouraging, on account of internal

metastases. Treatment of inoperable or recurrent cases by radium or roentgen ray yield very unsatisfactory results.

(*b*) Medullary sarcoma arises in the bonemarrow, and produces a distension and thinning of the cortex of the bone such that spontaneous fracture is very common. The onset is insidious and symptoms vague. A roentgen ray is suggestive, but not always to be relied on with certainty to exclude bone cysts and other benign lesions. The tumor often contains giant cells as well as large and small round cells, and its malignancy is much less than the periosteal type. Extension is not so rapid and internal metastases are not so often found. Local excision, and even incision and curettage have been sufficient to cure in certain cases. Amputation may be necessary, however, on account of the extent of the tumor, and the impossibility of saving the vessels and nerves to the distal part. The prognosis is much better than with periosteal sarcoma, although internal metastases occur in rare cases. Treatment by radium and roentgen ray gives promise of benefit in certain cases of medullary sarcoma.

2. FASCIAL SARCOMA

Fascial sarcoma is, as a rule, of the spindle cell type, yet its malignancy is much less than the spindle cell sarcoma of periosteal origin. It appears as a hard, well defined tumor of the subcutaneous tissues, fixed to the deeper structures, and generally of slow growth. Its invasive character is not so pronounced, and its tendency to remote and visceral extension is less, although pulmonary and hepatic metastases do occur. Wide local removal without incision of the sarcomatous tissue often cures.

3. SARCOMA OF THE SUBCUTANEOUS TISSUE

Sarcoma of the subcutaneous tissues, and of organs such as the thyroid, the breast, the ovary, the uterus, the intestine, etc., present a varied cellular composition, and a marked variation of malignancy. In

the breast, sarcoma is usually of the myzomatous type and of low malignancy. In the uterus and ovary it is usually spindle cell, and also of relatively low grade malignancy, while in the subcutaneous tissues mixed cell or round cell sarcoma, of rapid growth, great infiltrate power, and rapid visceral and cutaneous metastases may occur. The early symptoms are merely those of a tumor of more or less rapid growth. Extensive removal of any such tumor of unknown origin should be performed as early as possible, and a wide margin of healthy tissue should be included. Only the microscope can indicate the exact nature of the tumor, and an exploratory incision into the tumor should be avoided. The close relation of sarcoma to the blood vessels is well established, and it is becoming more and more a principle of good surgery that the possibility of artificial metastases by incision or trauma of a tumor, in situ, is a measure to be avoided, if the best results are to be obtained. If an exploratory incision is absolutely necessary it may be performed with the cautery knife, in order to seal the blood vessels and lymphatics at the instant of their division.

4. LYMPHOSARCOMA

A number of tumors, or of diseases lying close to the border line between tumors and inflammatory diseases, occur in the lymph nodes. Among these conditions two are of special interest: (*a*) malignant lymphoma; (*b*) lymphosarcoma.

(*a*) Malignant lymphoma (Hodgkin's disease). This is a disease, the nature of which is still under investigation, which starts with the enlargement of one or more lymph nodes, and progresses to a disease of practically the whole lymphoid apparatus, with infiltration, invasion, and even visceral manifestations similar to metastases. Some authorities believe it an infectious process, a granuloma; some believe it a new growth. It is possible that both are correct and that it starts as the result of an infectious or toxic agent

and progresses to the character of a malignant tumor. The disease is not uncommon.

Symptoms.—The lymph nodes of one region, usually the cervical nodes, enlarge. The disease rapidly extends to other groups of lymph nodes and to the visceral lymphoid tissue. Death is finally caused by mechanical obstruction to one or another vital function, generally the respiration. The diagnosis is established by the removal of one or more of the affected lymph nodes, disclosing a tissue histologically typical of the disease.

Differential Diagnosis.—Tuberculous lymphadenitis must be excluded by the removal of a gland for microscopic examination, if necessary. Leukemic enlargement of lymph nodes is recognized by the differential blood examination. The blood picture of Hodgkin's disease is believed by certain writers to be characteristic, but this is not always to be depended on.

Treatment.—Radical surgical treatment is advocated by a few authorities, and vaccine treatment has been tried without much success. At the present day the usual treatment is by roentgen ray or radium, and even under this treatment the relief afforded is usually but temporary, although life may be made far more comfortable and may be notably prolonged.

(*b*) *Lymphosarcoma.*—This is a malignant tumor, made up of large round lymphoid cells. It occurs in several situations, notably the tonsils. It is of unicentric origin, and from that point it invades the adjacent tissues, either directly into surrounding muscles and fasciæ or systematically into regional lymph nodes and lymphadenoid tissue. Such tumors are rare. They extend rapidly to the adjacent lymph nodes as well as through the blood vessels by metastses to the viscera. They are extremely malignant tumors, and are rarely cured even by the most extensive surgical operations. They are sometimes favorably affected by radiation for a relatively brief period of time, but this can be considered only a form of palliative treatment.

5. MELANOSARCOMA

One of the rarer but one of the most malignant known forms of sarcoma is that composed of cells similar to the pigmented cells of the rete mucosum —melanotic sarcoma. Such tumors occur also in the retina, choroid, and other situations where pigment-bearing cells are found. It is because of the occurrence of melanosarcoma in pigmented moles that the universal rule for the removal of such moles is promulgated. Melanosarcoma, in its invasive characteristics and in its extension to adjacent lymph nodes, resembles carcinoma rather than sarcoma, and some, indeed, believe that its cells are of epithelial origin. In any case it is one of the most rapidly growing and one of the most malignant tumors with which we have to deal. When extension has occurred to adjacent lymph nodes a cure is rarely obtained, even by the most radical operation. The liver is early involved. The disease must be prevented by the removal of pigmented moles by excision, before they have undergone this malignant change, or, at least, by their radical removal together with the regional lymph nodes, on the slightest sign of induration, ulceration, or on any disposition to increase in size.

VI

OTHER MALIGNANT TUMORS

1. MYELOMA

Myeloma is a term applied to a rare group of tumors of the bone marrow. Some are local in origin, rapidly growing and productive of wide metastases, and rapidly fatal, while others are more systematic, or multicentric in origin, and more slow growing, but also generally fatal. Multiple involvement of the lymph nodes occurs in certain forms of the disease.

Symptoms.—The onset is obscure—gradually pain and tenderness occur over certain bones, and later definite local enlargement of the bone can be recognized, and bone absorption demonstrated by the roentgen ray. The destruction of the cortical bone and the occurrence of Bence-Jones albumose in the urine are characteristic symptoms.

Diagnosis.—Myeloma is to be distinguished from the relatively benign giant cell medullary sarcoma and the bone metastases of hypernephroma by microscopic sections, as well as from bone cysts, syphilis, and other bone lesions by the roentgen ray.

Treatment.—Only the more local and less malignant forms can be relieved by radical operative removal. The more systematic type is best treated by the roentgen ray with the hope of retarding the progress rather than of curing the disease.

2. ENDOTHELIOMA

A rare tumor, similar in structure to carcinoma, but arising from certain tissues of endothelial origin like the meninges, lymph nodes or serous membranes, or blood vascular system. Some endotheliomas (meningeal tumors) are relatively benign, while others show invasive and metastatic tendencies of a definitely malignant character.

Symptoms.—There are no characteristic symptoms of endotheliomas. A tumor arising primarily in a structure of endothelial origin, usually of slow growth, and of a low degree of malignancy is occasionally demonstrated by microscopic examination to be an endothelioma. The endotheliomas of the meninges form the most important group of these tumors because they are one of the relatively small number of types of brain tumor susceptible to radical removal. The symptoms of a meningeal endothelioma are those characteristic of a brain tumor, and the pathologic diagnosis after removal is the only positive evidence of the nature of the disease.

Treatment.—The treatment of all endotheliomas is by radical operation, when the situation is one which permits this measure to be undertaken. The prognosis after complete removal is very favorable.

3. GLIOMA

Glioma is the specific cellular tumor of the central nervous system, arising at all ages and at any point in brain or cord, and forming more than one half of all brain tumors. It is, however, a rare form of malignant disease.

Symptoms.—A glioma usually replaces a considerable portion of brain tissue, causing symptoms from (*a*) general cerebral pressure, and (*b*) from focal destruction of nerve tracts and centers. General pressure symptoms are severe headache, vomiting, slow pulse, and choked disk, with amblyopia or amaurosis. Focal symptoms depend on the location of the tumor, which can often be determined accurately by expert analysis. The course is usually progressive and fatal within an average of ten months. Gliomas do not produce bulky tumors, but replace a portion of the brain by soft vascular tumor tissue or a more solid opaque tumor mass which is poorly defined. A peculiar feature is the tendency to sudden hemorrhage into the tumor tissue, which may cause attacks suggestive of apoplexy. The Gliomas are prone to recur locally, but they do

not produce metastases. The structure presents variable proportions of ganglion cells and nerve fibers. most of the cells being small and round.

Treatment.—The surgical treatment of glioma involving craniotomy, is very unsatisfactory, but most cases deserve an exploratory operation on the supposition that the growth may be localized or that some less malignant tumor may be found. The prognosis is grave on account of the invasive character of the tumor, and the difficulty of complete removal. In any case a decompression can be performed as a palliative measure.

4. HYPERNEPHROMA

Although hypernephroma is the commonest tumor of the kidney, it is nevertheless a rare disease. Most hypernephromas arise from the renal tissue, a few from misplaced adrenal rests in the kidney or other organs, and some from the adrenal itself. They exhibit all grades of malignancy, some being benign adenomas, some adenocarcinomas, and others highly malignant carcinomas. The cells are large and clear, and resemble endothelium. The malignant tumors are extremely vascular, grow rapidly, and produce bulky tumors in a few months. They often invade the renal vein and vena cava, and produce local peritoneal extensions and general metatases in liver, lungs, bones and brain. Bulky destructive bone metatases are characteristic, and often appear before the primary tumor is suspected.

Symptoms.—Local pain, a tumor in the region of the kidney, and hematuria are the chief diagnostic signs. Roentgen-ray examinations of the long bones are necessary to exclude metastases.

Treatment.—The treatment is immediate extirpation of tumor and kidney, but it is successful only in the early stages of comparatively benign tumors. The first step in the radical operation should be the ligature of the renal veins to prevent dislodging tumor emboli into the general circulation.

5. NEUROCYTOMA

Neurocytoma is a cellular tumor derived from nerve cells. It may originate from embryonic or adult nerve cells. Two groups of these rare tumors are recognized —those arising in the central nervous system (neuroepithelioma) and those outside the central nervous system in the distribution of the sympathetic nervous system (sympathetic neurocytoma). Both tumors are chiefly of pathologic interest on account of the identification of typical neuroblastic formation of cells in rosettes or with the characteristic neurofibrils of the peripheral nerve system. They are both extremely malignant. Their symptoms are not characteristic, and operative treatment rarely succeeds in accomplishing their complete removal.

6. ADAMANTINOMA

Adamantinoma is a rare tumor in human beings, but one of sufficient importance to justify its mention. It usually occurs in young adults. The tumor arises from the enamel organ of a misplaced or unerupted tooth. The structure of the enamel organ which is designed to secrete enamel from epithelial cells surrounding the crown of the unerupted tooth, gives rise to a characteristic histologic picture. When an overgrowth of these cells takes place it duplicates a typical carcinoma —that is, solid columns of epithelial cells grow in a fibrous tissue matrix. Although the histologic picture is that of carcinoma, these growths are relatively less malignant. They are locally invasive of the surrounding tissues, and on this account show a tendency to recurrence after incomplete removal, but only in rare instances do they produce remote metastases.

Symptoms.—The Symptoms are those of any slow growing tumor of the jaw. The diagnosis is established only by a pathologic examination of the tissue.

Treatment.—The treatment consists in the thorough operative removal of the disease. Unless this is accomplished the danger of recurrence is considerable.

7. CHORIOMA

Chorioma or chorionic epithelioma is a highly malignant tumor of the uterus which occurs chiefly after hydatid mole (44 per cent.); after abortion (30 per cent.) and after normal labor (22 per cent.). It occurs so frequently at a period of from five to eight weeks after hydatid mole that all such cases should be watched for the development of malignant disease. All moles should be carefully examined in the gross and microscopically for malignant changes. Adherent moles or placentas and multiple pregnancies, especially, predispose to chorioma.

Symptoms.—The chief symptom is repeated bleeding from the uterus, which may or may not be enlarged. The bleeding usually begins in the third month of a supposed pregnancy. Bluish vaginal metastases have often been the first sign detected. The diagnosis is to be made from the curettings, showing the characteristic two types of cells of syncytial and Langhans layers. The prognosis is always unfavorable, but when villi are preserved in the tumor (destructive placental polyp) not a few cases have recovered. The association of chorioma with large corpus luteum cysts is thought to be of significance in the origin of these tumors, and it is believed by certain writers that it is in response to the excessive internal secretion of these lutein cysts that the syncytial cells take on the enhanced invasive growth which leads them to perforate into the blood vessels and produce remote metastases.

Treatment.—The treatment is hysterectomy.

8. TERATOMAS AND MIXED TUMORS

Among the rare types of malignant disease are the two groups of tumors of embryonic origin, called teratomas and mixed tumors. Not all tumors of these two groups are malignant, although all may be said to have potential malignancy. They are due to vestiges of tissue misplaced in embryonic life.

Tumors of the teratoma class may be regarded as misplaced and incompletely developed masses of tissue, which if not misplaced and incompletely developed would have formed a complete fetus—a twin to the individual who presents the tumor.

Mixed tumors are due to misplaced vestiges of tissue less complicated than the teratoma, yet including two or more distinct tissues arising from different germinal layers. The best examples of teratomas are provided by the mixed tumors of the testicle and ovary, which present tissues of great variety from all three germinal layers, skin, gland-tissue, bone, cartilage, endothelium, and a variety of mesoblastic tissues. The more common mixed tumors are those occurring in the salivary glands, and show chiefly glandular epithelium and cartilage, and various types of more or less embryonic connective tissue.

Certain of these teratomas and mixed tumors remain virtually benign tumors throughout life, while others undergo malignant change and develop a tendency to rapid infiltrate growth and metastases of the most malignant character. While the form of malignant change which is most common in these tumors is that productive of tissue of a carcinomatous type, some tumors, especially those of the testicle, show areas which are not distinguishable from sarcoma, and the terms of carcinoma and sarcoma have been used somewhat loosely in describing tumors of this type in literature.

Symptoms.—No symptoms are especially characteristic of the teratomas and mixed tumors. Their origin, however, being largely restricted to certain special regions, leads to the suspicion of the diagnosis when tumors of previously slow growth in those regions suddenly take on malignant characteristics.

The teratomas occur chiefly in the ovary, testicle, base of the skull, and in the mediastinum, whereas the mixed tumors are found chiefly in the region of the salivary glands, the breast and the kidney.

The *diagnosis* of tumors of this character depends ultimately upon the pathologic examination of the

tissue, and the recognition of its complicated structure.

The *treatment* in the earliest stages—i. e., before the tumor shows extensive metastases, consists, of course, of radical surgical removal. After the stage of possible cure by operation has passed, rœntgen rays and radium offer the only hope of delaying the progress of the disease, and of relieving the patient's symptoms as they arise.

VII

TREATMENT OF INOPERABLE OR RECURRENT CANCER

Much may be done to relieve the patient with recurrent cancer. Not only can life be prolonged, but it can be made much more comfortable by palliative treatment. The more important methods of treatment are as follows:

1. *Rœntgen Ray.*—Heavy treatments with rœntgen rays from a tube of standard strength up to, but not beyond, the resisting power of the adjoining skin, can be used to relieve pain, diminish sloughing and discharge, and to retard growth or even cause shrinkage of tumor tissue. Where the tumor tissue is superficial and ulcerated the bests effects are obtained, and when the tumor tissue is spread over a wide area, as in recurrent cancer of the breast, rœntgen rays are to be preferred to radium. For deeply situated tumors (abdominal, mediastinal. etc.) the rœntgen ray is of value, although its results are not so certain.

Radium.—Radium can be used in much the same manner as rœntgen rays. It is not so well adapted to the treatment of large superficial areas as the rœntgen ray, but for intensive treatment of smaller superficial areas, and for deep tumors of the mediastinum and prostate, its effects are promising. It is especially valuable in recurrent cancer of the cervix and of the body of the uterus, in cancer of the rectum and prostate, in superficial and inoperable cancer of the mouth and pharynx, and in some of the more general diseases, such as leukemia and lymphoma, or Hodgkin's disease.

3. *Palliative Operations.*—Palliative operations are often indicated in cases of recurrent cancer to relieve the patient of an offensive sloughing tumor, or merely for the relief of pain or of other mechanical symptoms. In such cases the cautery can often be employed to

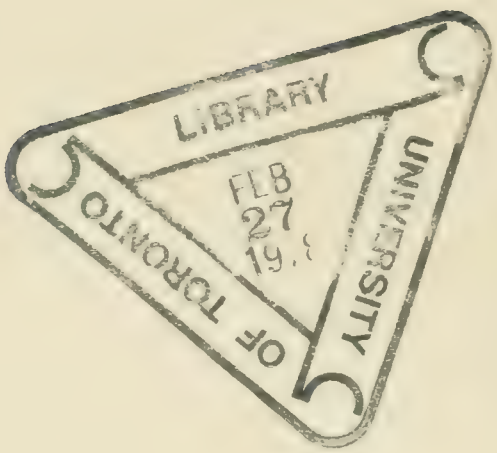
increase the destruction of tumor tissue without dissemination. Operations of this nature are often advisable in recurrent cancer of the cervix and of the breast. In cancer of the pharynx or larynx tracheotomy is often an operation of necessity, and in incurable cases of cancer of the stomach or intestine, where obstruction exists, a palliative gastro-enterostomy or an intestinal anastimosis may relieve the patient's most distressings symptoms. Colostomy gives relief to much of the distress in cancer of the rectum, and a suprapubic drainage gives relative comfort in cases of advanced cancer of the bladder and prostate. In many cases of advanced cancer about the face, a combination of operation, cautery, and radium or rœntgen-ray treatment may yield results quite unattainable by any one method used alone. Finally, even so severe an operation as an amputation at the shoulder joint may be performed for the "brawny arm" of recurrent cancer of the breast to relieve the patient of an intolerable burden.

4. *Symptomatic Treatment.*—Symptomatic treatment of recurrent cases of cancer yields results in the way of relief of suffering which have not always been appreciated. Opiates are indicated as surely in hopeless cases of cancer as in any other condition with which the physician has to deal. Their use, however, should be guarded, and should be supplemented with other sedatives in order to delay the necessary increase of dosage.

Where the pain of nerve pressure exists, as in spinal metastases or tumor infilration of the brachial or lumbar plexus, special operations for the division of sensory nerves or spinal nerve tracts may be advisable, although such measures are not widely practised.

Finally, the nurse can contribute quite as much to the comfort of the advanced case of recurrent cancer as can the physician. Frequent and gentle dressing of ulcerated surfaces to diminish discharges, relieve offensive odors and prevent distressing infections, do much to make the patient's condition bearable, while the

maintenance of a comfortable position, the avoidance of pressure sores, the occupation of the mind of the patient, and the maintenance of nutrition by carefully selected nourishment, all help materially to alleviate distress.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