

that of the Canaries, in Southern California, more especially inland, and in some portions of the Southwest, the novelty of the change, the ocean voyage, and the variety and beauty of the scenery of the "fortunate isles" may tempt some invalids to try its mild, sunny climate and pure atmosphere, and enjoy the "equability of an island climate combined with the dryness of a continental one."

For a more extended account of the Canaries the reader is referred to: "Tenerife and Its Six Satellites," by Olivia M. Stone, 1887; "Madeira and the Canary Islands," by A. Lander Brown, 1896; "The Canaries for Consumptives," by E. Paget Thurstan, 1889; "Climatic Treatment in Grand Canary," by Brian Melland; *The Medical Chronicle*, Manchester, England, 1897; "The Canary Islands as a Health Resort," by John Whitford, 1890; "The Therapy of Ocean Climate," by Albert H. Gihon, M.D.; Transactions of the American Climatological Association, 1889. *Eduard O. Otis.*

CANCER. (CLINICAL).—In the first place it is well to have a clear understanding as to what we mean by the term "cancer." I believe that the time has come when we should give up trying to limit the term "cancer" to tumors of epithelial origin, excluding those arising from connective tissues, though the latter may, and frequently do, equal or even surpass the former in malignancy. There is really no good reason for this distinction, and it is far better to go back to the older use of the word in which cancer included all varieties of malignant tumors, whether carcinoma or sarcoma; the feature of malignancy should really be the determining factor, and not some microscopic distinction in histological structure that is often so finely drawn that the trained pathologist is unable to decide upon the proper classification. At present, though we often are able to give some temporary comfort to a patient with sarcoma by assuring him that his trouble is not cancer, yet, if he happens to be suffering from a subperiosteal sarcoma of the femur and knew that of sixty-eight cases treated by the most extensive operation, viz., hip-joint, or very high amputation, but one was known to have been cured, he might readily wish to exchange places with his neighbor who has a well-marked cancer of the lip with one chance in two of being cured by a small operation.

GENERAL CONSIDERATION.—While the problem of the etiology of malignant disease comes hardly within the province of this article, it is so intimately connected with the clinical history and rational treatment that a few lines may not be out of place.

As having a more or less direct and very important bearing upon the etiology of cancer, should be mentioned (1) its local distribution; (2) its rapid increase during recent years; and (3) the influence of injury as a direct or predisposing factor in its development.

Local Distribution.—Much has been written in proof of the fact that cancer is far more prevalent in some countries than in others, and in some localities in the same countries than in others, but we are more deeply indebted to Mr. Alfred Haviland than to any other writer for accurate and detailed data concerning this varied distribution.

In 1868, in his first paper, read before the Medical Society of London, on the "Geographical Distribution of Cancer among Females throughout England and Wales during 1851-60," he found that 4.33 cases of cancer occurred in every 10,000 females and only 1.94 in every 10,000 males.

In a recent paper (1899) he has found in the period 1881-90, 7.30 cases in every 10,000 females and 4.30 cases in every 10,000 males. That is, the number of cases in females has nearly doubled and the number in males has more than doubled during a period of thirty years.

Roswell Park, of Buffalo, is a firm believer in the increase of cancer, and in a recent paper he makes the statement that in England and Wales from 1840 to 1890 the death rate has increased four or five times, and he further adds: "A careful study of all these tables permits one to make the following startling prophecy: If for the next

ten years the relative death rates are maintained, we shall find that in ten years from now, viz., in 1909, there will be more deaths in New York State from cancer than from consumption, smallpox, and typhoid fever combined."

It is true certain writers, among the ablest of whom may be mentioned Newsholme,* attempt to show that this increase is more apparent than real, and may be largely explained by greater accuracy in diagnosis at present than in preceding years, and in the increasing number of autopsies. I prefer to believe with Mitchell Banks, in his recent and most valuable lectures on "Cancer of the Breast"† that these explanations account for but a very small part of the increase, and that it is as real as it is alarming.

Haviland's latest conclusions upon the local distribution of cancer, based upon the most careful study of more than a third of a century, are as follows:

"1. That districts having the highest death rates from cancer among females were invariably associated with seasonably flooded areas traversed by, or in close proximity to, seasonably flooded rivers.

"2. That geologically these high mortality districts were characterized by alluviums and subsoils of clays of every variety of formation.

"3. That districts having the lowest mortality were situated on an elevated land where drainage was good.

"4. That geologically these low-mortality districts were characterized by the oldest paleozoic rocks, especially those of the carboniferous limestone period."

This question that Haviland first brought before the medical public in 1868, "How is it that limestones are always associated in England and Wales with the lowest mortality from cancer and flooded clays with the highest?" he is still unable to answer, but when it is answered, he believes much light will fall upon the cause of cancer.

The most complete of recent statistics on cancer are found in the elaborate paper of G. Heiman, of Berlin (*Archiv f. klin. Chir.*, Bd. 57 and 58). These statistics confirm the view that cancer is rapidly increasing.

In the year 1877 there were 6,971 deaths from cancer in Prussia, and in the year 1896 17,643, an increase of 153 per cent. Of 10,000 living in 1877 the mortality from cancer was 2.66, while in 1896 it was 5.53.

Heiman has also made separate statistics for the mortality in cities and the country districts: In 1876 in the cities it was 3.62, in the country, 1.82; in 1881 in the cities it was 4.70, in the country, 2.25; in 1886 in the cities it was 5.71, in the country, 6.43; in 1891 in the cities it was 6.43, in the country, 3.24; in 1896 in the cities it was 7.9, in the country, 3.8.

In still further confirmation of the opinion that cancer is increasing may be cited the mortality records of the Mutual Life Insurance Company of New York, as recently quoted by Oliver, London *Lancet*, November 10th, 1900, p. 1341. The statistics show that in 1879 the percentage of deaths from cancer in patients between fifty and seventy years of age was 4.23; in 1889 it was 6.22, and in 1898, 7.59. In further support of this view, Oliver refers to the statistics of the Scottish Widows' Fund, collected by Claude Muirhead. Between 1815 and 1845 the deaths from cancer were .93 per cent. of the whole number; from 1845 to 1852, .72 per cent.; from 1852 to 1859, 2.87 per cent.; from 1859 to 1867, 3 per cent.; from 1867 to 1873, 4.56 per cent.; from 1873 to 1880, 4.34 per cent.; from 1880 to 1887, 5.23 per cent. Muirhead states that, "allowing for greater accuracy in returns, the number of deaths from this cause has increased enormously."

As to the question of heredity, the statistics of the Scottish Widows' Fund show that 9.5 per cent. gave a history of malignant disease in parents.

The difference between the prevalence of cancer in the city and the country is very striking. This steady increase cannot, I think, be explained by increasing skill in diagnosis.

* Practitioner, London, April, 1899. † *Loc. cit.*, March 10th, 1900.

As Mitchell Banks has pointed out, in 1861 such men as Miller, Syme, Spencer, and Wilson, the leading surgical teachers of Edinburgh, were the equal of any of the present day in diagnostic skill as regards both external and internal cancer.

The Parasitic or Infectious Theory of the Origin of Cancer.—The embryonic theory of Cohnheim which has long been accepted by most pathologists falls far short of explaining many important points in the etiology of cancer, and must, I believe, soon be abandoned. While the result of the long and patient investigations of Russell, Plimmer, and San Felice and Leopold in Europe, and of Park and Gaylor in this country, have not yet absolutely demonstrated that cancer is of a parasitic origin, we are, according to Park, justified "at least in maintaining that some cancers are of such origin." And if it can be demonstrated that some are, there is strong probability that all are. The almost constant presence of these peculiar bodies in all cancers including sarcoma, and especially in the advancing and growing borders, as proven by Plimmer, whether they prove to be blastomycetes or protozoa, furnishes strong presumptive evidence that they may have some bearing upon the causation of the tumor. Now that pure cultures of these organisms have at last been made, and that actual carcinoma has been experimentally produced in animals by these cultures, it would seem that the parasitic or infectious theory of cancer has passed beyond the stage of ridicule and is worthy of serious consideration. It explains far better than any other theory the geographical differences in the prevalence of cancer, as well as the increasing mortality. Furthermore, cancer closely resembles other diseases, e.g., tuberculosis and syphilis, which are known to be of infectious origin. If we admit the origin it is easy to explain the various types of the disease, from the slow-growing epithelioma of the face to the rapidly fatal sarcoma of the testis or orbit, by supposing that the infectious agent, like the malarial organism, varies as to its morphology within wide limits, different types of the germ (or different conditions) causing very different clinical manifestations. The whole clinical course of cancer is strikingly suggestive of an infectious disease. The question of the infectious or parasitic nature of cancer has very recently and ably been discussed by Mitchell Banks in the last of his three lectures on "Cancer of the Breast" (*loc. cit.*). He calls attention to the fact that the first notable step in advance was made by W. Russell, of Edinburgh, in 1890, whose paper on "Characteristic Organisms of Cancer" excited profound interest. These so-called "fuchsin bodies" of Russell, which he described as both intracellular and extracellular, were even then regarded by Russell himself as blastomycetes, a variety of saccharomycetes or yeasts. While the great majority of pathologists in different countries have been of the opinion that these bodies described by Russell are not "characteristic organisms of cancer" but rather certain forms of cell degeneration, there have always been notable exceptions on the other side, and the question has remained an open one until at present the weight of evidence is strongly in favor of regarding them as separate organisms.

In 1892, Soudakewitch, of Kieff, and Armand and Ruffer, of London, published papers describing bodies similar to those described by Russell. Specimens of these bodies were carefully examined by the distinguished Metchnikoff, who believed them to be "parasitic protozoa." The original opinion of Russell that they are blastomycetes has recently been revived and strongly advocated by the well-known Italian investigators, San Felice and Roncali. These bodies are of various size, estimated by Plimmer at from .004 to .04 mm., and they may be stained in several different ways. The Ehrlich B triple stain or the Ehrlich acid hæmatoxylin, in distilled water rendered faintly alkaline with lithium carbonate, may be mentioned as most satisfactory.

The latest researches of Leopold* along the same lines

* Leopold, "Researches as to the Etiology of Carcinoma and Pathogenic Blastomycetes." *Archiv f. Gynäkologie*, vol. lxi., No. 1.

are strongly confirmatory of the work of Plimmer and San Felice. Leopold's paper is the result of diligent labor extending over many years. He has examined several hundred carcinomata of numerous localities, excluding as far as possible ulcerating tumors. Leopold found the organisms variously described by others, and believes them to be blastomycetes. In twenty cases he tried to cultivate blastomycetes from the carcinomatous tissue and met with greater success than any of his predecessors. In four cases he obtained pure cultures from malignant tumors. In attempting to inoculate animals he had three positive successes. A curious fact was observed that, while the culture of blastomycetes had been obtained from carcinomatous tissue, the tumors in two instances resulting from inoculation were sarcomatous. This fact, if further confirmed, together with the fact that hereditary malignant disease not infrequently takes the form of carcinoma in some member of a family and of sarcoma in others, would go to show that the etiological relationship is exceedingly close.

SYMPTOMATOLOGY AND TREATMENT OF CANCER.

DIAGNOSIS.—There is no department in surgery in which there is greater need of large clinical experience and well-trained powers of observation than in the diagnosis of malignant tumors. In every suspicious case a careful history of the patient should be obtained before a diagnosis is attempted. Among the most important points to be elicited may be mentioned: hereditary influence, the anatomical situation of the tumor, its duration, and the rapidity of its growth. Too much stress should not be laid upon the apparent duration of the tumor, inasmuch as in not a few instances it may have existed for a considerable time before it was observed by the patient. The situation of the tumor is often of great aid in diagnosis. If it is first observed in the glands—for example, the cervical, axillary, or inguinal—there is a strong probability that it may be a secondary growth, and careful search should be made for a primary growth in the mouth or throat, the breast, rectum, or pelvic organs, or even the extremities. I have myself observed a large fungating sarcoma of the groin, supposed to originate in the inguinal glands, and although the patient stated that he had never had any swelling in the leg or foot, careful inquiry showed that two years previously he had had a small ulcerated area upon the ball of the foot, produced by the irritation of a projecting nail in the shoe. This apparently healed, but from time to time there was a recurrent ulceration and a slight discharge. A small indurated area remained, but gave such slight symptoms that the patient never thought of connecting it with the trouble in the groin. The patient soon died of general metastases. At autopsy the area in the ball of the foot was excised and found to be the primary pigmented sarcoma.

On examining the tumor itself, the surrounding tissue should be carefully palpated in order to determine its relation to the skin, the muscles, or the underlying bony structures. The size of the tumor, and the rapidity of growth, are very important points to be noted. Pain and tenderness, while far less important than many writers have led us to believe, should nevertheless be always noted. While in most cases of malignant disease, especially in carcinoma of the breast, pain is rarely present in the early stages, it is seldom absent after the tumor has become well developed. Pain is much more important in the diagnosis of recurrent than in that of primary tumors. In many cases of recurrent cancer the patient based her suspicion solely upon the peculiar stinging pain resembling that which she had experienced during the existence of the primary tumor, and in almost every case I have found these suspicions well founded. Therefore, in suspected recurrent cancer, one cannot be too careful in considering the symptom of pain. In some localities the primary tumor naturally is attended with marked pain. This is especially the case in malignant tumors originating in the spine or in the pelvic bones.

In most cases of sarcoma of the ilium, sacrum, or ischium, the first symptom is a severe neuralgia of the crural or sciatic nerves, and cancer is seldom suspected for a considerable time.

Tenderness.—Tenderness is a very important diagnostic sign, especially from its negative value. It often enables us to distinguish between a malignant and an inflammatory tumor. Tenderness may be said to be practically absent in most malignant tumors.

Palpation.—By this means may be determined the consistence of the tumor, its mobility, the presence or absence of pulsation, tenderness, or crepitation. Mobility is a valuable guide in differentiating sarcoma from carcinoma, or carcinoma from a benign tumor. Inasmuch as carcinoma has a tendency to infiltrate the surrounding tissues, sarcoma will be found to be much more freely movable than carcinoma.

General Symptoms.—Careful inquiry should be made as to the patient's general health, his mode of living and his habits, and a thorough physical examination should be the rule in all cases. Also the age of the patient should invariably be ascertained, for not infrequently this alone will enable one to diagnose a malignant from a benign growth. While carcinoma occasionally occurs under the age of thirty years, such cases are extremely rare. Loss of weight, if of considerable amount and progressive, is of much significance. A general physical examination often enables one to avoid a useless operation, by disclosing the fact that the patient is already suffering from metastatic deposits in the lung, liver, or other localities, although the primary growth may be readily removable. The local examination of the tumor itself should be thorough and systematic; one should note its color, its size, the condition of the overlying skin, whether thickened, adherent, or dimpled as in carcinoma of the breast, or greatly thinned out as in a rapidly growing sarcoma, the presence or absence of ulceration, and the amount and character of the discharge, if present. The consistence of the tumor throws much light upon the diagnosis. If it is hard and indurated, with other signs of malignancy, the diagnosis points strongly toward carcinoma, while if soft and semifluctuating, the probabilities are much in favor of sarcoma.

Exploratory incisions, or the removal of specimens for microscopical examination by means of the Mixter punch, under cocaine, have been frequently resorted to, and are still much used by many surgeons. While there is much to be said in favor of this method of confirming a doubtful diagnosis, there are strong reasons for restricting its use within the narrowest limits. I believe that the cutting into a highly vascular and soft malignant tumor, or even the removal of a portion with the Mixter punch, is attended with considerable risk of disseminating tumor cells throughout the body and producing generalization of the disease. I have personally observed a number of cases in which this method was used, develop metastases within a few months after exploration, so that I have given up exploratory incisions, except in cases in which it seems absolutely necessary. In the case of a small, doubtful tumor of the breast it is far better to remove the entire growth than to cut into it and remove a small portion for the purpose of microscopical examination. In a case of suspected sarcoma of the femur, instead of removing a portion prior to operation, I have adopted the plan of preparing the patients for a hip-joint amputation, then—after the tourniquet has been applied—cutting into the tumor to confirm the diagnosis prior to amputation.

Prognosis.—The prognosis in cancer depends very largely upon the locality of the primary growth. It also depends greatly upon the rapidity of growth prior to operation. This point is very well brought out by the statistics of cancer of the breast by Dr. J. Collins Warren, of Boston, which show that in the successful cases the tumor had existed prior to operation for a longer time than in the unsuccessful. In other words, the more rapid the growth of the tumor the less the probabilities of curing it by operation. The prognosis has improved

remarkably within recent years by reason of earlier diagnosis and earlier operation, as well as from improved technique. Yet this great improvement has been insufficient to offset the increase of the mortality, on account of the rapid and progressive increase in the number of patients afflicted with cancer. In certain regions the prognosis is still absolutely bad; for example, periosteal sarcoma of the femur which, according to the latest statistics of Butlin, show but one cure in sixty-eight cases treated by amputation at or near the hip-joint, and cancer of the stomach or larynx, in which the percentage of cures is extremely small. On the other hand, if we are dealing with cancer of the breast or lip, the extensive operations and improved technique of the present day offer the patient about one chance in three for being cured. The age of the patient also has an important bearing upon the prognosis. It may be laid down as a general rule, particularly true in carcinoma, that the younger the patient the more rapid the course, and the worse the prognosis. In the very aged, while perhaps the probability of a cure may not be greatly increased, the progress of the disease will be very much slower. I have observed a cancer of the breast in a woman aged ninety-four years, of eight years' duration. During the two years of my observation there was little change in the size or appearance of the growth, and the general health of the patient was but little affected. Early and repeated recurrences, while making the prognosis much worse, should not cause the surgeon to give up all hope of a cure, and if the tumors are anatomically removable, he should continue to operate.

Treatment.—General Treatment.—While the majority of the profession believe that drugs have little or no influence upon the progress of cancer, there have been many remedies that, from time to time, have enjoyed much favor in the treatment of the disease. There is no inherent or *a priori* reason why certain drugs should not have an inhibitory influence upon the growth of malignant tumors, especially if these tumors prove to be due, as many of us believe, to an infectious agent. Therefore, we should not deny the possibility of the existence of such a drug, or refuse to give all a fair trial. The statement of Senn that "no kind of internal medication has any influence whatever in limiting tumor growth, much less in causing the disappearance of the tumor," is not, I believe, in harmony with the facts. There are certainly well-authenticated cases of sarcoma, especially of the skin, in which the disease has been clearly retarded by the use of large doses of arsenic; there are likewise well-authenticated cases of sarcoma and even of carcinoma, that have shown decided improvement under mercurials and iodides. I have personally observed more than one such case in which the diagnosis was confirmed by microscopical examination. In one case, a carcinoma of the breast, the improvement was so marked under large doses of iodine that the diagnosis of syphilis seemed clearly correct; after a time the improvement ceased and exploratory operation showed the growth to be a typical carcinoma.

Local Treatment.—This includes operative treatment as well as removal by caustics, electrolysis, parenchymatous injections, and the injections of the toxins of erysipelas, which produce both local and systemic action, though the local predominates.

Operative Treatment.—Free and thorough excision of cancerous tumors with the knife is the only method of treatment that should be considered in cases in which it is possible completely to remove the disease. By removal we mean not only removal of the tumor itself, but of all the neighboring lymph glands, together with the connecting lymphatics. A careful study of recurrent cancer shows that in by far the largest proportion of cases the return takes place in the region of the skin or cicatrix. Therefore, if we expect to improve the results, we must remove wider areas of skin in the future than has been our custom in the past.

Limitations of Operative Treatment of Cancer. Cancer is unquestionably a local disease at its origin and during

the period of its early development, and if treated by thorough removal at this period can, in the majority of cases, be cured. The difficulty, however, in operating at this time lies in the fact that the tumor itself is not always discovered until the disease has already infected the neighboring glands, and in other cases when discovered, the patient refuses an early operation. The curability of cancer depends largely upon our ability, anatomically and surgically, to remove the invaded area, together with a sufficient amount of healthy tissue on all sides. From a clinical standpoint we must admit that it is impossible to cure all cases, but even with the limitations which I have mentioned as regards early diagnosis and the difficulties in persuading patients to submit to early operation, we are still able to cure a very large number of patients and materially to prolong and render more bearable life in many others. I believe with Banks and Shield, that the pendulum has swung too far in the direction of operative treatment for cancer, especially in the later stages of the disease. We are not likely to err in the direction of too extensive operations in the early stages, and, indeed, there is reason to believe that our operations are generally not extensive enough in such cases; but I have seen many cases of advanced recurrent cancer subjected to operation, in which there was little or no prospect either of curing the patient or of rendering the disease less distressing. It is natural that surgeons should not always agree as to the exact classification of operable and inoperable cases, yet it is possible for us to lay down certain general rules which may be of help in deciding this difficult question. There will always be surgeons who will operate only upon cases in which there is a high probability of final success, and there will be others who will continue to operate when there is practically no hope of effecting a cure, or of completely removing the disease, even though the operation itself may be attended with the gravest risk to the life of the patient. Partial operations in which there are large infected areas left behind, instead of decreasing, frequently increase the rapidity of growth. Watson Cheyne does not believe that we should refuse operation unless early recurrence is very highly probable, or unless operation means almost certain death.

My own feeling is that often in persuading ourselves that there is a bare possibility of curing the disease in these advanced cases, we are apt to forget that the high mortality and the very small proportion of cures cannot but have a great influence upon the laity in destroying their confidence in all operations for cancer, and thus prevent many patients suffering from cancer in the early and operable stage from consulting a surgeon or consenting to operation at a time when the prospect of cure is good. Operations, therefore, I think, should not be advised unless there is strong probability of being able to remove the entire disease. This does not mean that we should not in certain special cases remove foul, fungating masses, when thereby we may be able to add greatly to the comfort of the patient, although there is no prospect of prolonging life.

GENERAL CONSIDERATIONS.

Sex.—Of 7,878 cases of primary neoplasm collected by Williams the proportion of males and females was 1 to 1.7. According to statistics covering years between 1872 and 1898, cancers of all kinds show a proportion of 1 male to 2.29 females. Comparing the mortality of cancer with that of all other diseases, we find that among males we have 1 death from cancer to 100 deaths from all other diseases; while among females we have 1 death from cancer to 49 deaths from other causes. The statistics of the year 1889 show that of every 21 males who reach the age of 35 years, 1 dies from cancer; while in females who reach the age of 35 years, 1 in 12 dies of cancer. Williams' statistics show, however, that the relative difference in the mortality of the (two) sexes is gradually decreasing, the records for 1851 showing the ratio to be 1 male to every 2.2 females, whereas, in 1896, it had dimin-

ished to 1 male to every 1.4 females. Curiously, in certain localities this ratio is reversed. For example, in New South Wales and New Zealand the mortality is greater in males than in females.

Age.—Of 941 consecutive cases of malignant tumors observed by Williams, there were only 25 cases under the age of 25 years.

Williams believes that a considerable number of malignant neoplasms are of congenital origin, and that in some instances these are multiple from the start. I have personally observed 1 case of a very large multiple rounded sarcoma in an infant 6 months of age, in which the multiple growths were noted soon after birth. The disease ran a very rapid course.

Under the age of puberty carcinoma is so rare as to be practically unknown. The rectum is the most favorable site for malignant epithelial disease occurring before the age of 30. The type of disease is either carcinoma or malignant adenoma. About 20 such cases have been reported under the age of 30. R. de Bovis (*Revue de Chirurgie*, Juin, 1900) found 35 cases of cancer of the large intestine (exclusive of the rectum) under the age of 30, out of a total of 400 cases. Of 500 cases of mammary cancer observed by Williams, the youngest patient was 24 years of age. Of 1,622 cases collected by Gross, the youngest patient was 22 years.

In the uterus the disease may occur somewhat earlier in life than in the breast, although the difference is not great. Of 500 cases collected by Williams, it occurred once in an individual 22½ years old; while out of 3,385 cases collected by Bousserau, it occurred in 2 under the age of 20 years; and 1 authentic case has been reported at the age of 17 years.

It is a well-known and somewhat striking fact that cancer is seldom seen in the very aged. Williams states that of 1,087 centenarians only 5 died of cancer, giving a proportion of 1 in 217; while of 202 individuals between 90 and 100 years of age, not a single one died of cancer. Of 500 cases of cancer of the uterus, the oldest was aged 83 years. The oldest individual with cancer of the breast observed by Williams was 84 years. I have personally observed cancer of the breast in a woman aged 94 years. The disease had existed for six years and the progress was extremely slow. It may be stated that the average age of women with mammary cancer is 48, and with uterine cancer 44, with cancer of the tongue and mouth 50, of the lip 51.6, of the rectum 50.7, of the stomach 40.5. The maximum period of frequency in the female is 45.55, in the male 55.65 years.

Geographical Distribution.—The mortality from cancer differs very greatly according to locality, also according to the period covered by the statistics, the mortality showing a general increase, as has already been stated, all over the world during the past half-century. The mortality for 1890 was 7.9 per cent. for Boston; 6.2 per cent. for New York; 4.8 per cent. for Brooklyn. Fifty large American cities, in 1888, showed a cancer mortality of 7.9 per cent., of which 5.1 per cent. were females, 2.8 per cent. males. Comparing these statistics with European cities, we have for London, 6.8 per cent. in 1881 to 1890; for Paris, 10.4 per cent. in 1886 to 1891; for Lyons, 16.3 per cent. in 1892.

Heredity.—The influence of heredity upon the etiology of malignant disease is a question about which there is still little uniformity of opinion. However much authorities may differ as to the amount of influence attributable to heredity, it is impossible to deny that there is some influence. Numerous cases have been cited to show that in certain families this influence has been very striking. Williams observed a patient, aged 53, suffering from uterine cancer, and whose maternal grandmother, mother, mother's two sisters, and patient's two sisters all died of cancer of the uterus. The Bonaparte family is another striking illustration of the influence of heredity. Napoleon's father, brother Lucien, and two sisters, died of cancer of the stomach. Manichow reports 23 families in which intermarriage had been frequent, showing 69 cases of cancer, of which 57 occurred in the stomach. The

tendency of hereditary cancer to attack the same organ in different members of the family is another remarkable peculiarity of this mysterious influence. A case was cited by Williams, in which the mother and five daughters all died of cancer of the left breast. I have myself reported two cases of sarcoma of the left breast occurring in two sisters, appearing at the same age and both imme-

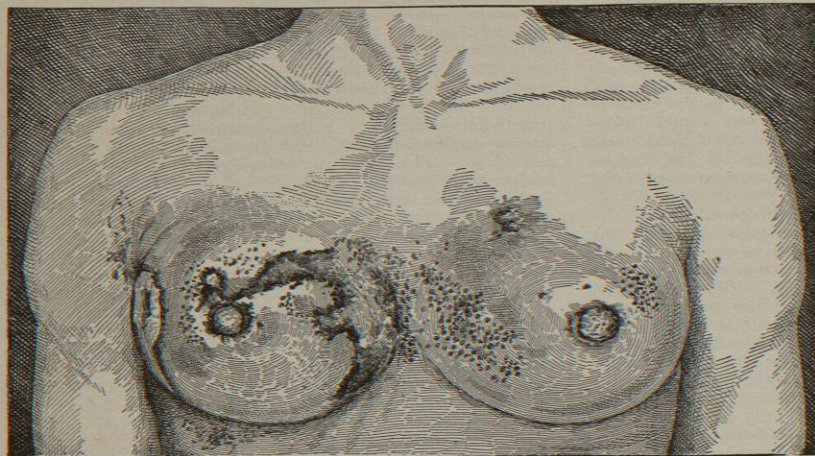


FIG. 1088.—"Squirrhe Disseminee," Acute Traumatic Carcinoma.

diately following trauma. Williams believes that these peculiarities associated with heredity point to intrinsic rather than extrinsic causes of the disease. It seems to me that such a conclusion is hardly warranted by the facts. We certainly can get very little light upon the vexed question of etiology from what we know of hereditary influence.

As to the frequency with which hereditary influence has been observed, statistics differ. Williams found a family history of cancer in 24.2 per cent. of 136 cases of cancer of the breast; while of 209 men suffering from cancer of various organs, a history of heredity was found in but 11 per cent. Selecting only those cases in which there was a history of cancer in parents, the percentage is 8. A very curious fact has been noted, namely, that a patient is capable of transmitting this hereditary influence to offspring while latent, or long before any evidence has been visible in the patient herself. For example, Broca's famous case of Mme. Z., who had four daughters, all of whom died of cancer, and yet they were born from fifteen to thirty years before the mother herself contracted the disease. It has further been noted that hereditary influence is more often transmitted to the female than to the male line. For example, of 19 daughters and granddaughters of Mme. Z. that lived to be 30 years of age, 14 died of cancer, whereas of 17 males only 1 died of cancer.

Cancer is far more frequently seen in persons of robust health than in thin, weakly individuals. Williams is inclined to attribute considerable weight to the opinion that the increase in cancer may possibly be due to the fact that during the last fifty years the standard of living has become so much higher, much larger quantities of animal food being consumed now than formerly.

CANCER OF SPECIAL REGIONS.

CANCER OF THE BREAST.—Carcinoma of the breast rarely occurs in women under the age of 30, and one seldom sees it until after the age of 35. The average age at which it appears, as given by Gross, is 48 years. The first thing the patient usually notices is a lump in the breast,

without any history of antecedent pain. The growth does not change materially in size for a number of months, and it being nearly or quite painless, the patient does not regard it of serious importance. Later on, occasional sharp twinges of pain may appear. The pain is always at first intermittent, and does not become dull and steady until the later stages of the disease. The family history of the patient, as well as the previous personal history, is of great importance.

Heredity is found in about 21 per cent. of all cases. A considerable number of patients give a history of local injury, and the more one studies the malignant tumors from a clinical standpoint, the more importance does one attach to the influence of antecedent injury in the etiology of cancer. MacWilliams* states that in 100 consecutive cases operated upon at the Presbyterian Hospital of New York, 44 gave a history of antecedent injury.

Inflammatory trouble often precedes the development of cancer of the breast, and, no doubt, likewise has some influence on its causation. Although many—perhaps the majority—of surgeons refuse to believe that there is any direct etiological relationship between trauma or chronic

inflammation and cancer, the clinical fact remains that these conditions are very frequently associated with the development of cancer, and although we are at present unable entirely to explain this relationship, the facts must have due weight in making our diagnosis. Antecedent injury in carcinoma of the breast is variously estimated at from 12 to 40 per cent. In sarcoma the percentage is much higher. Nearly all the cases of sarcoma of the breast that I have personally observed have given a distinct history of local injury. It has been the custom of most writers to minimize the patients' statements with reference to having received blows or knocks upon the breast, the reasons given being, first, that only a certain percentage of patients give this history, and second, that every woman probably receives similar blows without the development of cancer, and that, therefore, they cannot have an important bearing on the disease. If we could know the exact facts, I believe that the percentage of cases in which injury has been noted is far smaller than the actual percentage in which it has occurred, the reason being that many patients have forgotten the antecedent injury. The fact that many women who receive blows upon the breast do not develop cancer is no more argument against the etiological relationship of trauma, than it would be to cite the fact that many patients are exposed to the diphtheria bacillus and do not contract the disease, as an argument against the relationship between the bacillus and the disease in persons who did contract it.

Malignant disease of the breast may be either acute or chronic. *Acute military carcinosis* or *squirrhe disseminee* is exceedingly rare, and but few cases have been reported. I have personally observed one case occurring in a woman of 38 years, immediately following a blow. The disease ran a very rapid course, spreading quickly to the other breast, involving the entire skin and the anterior portion of the thorax, causing death in about nine months. Only 2 cases of this variety were observed by Williams in 170. Carcinoma en cuirasse is also comparatively rare, only 3 cases having been observed by

* Medical News, April 28th, 1898.

Williams in 170. Carcinoma en cuirasse is not a special type of cancer, but derives its name from the fact that the superficial or skin lymphatics are early and extensively involved. The opinion held by some writers, that the disease is limited to the skin, is probably erroneous. The primary focus is in the breast, and the contiguous lymphatics are involved at an early period.

The chronic form of carcinoma of the breast includes those cases in which the disease has a duration of five years or more. In Williams' list of 170 cases 31 were of the chronic form. Of these, 14 cases had a duration of from 5 to 10 years; 6 a duration of from 10 to 15 years; 2 a duration of from 15 to 20 years; and 1 a duration of from 20 to 25 years.

One case of undoubted breast cancer has been reported in which the disease lasted for over thirty years.

Melanotic growths are exceedingly rare in the breast, especially in the female. Williams' table of 2,397 cases of primary carcinoma of the breast does not contain a single example of melanotic carcinoma; while in 100 cases of cancer of the male breast there were 3 of the melanotic type. I have personally observed 1 case of melanotic cancer of the female breast. The history of the case is as follows:

Melanotic Sarcoma of the Breast.—Mrs. F., aged 44, married, with four children, good family history, had inflammation of the right breast ten years ago. Shortly after this she noticed a small lump in the region of the nipple, but not attached to the skin. This remained comparatively stationary for nine years. At the end of this time the nipple became slightly retracted, and a small lump appeared in the opposite breast, which was of bluish color and attached to the skin. The first operation was performed by Dr. Abbe, of St. Luke's Hospital, on the 19th of July, 1897. Both tumors were removed, together with two other smaller ones on the outer aspect of the left arm. When seen by myself, on August 29th, 1898, there was an area four by five inches in extent, of local recurrence, together with numerous small, dark-colored nodules scattered through the skin of the abdomen.

Paget's Disease of the Nipple.—Shield, who has made a careful study of this disease, believes "superficial carcinoma of the skin" a better term. The disease is rare and the diagnosis not infrequently difficult. It is almost invariably, although not certainly, followed by carcinoma of the breast itself. As regards the treatment of this disease, I am thoroughly convinced that nothing short of a very radical operation (namely, complete removal of the breast and axillary glands) should be performed. Shield states that he has never known a genuine case of Paget's disease cured by local remedies. I have personally observed two cases of Paget's disease; in the first of these I operated upon September 13th, 1897, and the entire breast, together with the axillary glands, was removed. The patient has remained well up to the present time, three and a half years after the operation. The second case refused operation, and one year later the disease had involved the breast so extensively that operation was impossible.

Cancer of the breast occasionally may co-exist with sarcoma of other organs. Roger Williams has collected 11 such cases. I have personally seen one. The patient was a woman, 53 years of age. In July, 1896, I operated for a recurrent carcinoma of the breast; in September, 1896, I removed from the same patient a round-celled sarcoma the size of an egg, from the submaxillary region, on the same side. The disease quickly recurred, and in a few months proved fatal.

Diagnosis.—Age. Cancer of the breast is extremely rare under the age of 30, and few cases have been observed under the age of 35. The average is estimated by Gross as 48 years.

The clinical history of the ordinary case would be something as follows: The patient will be in middle life, probably married. Eighty-eight per cent. of the cases collected by Gross occurred in women who were or had been married. There will be a history of slight pain, or

occasional stinging sensations hardly severe enough to be characterized as pain. There is seldom dull or constant aching in the early stages of the disease. In many instances the patient discovers the lump while bathing, before the advent of pain. Too much stress should not be laid upon pain, inasmuch as many cases of cancer of the breast become comparatively far advanced before they produce appreciable pain. Gross states that "carcinoma of the breast begins as a small, painless nodule." In about one-third to one-half of the cases the patients give a history of having received some injury to the breast at varying intervals of time prior to the discovery of the tumor. Previous inflammatory trouble or antecedent injury is of great importance and should be carefully inquired into. For notwithstanding the circumstance that many refuse to admit that there is an etiological relationship between trauma and cancer, the clinical fact remains that these conditions are very frequently associated with the development of malignant disease; and, although we may not at present be prepared to offer a satisfactory explanation, the facts must have due weight in our efforts to establish the diagnosis.

The frequency of histories of previous trauma in cancer of the breast varies from 12 to 46 per cent. in the statistics of different writers. A careful physical examination will enable us in most cases to make a diagnosis; and in making this examination the fingers should be applied flat against the parts and should not be used as in pinching. In carcinoma of the breast the tumor is generally very hard, no matter how small it may be. It is usually found somewhere in the periphery of the breast, and is,



FIG. 1099.—Carcinoma of the Breast.

even in the early stages, much more fixed to the surrounding breast tissue than are benign growths. In about half of the cases there will be found a retraction of the nipple, although I believe that the diagnosis should be made in most cases before this sign has appeared. The condition of the skin is of very great importance and is of great help



FIG. 1100.

in determining the diagnosis. The peculiar condition, known as "dimpling of the skin" is caused by the contracting of the fibrous tissue lying between the skin and the gland tissue. In the great majority of cases the skin is obviously dimpled. Shield states that there is no sign of more vital importance than this. Even when the skin did not appear dimpled, I have seen cases in which the dimpling could be easily brought out by slightly pinching a considerable area of skin overlying the tumor. Examination of the axilla should always be made, although the absence of enlarged glands would not justify us in excluding carcinoma. The axillary glands are palpably enlarged in about 50 per cent. of the cases. The tumors most likely to be mistaken for carcinoma are fibro-adenoma, cyst-adenoma, fibroma, sarcoma, chronic inflammatory and tuberculous disease. Fibro-adenoma occurs, as a rule, in younger individuals. Of 63 collected by Shield, 45 occurred before the age of 40. This variety of tumor more frequently occurs in single than in married subjects, a fact just the reverse of that found in cancer. The age of the patient and the absence of the characteristic symptoms and signs already noted with reference to cancer enable us to make a diagnosis in most cases. In certain cases, however, it is impossible absolutely to be sure whether the tumor is malignant. However, the plan advocated by some surgeons in such an event, to cut out a portion of the growth under cocaine or with a tumor punch for examination, is hardly to be recommended. The better way is to prepare the patient for a complete operation, first remove the tumor, and if the surgeon is not able to determine whether or not it is malignant on examination of a gross section, a frozen section might

be made and examined. In very few cases will this be necessary.

Results of Operative Treatment.—The improvement in results of the operative treatment of cancer is nowhere more manifest than in cancer of the breast. The gradual and, as it were, painful evolution of modern methods from the incomplete operations of a few years ago has been very clearly shown by Sir W. Mitchell Banks in his recent Lettsomian Lectures on "Practical Observations on Cancer of the Breast."* He states that in 1862 operations for cancer of the breast consisted in local removal of the tumor of the most imperfect description. If any glands were affected, this was a sufficient bar to any operation. In 1867 Mr. C. H. Moore wrote what is now an almost historic paper on "Inadequate Operation in Cancer," which set a great many minds thinking, inasmuch as it was "a revolt against constituted authority." Banks' paper, "A Plea for the More Extensive Removal of Cancerous Growths," was published in 1877, and the classic work of Gross on "Tumors of the Mammary Gland" in 1880, or three years later. The works of Moore and Banks and Gross were slow in being accepted. Banks again, in 1882, in a paper read before the British Medical Association, said: "Surgeons, as a rule, do not remove cancers of the breast; they persuade their patients that they do and they almost persuade themselves, but there is always that little bit that they leave behind, and which they fondly hope will not grow because it is such a little bit. Alas, that such little leaven should leaven the whole lump!" Banks made a most urgent appeal in favor of removing the entire breast with a very wide area of skin, but he advocated the removal of all the axillary glands and fat in all cases, whether the glands could be felt or not. As late as 1888 this complete

* Lancet, April 7th, 1900.



FIG. 1101.—Double Carcinoma of Breast.

operation, so long practised and championed by Banks and Gross, was opposed by many of the ablest surgeons of England and America, notably by Butlin and Pick, while Thomas Smith even went so far as to say that patients lived longest who had never been operated upon at all. It is true that the high mortality that followed the operation at this period (16 per cent.) gave some justification for those who were content with the simpler procedure. In spite of all criticism and obstacles Banks

and Gross continued to practise as well as to preach the complete operation, until to-day we find that even Butlin himself has not only come over to the complete operation of Banks, but has gone a step further and is now a most enthusiastic advocate of Halsted's operation. While many who advocate the extensive operation of today prefer to credit their conversion to the histological researches of Heidenhain, we must in fairness acknowledge that this great change has been largely due to the earlier clinical works and the superior results of Moore, Banks, and Gross. Banks' statistics are the largest and most complete yet published. He has operated upon 213 cases of cancer of the breast. Of these, 175 have full histories; 67 died of local recurrence, and it is a most remarkable fact that of these 67 cases 17, or 25 per cent., lived from 3 to 13 years; 38 patients were alive and well from 3 to 21 years after operation. Of 108 cases that remained free from local recurrence, 73 lived from 3 to 21 years after operation; 40 from 3 to 6 years; 28 from 7 to 14 years; 28 from 16 to 21 years; 30 died of metastases without local recurrence. Of these it is important to note that 20, or 66 per cent., died from 3 to 14 years after operation.

Adding the cases that died after 3 years from local recurrence to those that died after 3 years from general recurrence, we have 37 patients who, according to the usual reckoning, would have been regarded as cured, yet who really died of recurrence.

Let us then compare the percentage of cases estimated by the usual 3-year basis with the percentage of actual cures of Banks' series of 213 cases (we must exclude 60 operated upon during the last three years and 7 in which only partial operation was performed); we have left 146 cases; 90, or 62.3 per cent., lived beyond 3 years. The careful tracing of the after-history of these 90 cases showed that 38, or 42 per cent., recurred after having passed the 3-year limit. Thus 26 per cent. of the total of 146 cases operated upon more than three years ago recurred after 3 years. This shows the great importance of following up the patients for long periods of time, and makes the statistics of Banks by far the most impor-

tant data we now possess upon which to base a true estimate of the curative value of surgical treatment of cancer of the breast.

These statistics certainly justify the conclusion of Banks, that "the plan of taking percentages in small numbers of cases ought to be abolished," and, furthermore, that "the 3-year cure system, too, must be abolished if people are to be instructed fairly." The recent statistics of Barker bear out the conclusions of Banks.*

Barker's tables contain 100 consecutive cases of breast tumors treated by operation, most carefully traced to final results. Of these, 90 were malignant; 6 died of operation; 33.7 per cent. lived over 3 years and 16 per cent. over 5 years.

In regard to the 3-year limit Barker says: "It is clear that 33 per cent. live more than 3 years after operation, which has been suggested to some surgeons that they should be regarded as permanent cures; but some of the cases (26.9 per cent.) have died most likely of recurrence in all but 1 after an immunity of over 3 years, so that such a presumption is unwarranted."

In one of Barker's cases there was extensive glandular infection and a bad prognosis was given, and yet the patient was well 14 years later.

Cheyne's latest statistics† are among the best that we have. He gives the details of 61 cases operated upon more than three years ago. Excluding the cases not traced and those which died of operation, which I did not do in estimating

Banks' percentage, Cheyne has 37 cases remaining, of which 19, or 51 per cent., were alive and well.

Butlin's most recent statistics‡ give 116 cases operated upon between 1880 and 1894. Of these 6 died of operation; 3 were not traced; 51 had local recurrence; 22 had general recurrence; 2 died of other causes within 3 years; 3 died of other causes after 3 years; 29 are alive and well more than 3 years after the operation.

In 1895 Butlin adopted Halsted's method, and of 33 cases up to the end of 1897 had but 1 death. Of these 11 were operated upon more than 3 years ago. Of these 1 died of operation; 3 of recurrence (2 local), and 9, or 70 per cent., were well more than 3 years. These results are brilliant, yet it would be clearly unfair to form an estimate of the value of any operation for cancer on such a small number of cases.

Supraclavicular Glands.—I have not yet been convinced of the wisdom or value of removal of the supraclavicular

* "The Expectancy of Life in Cases of Cancer of the Breast." Lancet, September 3d, 1900.

† "Further Statistics as to Results Obtained by Operations for Cancer of the Breast." Lancet, March 13th, 1899.

‡ St. Bartholomew's Hospital Reports, vol. xxiv., 1898.