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AN ESSAY ON CANCER

THE MODERN TREND OF MEDICAL OPINION
ON CANCER

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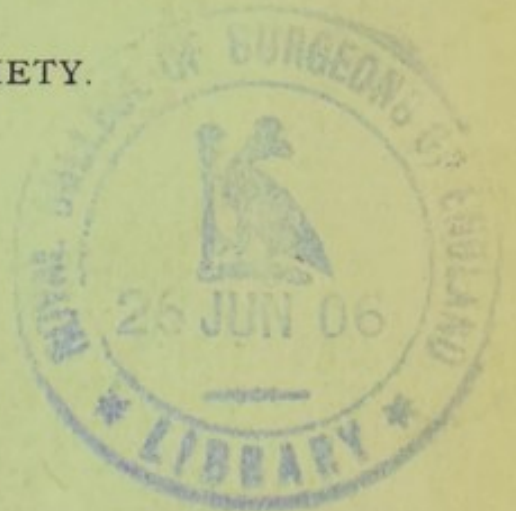
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AWARDED THE SCOTT PRIZE, 1900

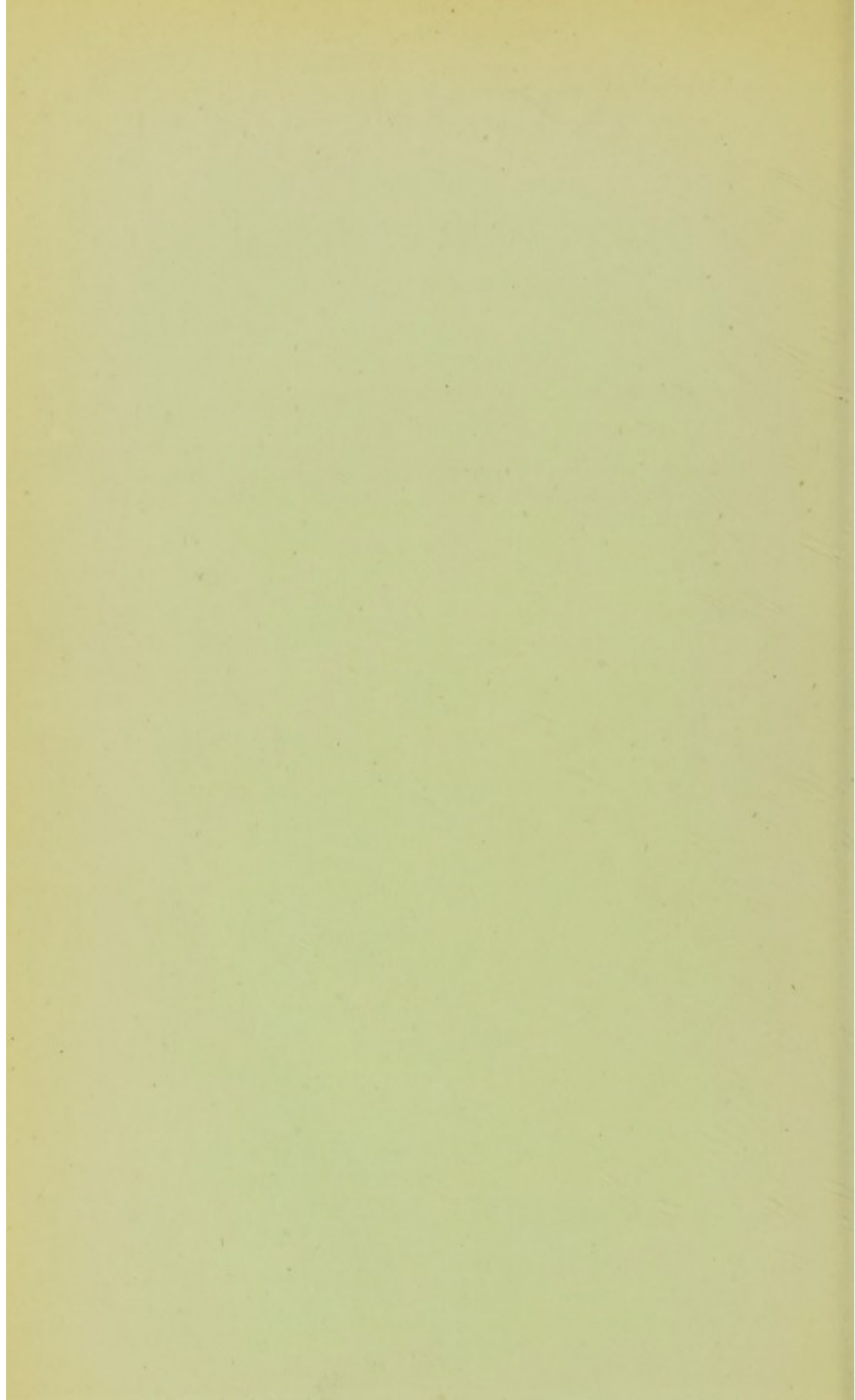
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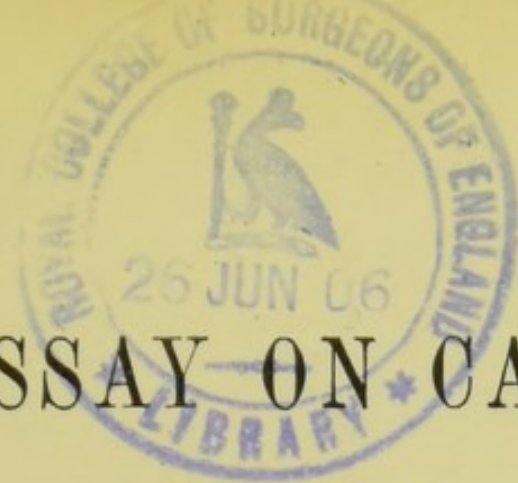
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AN ESSAY ON CANCER.

NOTHING in the field of speculative philosophy at the present day has evoked a more prolific discussion than the subject of Cancer. Though possessed of the results attained by the patient investigations of many centuries, though thousands of workers skilled in the most advanced methods of scientific research are unceasing in their attacks upon this problem from many diverse standpoints, yet in scarcely any particular pertaining to cancer are we certain. We are confronted by myriads of hypotheses, all of them truth to a few, but falsehood to many. The earnest seeker after truth, therefore finds not only his way barred by the natural veil that surrounds a mysterious disease, but with much difficulty has to discover for himself the trustworthiness or otherwise of the numberless sign-posts that point the way.

Alleged Increase of Cancer. Generally speaking, all diseases at the present time are on the decrease with two notable exceptions—cancer and diseases of the nervous system—though mayhap cancer may yet come to be classified under the head of the latter diseases. As illustrative of this increase in regard to cancer, I may say that in 1840 in England and Wales, cancer accounted for one out of every 129 deaths, while in 1891 the ratio was one to every 29 deaths. In order to show that the improved conditions of life with the greater attention paid to hygienic principles at the present day has had no effect on the disease we may compare the mortality of cancer and phthisis, the latter a disease due largely to bad sanitation and unhealthy surroundings, and in the Registrar-General's reports we find the following tables:—

Deaths from Cancer and Phthisis.

| | Cancer. | Phthisis. |
|------|---------|-----------|
| 1877 | 12,016 | 51,353 |
| 1887 | 17,113 | 44,248 |
| 1896 | 23,521 | 40,281 |

The cancer death-rate has risen from one out of 5646 of population in 1840 to one out of every 1306 of population in 1896, that is in fifty years the proportion has increased nearly five times.

I give below a comparison between the death-rates of Cancer and Phthisis.

Annual death-rate per million from Cancer and Phthisis.

| | Cancer. | Phthisis. |
|------|---------|-----------|
| 1877 | 486 | 2079 |
| 1887 | 615 | 1615 |
| 1896 | 764 | 1307 |

W. R. Williams writing in 1894 says: "From the extent of the mortality and the average duration of the disease there cannot be fewer than forty thousand persons now suffering from Cancer in England and Wales, whereas in 1840 the number was only 5500.

The same increase obtains in New York State, and Dr. Roswell Park, after a careful study of its statistics, makes the following prophecy: "If for the next ten years the relative death-rates are maintained we shall find ten years from now—namely, in 1909—there will be more deaths in New York State from Cancer than from Consumption, Smallpox and Typhoid Fever combined."

This increase, however, is not acknowledged by all. Dr. Newsholme, among others, points out that this increase is not real but apparent. That the present day improved methods of diagnosis, the greater number of people that live to a cancerous age owing to better sanitation, the increase in population and also the greater number of necropsies as compared with formerly, are sufficient in themselves to explain this increase. These factors may explain some of the increase, but not all. In most civilised countries where statistical records have been kept, a similar increase has been observed and it has been shown that the augmented Cancer mortality has coincided with progressive population, increased national wealth, and marked improvement in the general well-being. In Ireland, where less favourable conditions have prevailed, the Cancer death-rate has been much lower than in either of the sister countries and for many years it has shown no such marked increase as in the latter.

Increase of Cancer in Males. A curious fact in regard to this increase is the growing prevalence of the disease in Males out of proportion to that of Females. In the Registrar's Report, the following table is given:—

| | Male Cancer Death-rate per million living. | Female Cancer Death-rate per million living. | Ratio. |
|---------|---|---|----------|
| 1851—60 | 195 | 434 | 1 to 2.2 |
| 1871—80 | 315 | 622 | 1 to 1.9 |
| 1881—90 | 512 | 839 | 1 to 1.6 |
| 1896 | 618 | 901 | 1 to 1.4 |

Simpson has shown that malignant disease is about equal in the sexes at or about the age of 15 and from this period

of life the difference becomes more marked until between the ages of 45 and 55, when the proportion of women and men affected is as $3\frac{1}{2}$ to 1. Afterwards it begins to approach a more equal distribution. No proper explanation has been forthcoming of this undue incidence of the increasing Cancer mortality in Males, but it has been urged that it is the result of urbanisation, the conditions of life for men having come to resemble more closely that of women than heretofore. Excess of food with want of proper exercise and changed surroundings being put down as probable causes. It is remarkable that in New Zealand more men are affected than women, and here it is supposed that this is due to their gluttonous habits with regard to meat eating. It is also strongly urged that this increase in Male Cancer can be explained away by improved diagnosis, and increased necropsies, as it is generally recognised that Cancer in the Male is often more internal and more difficult of diagnosis than in the Female, and the increase is therefore only apparent.

Liability of Females. With regard to the greater liability of females to Cancer, most observers are agreed that it is not the outcome of any general constitutional condition correlated with sex, but that it is due to biological peculiarities inherent to the reproductive organs themselves. For example, Mammary neoplasms are most prone to arise in the site of greatest post-embryonic developmental activity, where cells still capable of growth and development most abound, the like is true of other organs. This brings us to the—

Aetiology of the Cancer Process. All the tissues of the body consist of cells which multiply according to the requirements of the healthy tissue, and these cells pass through a certain evolution from a simple embryonic character, to the specialised cell of the part where the growth takes place. This multiplication and evolution is governed by a certain regulating force. A cancerous growth is an excessive cell proliferation whose cells do not advance beyond the low embryonic type, but whose numerical increase is quite out of proportion to that of the healthy tissue, and in which apparently the regulating restraining force has been suspended or lost. The question arises—What brings about this suspension, or loss, of this power? It may be due to one or both of two conditions,—

1. The result of the abnormal play of forces arising within the body, or

2. Due to the intrusion of some irritant from without.

1. What the abnormal play of forces within the body may be can only be vaguely guessed. It must act by releasing a restraining influence on the cellular activity, and if there be a sufficient supply of nutritive material at hand a neoplasm ensues. Lack demonstrated that epithelial cells from a freshly cut ovary of a living rabbit, allowed to diffuse in its own peritoneal fluid, so multiplied that at the end of 14 months, the rabbit being killed, tumour-like masses of epithelium were found in the abdomen and thorax, and white hard round

nodules, cancerous in appearance, in most of the organs of the body.

The loss of the restraining influence on the growth of the epithelial cells, was apparently due to change of position from the ovary to the peritoneal fluid.

2. Irritation *ab extra*. We can from our knowledge of other diseases more readily understand how the action of some irritant from without the body should cause a cellular development. With regard to the irritative causation of cancer, there are two schools of belief—one holding the opinion that any form of chronic irritation may originate the disease whether of microbic origin or otherwise, and the other which ascribes everything to the microbe.

We have reliable evidence to demonstrate that irritation does cause, or at least predispose to cancer. Volkmann has collected 223 cases of primary cutaneous cancer of the extremities, in 88% the cancerous disease has originated in connection with some previous lesion of the part. The special liability of chimney sweeps, workers in tar and paraffin and other irritant substances, to cutaneous cancers is well known. The majority of surgeons are agreed from their experience that chronic irritation is a cause, but perhaps not so frequent as has been asserted. If I might mention my own modest observations, I found that in the last ten consecutive cases occurring in my practice, there was a distinct history of irritation in three of these.

The Cancer Parasite. The evidence in favour of a cancer germ as the active agent in the causation has of late years been much advanced by many observers.

Pathologists have demonstrated the presence in cancerous tumours of round bodies of varying size from .004 to .04 mm. in diameter, lying within and without the cancer cells. These are the cancer parasites. They are circular with a double outlined capsule, they are highly refractory, and are said to possess a nucleus. Russell, writing in 1890, was of opinion that they were Blastomyces and called them "Fuchsin bodies," from their staining properties. Metchnikoff and Plimmer are content in the present state of our knowledge to regard them as "Parasitic protozoa." Sanfelice and Roncali lend their support to Russell's theory, that they belong to the blastomyces, a variety of the saccharomyces. Bra of Paris regards them as inferior Mushrooms of the Ascomycetous family. These organisms have been isolated and cultivated on media, the best results according to Plimmer being obtained in a medium made from an infusion of Cancer, and the organism grown anaerobically, the air being substituted by Hydrogen. The organism reproduced corresponds in every respect to the organism found in the cancer cells. These have been inoculated into animals by such experimenters as Roncali, Sanfelice, Plimmer, Mafucci, Sirleo, Curtis, and others, with varying success.

Many observers have found that on inoculation into guinea-pigs whenever inoculation was performed, a general infection ensued, which ran a very rapid course, causing death in a month.

A post-mortem examination revealed the presence of the parasite in all the organs of the body with the formation of tumours consisting partly of masses of the parasite and partly of proliferation of the cells of the part. Sanfelice has noticed that the parasite in the tissues has a somewhat different appearance to that which it has in the cultures. In fowls the parasite appears quite different from that in other animals. In mice a rapid infection with a great multiplication of the parasite occurred. This experimenter has had good results with cats, though he used an organism derived from prune juice, which he prefers to a culture from a cancerous tumour, apparently because of its readier cultivation. The cats lived, on an average, three months after inoculation. Dogs gave results more nearly resembling human Cancer, and one dog lived ten months. From what one can gather from his experiments the nearest approach to human Cancer in general appearance, physical signs, course and development, was obtained after passing the parasite, by intraperitoneal injection through a series of dogs, and then inoculating into the nipples of a bitch. Another has found that geldings are most susceptible. Sanfelice is of opinion that when the parasite has been long enough in the body of cats to assume the typical forms of Russell's fuchsin bodies they are no longer cultivatable in artificial media. If, however, the cats be killed soon after inoculation, cultures can be obtained, the parasite then presenting the forms which occur in guinea-pigs and rabbits, where the infection ran a more acute course. He thinks, therefore, that the parasite appears in the tissue of animals in two forms. In one form it possesses a capsule and is cultivable in artificial media. In the other it has no capsule, is identical with Russell's fuchsin bodies and cannot be cultivated in artificial media. This second form is only observed in the organism when the parasite has lived in it for some time. It might be urged that the presence of this form of the parasite in pieces of cancerous tumour inserted into animals may be accountable for the failures that many experimenters have experienced. It must be remembered, however, that our means of artificial cultivation are by no means perfect.

From a review of the results of inoculation experiments one might venture to draw the following conclusions:—

1. That animals possessing a relatively highly developed nervous system are more prone to Cancer, and in them it approaches more nearly the type found in human beings. Additional evidence is supplied by the analysis of cases of Cancer occurring naturally in domestic animals. Amongst these the order of frequency is as follows: Horse 25, dog 16, ox 5, cat 2, sheep 1, and the pig is very rarely a victim.

2. It is mentioned by several that animals that have been kept for some time in close confinement are more readily inoculated, and furnish the best results. It is quite in keeping with the view widely held that a period of nervous worry is a very common predisposing cause in human beings.

A rather curious experiment favouring the microbic origin is reported by Jurgens, who successfully inoculated animals with fragments of Sarcoma taken from a patient who had been three days dead. This certainly shows that the infectious nature of cancer cannot be attributed to the epithelial cells, but to some other agent, that had survived the death of the host.

Confirmatory testimony is also furnished by surgeons. One had sometime ago a case where cancer developed along the lines of an incision made for relieving tension in the endeavour to close a large wound made by removing a cancerous breast, these incisions having been made with the same knife used for operating upon the primary tumour. Cornil also reports a case where a surgeon having removed a tumour of the breast inserted part of it beneath the skin on the breast of the opposite side. The wound healed, but in two months a nodule formed which proved to be undoubtedly cancerous in its nature.

Interesting as assisting by analogy the classification of the germ in the vegetable kingdom is, firstly, the statement by Busse, who discovered, in a case of sarcoma of the tibia, yeast cells which on inoculation are capable of irritating the connective tissue, and cause a tumour resembling sarcoma, and also the fact that some success in the treatment of cancer has attended the administration of pure cultures of yeast ferment by Dr. De Backer. Brault has drawn attention to the fact that rapidity of growth in tumours varies in direct proportion to the amount of glycogen present in them. He remarks that cancer commonly occurs in organs where glycogen is present in large quantities. Dr. De Backer argues that if the amount of glycogen could be diminished the growth would decline in proportion. The yeast fungus acts in reducing the glycogen and the results he has had appear to justify his supposition.

Predisposing Causes. Having considered the alleged exciting cause, it would be well to consider in relation to these some of the predisposing causes that are put forward, and first of all the fact of Local Incidence—one which is exciting very serious attention at the present moment.

Many observers have established a connection between a high cancer mortality and districts possessing a clayey sub-soil traversed by fully formed rivers which occasionally flood their banks. Mr. Alfred Haviland, for long a pioneer on this subject, comes to the following conclusions:—

1. That the districts having the highest death-rates from cancer were invariably associated with seasonally flooded areas traversed by, or in close propinquity to, fully formed rivers.

2. That geologically these high mortality districts were characterised by alluvium and subsoils of clay of every variety of age and formation.

These assertions are strongly supported by the evidence, among others, of D'Arcy Power, Noel Nason, the Registrar-General's reports, the special report of the Birmingham and

Midlands Branch of the British Medical Association, and T. W. Blake. The latter in a paper mentions the curious fact that horses in Australia suffer from "swamp cancer" in the axilla, from grazing on stagnant marsh grass, the tumours growing to an enormous size.

In the Registrar-General's report of the cancer death-rate throughout England and Wales, for the decennium 1881-90, a few of the counties are classified as follows:—

| Death-rate per million. | | | |
|-------------------------|-----|-------------|-----|
| Durham | 440 | Sussex | 727 |
| Stafford | 475 | North Wales | 736 |
| Lancashire | 477 | Devon | 740 |
| Derby | 482 | Cambridge | 799 |
| S. Wales | 401 | Huntingdon | 916 |
| Norfolk | 716 | | |

This compilation is all the more remarkable when we consider that Cambridgeshire and Huntingdonshire contain no very large towns with a wealth of hospitals to draw a great part of the cancerous population for miles around as obtained in Lancashire and S. Wales. He further remarks that an examination of the uncorrected cancer rates in the separate registration districts within and around the counties of Huntingdon and Cambridge show a fairly defined area in which cancer would appear to be exceptionally prevalent. Defining the area as inclusive of nearly all of Huntingdonshire and Cambridgeshire with portions of the adjoining counties, he finds that with a population of 300,000 in the decennium 1881-90. there was 859 deaths per million, or 46% above the average rate. In the previous decennium it was 44% above. This area geologically coincides with Haviland's conception of a cancerous country.

Before leaving this subject of locality I may mention some curious features elicited from the histories of nine consecutive cases of Cancer which occurred in my practice, which lies in the city of Manchester. Only one out of the nine was born in Manchester, seven out of the other eight were born, and lived till the average age of 20, in the different Cancer fields of England and Wales mapped out by Haviland. All these seven had a very distinct history of special worry antecedent to the outbreak of the disease, but no indication of recollection of any irritation of the part affected, and they did not develop the disease whilst living in the Cancerous district, but many years later. The other two had not lived in a cancer field, both were stout, of lymphatic temperament, confessed to having led lives singularly free from worry, but both had clear histories of irritation,—in one an only sharp tooth caused disease in the tongue, and in the other a clearly remembered pressure on the breast from an elbow in a crowd. There may be something stronger than coincidence in these histories. Interesting in this connection is the remark of Noel Nason: "When the organ or region in which the disease has developed is noted it appears that in those districts on higher and better drained

land, where malignant disease is less common, a larger proportion of the cases which do occur have some more or less obvious predisposing cause, and, I am inclined to think, run a more chronic course. Here such cases as surface epitheliomata, following definite irritation, carcinomata of breast, uterus or rectum, are formed in greater proportion. In close proximity to streams, on the contrary, malignant disease of some of the less commonly affected organs, or portions of the intestinal tract, is found with unexpected frequency, and I fancy, runs a more rapid course."

"Cancer Houses." Recent literature, English and Continental, recognises more widely the fact that Cancer houses exist, houses in which several of the inmates are attacked by the disease, implying that the house is the seat of the infection. The location of such houses is generally along the banks of sluggish streams. This infectious view gains in weight from the increasing disbelief in the potency of heredity in transmitting the disease.

Others have noted that Cancer occurs near streams which are polluted with sewage.

Arboreal Cancer. Others that it is frequent in the neighbourhood of large woods, and Fiessinger, and Noel have drawn attention to the presence of apparently contagious tumours on trees growing in cancerous districts, and certain insects seem particularly drawn to these tumours, and they are supposed to carry the infection from tree to tree. Dr. Bra inoculated several healthy trees with human cancer. All in six months showed diseased patches of dry rot, and one died from the cancer communicated.

It is assumed from the above by some that the parasite is water borne, by others that it is carried by insects, and yet by others that small fish are the agents in spreading the disease. It may be that the parasite flourishes best on the drying land which is occasionally flooded, or it may be that instead of the parasite the latter may have a host whose habitat lies in such places. This is suggested to one by the recent discoveries of Ross in regard to malaria, and interesting in this connection is the fact that some observers have noted that where malaria is common, cancer is rare, and vice versa.

Malaria is now believed to be due to the action of a parasite which lives in the blood of man, and which develops in the mosquito its intermediary host. The parasite is found in man in two forms,—one which spores asexually, and another, often of crescentic form, which appears to have no developmental activity in man. Some of these crescents on being taken up by the mosquito on biting, swell up and discharge filaments which find their way into another swollen crescent, which then spores. The spores find their way to the salivary glands of the mosquito and are discharged into the blood of the next animal which the mosquito attacks, and there set up the fever after a lengthy incubation period; the crescent form of the parasite is thought to be of use in continuing its existence from the

death of one year's mosquitoes to the birth of the next. Each year's new mosquitoes must get their supply of parasites from human beings who were infected in some previous year. If it were possible to suppose that the cancer parasite could exist in a certain form harmlessly in a human being, and to need the intervention of another host to render it capable of originating cancer by assuming probably a different stage of development, then we could readily understand why it should be that individuals who have lived in their youth in cancer fields should in after life, though removed from such surroundings, be more susceptible than their fellows to the disease. According to some scientists, the *Saccharomyces* are only a stage in the life history of certain fungi. We could then also understand why, after entire removal of the disease and a successful result to all appearances obtained, recurrence should take place ten, twenty or even thirty years later. Malaria is an acute disease. Cancer takes a long time to develop. But we must remember that Syphilis is a slow disease, one of years' duration, yet no one doubts that it is due to a parasite.

Influence of Age. In consideration of the predisposing causes, what strikes one most forcibly is (if we exclude sarcoma) the influence of age in the development of cancer. The occurrence of the disease is very rare in individuals up to 25 years of age. It then increases up to the 55th year, when it declines and becomes exceedingly rare after 80. It is by no means a senile disease; it occurs most frequently during the period of decline after maturity has been reached. In females who reach maturity sooner than males the most frequent decade is between 44 and 55. In men it lies between 55 and 65. Williams has compiled the following table:—

| | | |
|------------------------------------|----|-------|
| Average for Uterine Cancer (onset) | 44 | years |
| " " Mammary | 48 | " |
| " " Tongue and Mouth | 50 | " |
| " " Rectal | 53 | " |

The reason alleged for the difference in age for the different organs is that the uterus and mamma reach maturity sooner than the others and during their period of decline the liability increases. Is this susceptibility due to the alteration in the relationship between the income and expenditure in the body, or is it the outcome of some atrophic changes due to impaired nerve supply of the parts affected? The questions have not yet been satisfactorily answered.

Civilization. It has been conclusively proved that cancer is most frequent amongst the most highly civilised communities, some going as far as to say that the disease is unknown amongst the savage races in Africa. With regard to the class of people affected, Sinclair on uterine cancer says: "All observers are agreed that cancer of the uterus is most frequently met with in the lower ranks of the people of all countries. So marked is the difference of incidence that it might be reasonably affirmed that if we could place all the lower orders

who suffer from privation and depressing environment, for a generation or two in the position of the more favoured, we should stamp out cancer."

Overfeeding. This strong statement is necessarily in conflict with the view of those who hold that overfeeding is sometimes responsible for its development. One writer remarks: "Generally speaking the cancer mortality is lowest where the struggle for existence is hardest, the density of population greatest." The rarity of the disease amongst uncivilised peoples is explained by some as due to the fact that they eat very little meat or have to abstain from it for a time, and Sir W. Banks a few weeks ago asked the question: "Is the increase of cancer in any way synchronous with an increase of nutrient material—that is food—throughout the country, and people in consequence better nourished? There cannot be a doubt of it. Ever since the passing of the Corn Laws bread has been cheap and plentiful, while during the last 20 years the importation of animal food from other countries has been enormous. The increased wages and emoluments of all classes in this country have enabled them to purchase freely of the best there is to be had in the whole world of things to eat and drink. Our working classes fare admirably. Our better classes eat infinitely too much, especially of animal food partaken of at breakfast, lunch, and dinner," Many statistics have been drawn up to endeavour to substantiate this statement, but they do not appear very conclusive. It is also said that the rapidity of cancerous growth is lessened if butcher meat be reduced to a minimum.

Heredity. The importance of heredity in the causation of the disease has of late years in the opinion of most observers distinctly declined. Too much stress has formerly been attached to this subject. Its value has been discounted by the increasing evidence of the contagiousness of the disease.

Cancer and Tubercle. It has been urged that cancer and tubercle are intimately associated, not in the same individual, but in the family, and Moore has found that the eldest members of a tubercular family are more prone to become cancerous than the younger ones, the first-born being the most liable.

Sites of Cancer. The chief seats of Cancer in both sexes are in the following order of frequency:—

| | | | |
|--------------------|----------------|------------------|---------------|
| Uterus | 19.2 per cent. | Bones | 4.0 per cent. |
| Mamma | 17.5 " | Rectum | 3.3 " |
| Skin | 9.4 " | Maxillae | 2.9 " |
| Connective tissue | 7.7 " | Stomach | 2.6 " |
| Tongue & mouth | 6.3 " | Lower Lip | 2.6 " |
| Ovaries | 5.8 " | Other Localities | 13.6 " |
| External Genitalia | 5.1 " | | |

Morphology of a Cancer Growth. A cancer is essentially an epithelial overgrowth, the cells arising from the epithelium existing in the part affected, and thus the nature of the epithelium in the several parts of the body being different,

causes a variation in the appearance of cancer. The cells are not essentially identical with the epithelial cells from which they originated, but a resemblance can always be traced. Mixed up with the cells there is generally a varying amount of connective tissue, which may be loose fibro-cellular, or even strong and old fibrous tissue. The tumour sends out epithelial processes into the surrounding tissues, spreading most rapidly in the directions of least resistance along the adjacent lymphatics and paravascular sheaths.

Lymphatic Dissemination. Of late years much attention has been directed towards the dissemination of cancer by the lymphatics, notably by Halsted and Harold Stiles in connection with the mamma, and Blau, Dybowski and Winter in uterine cancer. Too much importance cannot be attached to a thorough knowledge of lymphatic infection, as upon it depends the nature, extent and hope of successful operation as well as the prevention of a recurrence. This has a special bearing on mammary cancer, because of the great accessibility of the parts to the operator. It will be of service to recapitulate a few of the points upon which Stiles lays stress in his masterly description of the mammary lymphatic system.

He classifies the lymphatics as interacinous, perilobular, periductal, and paravascular. These lymphatics communicate freely with the cutaneous. A tumour situated under the areola infects the main lactiferous ducts which lead into the sub-areolar plexus of Sappey, and then to the skin. The infection also spreads to the skin along the suspensory ligaments of Cooper, which pass from the anterior aspect of the main body of the gland to the under surface of the true skin. These ligaments branch amongst themselves and form a network. A very early infection is commonly met with in the lymphatics at the back of the gland and in the pectoral fascia. With regard to the pectoral muscle it is now more widely recognised, thanks to Rotter, that it is a very common seat of early cancerous dissemination. He has verified that the perforating branches of the internal mammary and the superior thoracic artery, after penetrating the pectoralis major, can be traced through the retro-mammary tissue into the substance of the gland, and in one instance he traced the latter vessel into a cancerous tumour itself. Branches of the long thoracic artery pass through the muscle as far as the retro-mammary fat, and Rotter showed that these bloodvessels were accompanied by efferent lymphatic vessels from the breast, and also that alongside the course of these bloodvessels there existed several very small lymphatic glands. In a very large proportion of cancerous breasts he found these lymphatics and glands diseased. With regard to the axillary glands it is now recognised that disease may exist, yet its presence may not be detected by palpation, nor even, when the axilla is cut open, by inspection of the glands, for no apparent enlargement may be seen although disease may be present.

Another point of importance is the now acknowledged mis-

leading statement of many surgeons that in axillary gland involvement the lymphatics leading from the breast to the glands are distinctly felt hard and thickened. Now it has been shown, first by Herring, that the mamma has normally a tricuspid form, two of the cusps projecting towards the axilla, an upper and a lower, and the other towards the sternum. The upper of these two axillary cusps is frequently prolonged round the border of the pectoralis muscle right into the axilla. It is the involvement of this process of the gland in the cancerous growth that gives the feeling of thickness.

Dissemination by Bloodvessels. As well as lymphatic invasion Goldmann has shown that the bloodvessels, especially the small veins, are more frequently and more extensively invaded than was hitherto thought to be the case. The arteries are also sometimes invaded.

Physical Signs and Symptoms. The physical signs and symptoms of a cancerous growth I need not mention here. It will be sufficient to indicate the value attached at the present day to a few signs and symptoms which had been considered classic.

Pain. It has been frequently pointed out lately that pain is not such a constant symptom as had long been supposed. In the early stages pain is absent, and often not till nearing ulceration is any discomfort experienced. Internal cancers are frequently painless during their entire course. On the other hand, benign tumours and especially chronic inflammatory swellings frequently occasion great pain.

Retraction of the Nipple. In mammary cancer it was long thought that retraction of the nipple was a certain sign. This is more than the truth. It is only when the tumour is situated underneath the nipple that the retraction occurs. In case of cancer at the periphery retraction may never show itself.

Dimpling of the Skin. This has been much insisted on of late, and all are agreed of its very great diagnostic value. It occurs long before any adhesion has taken place between the skin and the growth. It is seen in the Breast and is caused by the contraction of the suspensory ligaments. It has the appearance of, and is called by Banks, "Pig Skin".

Cachexia is not such a necessary accompaniment as it was formerly thought. Certainly it is not to be met with often at the beginning of the disease.

Hæmorrhage. In uterine cancer hæmorrhage is usually a marked feature, but it is often supposed that at the menopause irregular and profuse hæmorrhages as well as other discharges are a natural termination to the reproductive term of activity. This mistaken idea often gives rise to much delay in dealing with the case.

Treatment. At the present day it is agreed that almost the only means that holds out a hope of cure is radical removal by the surgeon's knife. Bearing in one's mind the various

alleged causes of cancer, it must seem that the employment of the knife does not furnish a scientific antagonistic agent, and it leads us to hope that at some future date, should the analogy between cancer, syphilis and other infectious diseases be rendered still closer, the treatment may become analogous. In using the term "cure" in regard to cancer there is not a full agreement as to its exact meaning, as after operation recurrences are frequent. One surgeon has affirmed that after successful operation not till the patient is dead can the case be entered as a cure. But the majority are more modest, and it is pretty generally accepted that the term "radical cure" may be applied to cases where no recurrence has taken place three years after the operation. There has been much discussion of late years, owing to the researches of Heidenhain and Stiles, on the lymphatic dissemination of cancer, as I indicated with regard to the extent of the operation. Formerly surgeons aimed at removing the tumour alone, leaving as much surrounding tissue as possible to secure a nice healing wound, and if the glands were not markedly affected they were left. Under this régime surgeons obtained results in which not more than 8 or 10% of their cases remained free from disease for three years. Now-a-days the pendulum has swung perhaps a little too far, and surgeons are basing their hopes of recovery on the most extensive operations. But since the extensive operation has come into vogue the percentage of cures has risen to 20%, and Watson Cheyne records his cures as even 51%. The improved technique in operation is best shown in a general description of a modern removal of the mamma. An incision, circular or angular, leaving a bridge of skin extending to the axilla, is carried through the skin outside the apparent limits of the mamma. The skin around this is further undermined in all directions. The tumour is then removed, and thereafter the differences between operations creep in. Some remove the fascia over the pectoral muscle, which, being intimately connected, means that the upper part of the muscle is removed with it. By others the part of the muscle immediately below and on each side of the tumour is removed, though some remove the entire sternal portion of the muscle, and cut through the pectoralis minor in order, it is said, to deal effectively with the axilla. The lymphatic vessels leading from the gland to the axilla are removed in the skin. The axilla is well laid open and all lymphatics, fat, and connective tissue are removed. Halsted considers it necessary to remove all glands and lymphatics in the posterior triangle of the neck, and formerly used to divide or even excise the clavicle for this purpose. However, the opinion of most men seems to be that if the glands there are enlarged the operation should not be undertaken. The mortality from the operation in the hands of men with moderate views is very slight, as witness Banks' statistics for his last 60 consecutive cases in which there was no death.

With regard to uterine cancer the idea of a more extensive removal cannot well be applied. Hystereotomy pervaginam by

many seems to be the favourite mode of dealing with cancer, however limited the disease may be. In Germany it appears to have quite displaced partial amputation. But the mortality is still very high indeed. More Madden has made some sensible remarks on this excessive zeal with the accompanying risk. He very rationally advocates the earliest possible recognition of the disease, and if it exist in the cervix its removal by amputation of the cervix affords a safe and successful remedy. In all his experience of the operation he has not had a single death. His results have not been so bad, out of 31 cases there were 9 recurrences within 4 years. The results of operation of course really depend upon the earliest possible diagnosis and treatment, especially in uterine cases.

It is sometimes asked whether life is really prolonged by operation. There is no doubt that, according to statistics, operation does grant an extension, but what it really amounts to I am unable to say, the statistics on which I rely being untrustworthy. Roger Williams shows in his book that the number of women operated upon who died before the end of the third year was 40%, whereas of the non-operated the number who died before this period was 53%. The average duration of life for the operated cases was 16 months more than for the non-operated.

Inoperable Cancer. Where cases have advanced too far for a major operation to be of any benefit, or where the sufferer declines operation, there are palliative measures that may be undertaken which delay rapidity of growth, and also increase the comfort of the patient.

Curette. In uterine cancer the sharp curette is often of much benefit in very slight cases or in those beyond hope of operation. All diseased tissue is scraped away until the hard firm tissue is felt. An escharotic is then generally employed, and most men are of the opinion that chloride of zinc is the best. It is used in the form of a paste made with flour; sometimes with the addition of opium, as in Fell's process. It is applied on the end of a strip of lint, the dry portion of the lint being packed in afterwards to retain it in place; and to prevent injury to the vagina and neighbouring parts, pieces of lint or wool soaked in soda are packed into the vagina. Fuming Nitric Acid is also used as well as lunar caustic, iodine solution, bromine, sulphate of copper. The danger in using such caustics lies in the fact that we are unable to exercise any control over the action and are unaware of the depths of penetration. Chloride of zinc is also said to produce a hard cicatrix which becomes denser and harder and ultimately the seat of neuralgic pain.

Cautery. The cautery is also employed chiefly in the form of the galvano-cautery and acts in a similar manner to the curette followed by a caustic. The passage of the negative electric current has been also much tried with varying success. It has been said to cause a cessation of growth, gradual subsidence of pain, shrinking and hardening of the tumour,

followed by improved nutrition and constitutional conditions.

Other remedies in legion are used, a few of which I will mention. They may be used in cancers of various parts of the body, providing the application can be made.

Arsenious Acid has long been a favourite caustic. Gottheil claims that it has a selective action on the cancer cells, stating that newly formed tissue has less resisting power than normal structures when exposed to irritants. It is most applicable to superficial skin cancers.

Formalin has been lately used, but causes much pain and much inflammation.

Copper Sulphate. I have seen some benefit from the frequent application of this caustic in the ulcerative stage.

Alcohol. In order to bring about atrophy of the cancer masses, injections of alcohol into the tumours have been tried since 1872, by various surgeons. Hasse is a very keen advocate of this method, and he proceeds as follows. He injects 60 to 80 minims, diluted to 30%, at intervals of 3 or 4 days, into the circumference of the growth, according to the amount of local reaction set up. He has had most success in mammary cancer, reporting 33 cases of cure. The alcohol causes connective tissue proliferation with atrophy of the epithelial cells. The disadvantages of this treatment are that, in cases which show glandular involvement, it is hopeless, again the cure is very uncertain and the pain inflicted upon the patient is so great and so frequent as to cause its abandonment in many cases.

Kataphoresis. This treatment is based upon the supposition that "a relatively infinitesimal part of the oxychloride of mercury acts lethally on the cancer cells, without destroying the normal tissues." Massey, who introduced this treatment, employs the following method. "A large flat electrode, the negative pole, is applied to the back, and three small gold electrodes, the positive pole, are thrust into the tumour. These gold electrodes are hollow needles, the proximal ends of which may be of platinum or silver, the distal ends of 18 carat gold. After insertion into the tumour mercury is injected through the electrodes and the current is turned on. This may be of a strength from 300 to 1,500 milliamps, and is continued for from 30 to 40 minutes. Anæsthesia is necessary. Nascent oxychlorides of mercury are formed and diffused in directions radiating from the electrodes. In a growth of any size two, three or more sittings will be necessary at intervals of a month to six weeks. As a result of the application the tumour at once shrinks *en masse*, and this is followed by an irritative reaction; discharge comes daily through the openings made by the electrodes. A sepsis is easily maintained. Massey has used considerable quantities of mercury without any symptoms of poisoning. He reports eleven cases, in six of which the method was followed by complete recovery. It may be that the oxygen in the oxychloride is combined so loosely that it is readily given off in a particularly active state, and the good

results obtained may be due to its action, and not that of the compound.

Oöphorectomy and Thyroid Extract. Dr. Beatson was the first to bring forward this treatment. Believing that the cancer parasites are only mucoid cells undergoing degeneration, he argued that the thyroid extract would favour these degenerative changes. Out of his three cases, two, in which he performed oöphorectomy followed by the administration of the thyroid extract, did well. In the third, in which the thyroid extract was given alone without removal of the ovaries, no improvement was noticed. These treatments have been practised by many observers since with some success. Some attributing improvement to one procedure, others to the other, but it would appear that the results obtained by the combined treatment are the best.

Chelidonium Majus. This drug has for long held a reputation as a remedy for inoperable cancer. A Russian surgeon, Denissenko, has lately strongly advocated its use. He injects a 50% solution of the extract into the growth, and administers by the mouth 60 to 90 grammes daily. It acts by softening the tumour and appearing to separate it from the surrounding tissues. Others who have used this drug have been disappointed.

Mixed Toxins. The injection of the mixed toxins of erysipelas and bacillus prodigiosus having proved ineffectual in cancer, their use is being abandoned and reserved for cases of sarcoma. In sarcoma the results are fairly good.

Serotherapy. This method has been applied to cancers. M. Beratta's description is as follows. "Cancer juice was obtained by reducing the tumour to pulp with glass and distilled water, filtering and centrifugalising the fluid obtained. Animals, chiefly dogs, were injected with this in amount proportionate to their weight, 5 to 10 cc. In the case of dogs, after a certain period the animal was bled or killed." The serum obtained has been used on 73 cases of advanced cancer. Pain is diminished by the injections, some softening of the tumour produced, and the general bodily health improved. Locally attempts at reparation are seen, sometimes portions of the tumours are thrown off by necrosis and healing advances to a certain extent. Tolerance to the effect of the serum soon appears to be established, however, and these efforts towards repair cease and growth again commences.

Oxygen. Plimmer has proved by experiment that the cancer parasite flourishes best under anærobic conditions, and he cultivates it in hydrogen. The organism will grow aerobically at first badly, but fairly well after a time, but its virulence is not maintained if grown continuously in this way. It might be inferred from this, that, if the organism was cultivated in oxygen, its growth might be retarded if not altogether checked.

Since February 1898 I have tried on several cases of cancer the effect of a solution of hydrogen peroxide made from magnesium dioxide. It contained oxygen in a nascent form next to ozone activity. For internal administration it was in

three-volume strength, and the average adult dose was a table-spoonful, well diluted, twice or three times a day. The following are my results.

1. Mrs. S., 55. Cancer of the Uterus. Disease began in March 1897. She consulted me in December 1897. She complained of severe pain in the uterus, with offensive discharge coloured with blood every day. Her appearance was sallow, cachectic, and her skin hung in loose folds on the body. On examination, the abdominal wall was found distended, hard and tender on pressure. I found two-thirds of the cervix eaten away. The remainder hard, nodular, with soft debris breaking away with the finger. Uterus fixed, considerable *inflammation*, infiltration around uterus in broad ligamenta, etc. Vagina involved and raw, especially on the posterior wall. She was sent to hospital, but the disease was declared to be too far advanced for operation, and she was given six months to live. Under the ordinary treatment patient had to keep her bed, and went gradually worse.

On February 9th, 1898, I started her on the Hydrogen Peroxide treatment. By the end of the week the coloured discharge which had been lessening each day entirely disappeared. The pain also went. After a fortnight, on examination with the finger no bleeding followed. Vagina had a healthier and more natural feel. No pain on examination. In time her flesh gradually became more solid, and her strength increased until within two months she was able to leave town for the country. She proclaimed herself better than she had been for 12 months. She continued to take the medicine and she remained remarkably well until the beginning of June, when, owing to the strain of nursing an ailing daughter day and night, she got run down. Pain returned and coloured discharge made its appearance once or twice a week. Flesh decreased. On the dose of the Peroxide being increased, all pain at once remained absent for four or five days and discharge absent for a week. Now, on examination, the os did not appear so hard and cartilaginous, but had a soft gutta-percha feel, as if the fibrous stroma had lessened in quantity. Abdominal wall was more relaxed, and there was less pain on pressure. Been no discharge for five weeks. Flesh was firm, she had regained all her old weight, indeed she had grown uncomfortably stout.

January 4th, 1899. Through neglect of the medicine just before Christmas she began to fall away, and pain returned. On stricter attention to, and on an increase of the dose of, the Oxygen improvement at once set in and now she feels very well indeed. The last hæmorrhage occurred in the second week of October.

February 2nd. Examination. Vaginal mucous membrane perfectly healthy. Os has entirely healed over, and is soft. No broken debris.

April 23rd. Feels and looks remarkably well, better than she has been for years.

July 11th. During the month of May I was unable to obtain a supply of the hydrogen peroxide, owing to the manufacture being transferred from Paris to new works in this country. While without medicine for over a month, the pain increased, the discharge became much worse, and began to be very offensive. Her strength began to fail. The contrast was very marked. On a resumption of the mixture, now manufactured in new works, she began to experience nausea, followed by vomiting and diarrhoea. Thus she could only take a very insignificant quantity of the medicine, and latterly none at all. Discharge of blood has appeared, the first sign since the second week in October.

August 5th. On examination the os now is ulcerated, hard nodulated, with necrotic tissue brought down with the finger. Vagina also ulcerated and very tender. Pain and blood on examination. The condition appears to be as bad as when the patient first came under notice, the retrograde signs dating from the discontinuance of the peroxide. She has for long been quite unable to retain any of it.

September. Died from obstruction of the bowels.

2. Mrs. M., 51. Cancer of left Mamma, began in beginning of 1898.

June 1898. Tumour feels hard and cartilaginous, nipple drawn in. Axillary glands hard and enlarged. Breast is ulcerated, and discharges pus and debris. Most severe and almost uncontrollable bleeding if touched roughly. Started the Oxygen treatment, and at once felt ease from pain.

July 6th. Tumour feels softer and is smaller. Axillary glands noticeably decreased in size.

September 26th. Tumour considerably smaller and much softer. Patient better generally.

November 11th. Still further decrease in size. Debris has disappeared. Painless. Nipple stands well out and is very soft.

February 5th. Patient for several weeks, owing to pecuniary reasons of which I was unaware, stayed away and ceased to take the medicine. On returning she complained of very great pain and much discharge. Tumour looks much worse and her general condition bad.

March 30th. Having resumed medicine regularly again, the tumour looks much better and pain is less. Strength is picking up again, and general condition improving.

May 10th. Her condition had steadily improved until my supply of Oxygen became exhausted. After a fortnight's deprivation the pain increased greatly. Patient is unable to obtain sleep even with opium tincture in two drachm doses, frequently repeated. Appetite quite gone and she feels very weak. The contrast is very marked.

July 14th. During the absence of Oxygen the tumour had grown very much larger. Discharge had become more copious, and very foetid. The lungs had developed marked signs of phthisis, and the heart valvular mischief, but on the resumption of the Oxygen, despite the phthisis, her condition improved. The

granulations diminished and the discharge became less. The foetor almost disappeared. Pain became somewhat less. Appetite better.

August 8th. The tumour has remained much about the same, though the lung and heart mischief has deepened, but on missing the medicine for five or six days the pain attacked her with redoubled and constant vigour: and the discharge increased in quantity, and became very foetid.

September 7th. Died: had been four some time previous unable to retain the medicine, during which time the ulceration increased markedly in size and extent. Suffered much from cardiac weakness and dropsy.

3. Mrs. B., 55. Cancer of Left Mamma. Hard Tumour appeared in left breast four years previous. Nipple went in, but came out while lying in hospital awaiting operation. She was not operated on, but on its getting worse she went to a quack in Belfast and had the tumour removed by a caustic. Tumour recurred. When she presented herself on September 26th, 1898, a hard nodule was found in the breast underneath a deep hard cicatrix, the mark left by the caustic. Complains severely of pain, but looks well nourished. Tumour measures from above downwards $2\frac{3}{4}$ " ; transversely $3\frac{1}{8}$ ".

Started on Oxygen.

September 30th. Feels better, has had less pain, able to go about better and a decided improvement in her appetite.

October 17th. Has felt very little pain since beginning the treatment. Tumour much smaller and much softer. Tumour measures from above downwards $1\frac{7}{8}$ " ; transversely 2".

December 9th. Tumour measures from above downwards $1\frac{1}{2}$ " ; transversely $1\frac{1}{2}$ ".

February 17th. Tumour still more diminished in size. No hard substance to be felt below the centre of the scar, all that had been there has disappeared. The scar itself feels perfectly soft, the fibrous tissue having gone. General condition improved.

May. I have not seen patient since last date, but have learnt that the medicine caused such nausea that she was utterly unable to persevere with it.

4. Miss N., 29. Has had cancer of left mamma. Breast removed by quack in Belfast. She complains of the presence of a few enlarged glands in the axilla. They are very painful, especially on movement of the arm.

September 27th. Started oxygen treatment.

October 17th. Immediately after she had begun the treatment she was able to move her arm with greater freedom than formerly, and she has not felt the pain shooting to the finger tips as she had every day previously.

November. Continues to improve in general health. Still no pain.

April. Has had for some time to give up the medicine because it made her very sick; she had always been bilious and now she is unable to retain sufficient to do her any good. The old pain had returned.

5. Mrs. D., 58. Cancer of the Cervix Uteri.

December 12th. Felt pain five months ago. Experiences it daily at present. Discharge is of everyday occurrence and is composed of blood and offensive debris. Has been to hospital, where her case was pronounced inoperable. Examination of Os. From the anterior lip a hard cauliflower mass extends two inches below the level of the posterior lip. Can be broken down by the finger. Severe bleeding ensued on examination. Appetite bad, loss of weight. Flesh very soft. Started the oxygen treatment.

December 21st. Discharge lessening, pain lessening.

December 27th. On examination the mass was not so irregular, it was more rounded and had a softer elastic feel, the feel of healthier tissue. No gush of blood happened as at the previous examination.

January 9th. Her general condition had much improved, her appetite had returned until on neglecting the medicine somewhat, her pain returned and discharge increased, but the latter was not coloured with blood.

February 27th. Very free from pain, no offensive odour, though posterior lip of cervix shows the presence of a small cancerous mass.

April 11th. Os feels softer, not hard and cartilaginous as it once felt, but the tumour does not feel diminished in size. On examining roughly, not much pain and absolutely no blood. Patient looks stouter, and has better colour and appearance.

July 4th. Patient in the interval had left off the medicine and been to a herbalist. The old pain had returned as severely as ever and the hæmorrhage came on every day. On a resumption of the medicine the discharge began to diminish, and within a fortnight she was able to have a full week free from pain and discharge. Her appearance also improved. Tumour is larger, and on resuming the medicine was of a most stony hardness, but after three weeks the hardness was not so marked. It felt somewhat softer. The decrease in discharge has been very marked.

September 18th. For last four weeks have used tampons of equal parts of peroxide and glycerine to the os daily. There has been no sanguinary discharge for about eight weeks until to-day, and then only clear blood. Pain since the tampons began has disappeared, the tumour after three weeks felt much softer, and had gone smaller. There was positive and undoubted evidence of it. There has been for some time a considerable quantity of albumen in the urine, and that has retarded the improvement. She is also much worried and badly nursed by a near relative.

October. The application of the tampons caused still more diminution in the tumour and it became softer. There has been no blood, and no pain since using them. An attack of peritonitis followed by pneumonia proved too much for her, and she died October 1899.

6. Mrs. W., 60. Cancer of Uterus. There has been a steady

discharge of blood every day from the uterus for six months before December 17th, when a sudden and copious gush of blood alarmed her, and I was called in. Examination. A cancerous condition of the os and implication of the anterior vaginal wall. Appearance of patient sallow, with marked loss of flesh, skin hanging very loose. As soon as the oxygen had time to act the hæmorrhage stopped.

January 17. Discharge a 'dirty white' colour, no pain.

February 9th. Anterior vaginal wall, rough at first, is now smooth, not rugged. Os not so hard as formerly. Discharge less and smell less offensive. Is putting on flesh and is stronger.

May 10th. Has been very lax in taking the medicine as she failed to be impressed with the seriousness of her condition. Has now been without for a fortnight (I being unable to obtain it) and the hæmorrhage has returned and is uncontrollable; so bad that she dreads going to bed lest she should bleed to death. She feels herself "washed away", and is piteous in her appeals for medicine.

July 11th. On a resumption the hæmorrhage stayed, but did not disappear altogether for some time. The dose she takes is exceedingly small and she is frequently sick on taking it. Sickness grew very much worse. Could not retain any medicine. Hæmorrhage became more severe. Pain increased and her bodily strength diminished. She died at the close of the year.

7. Mrs. W. Cancer of the Uterus. She complains of constant flooding and intense uterine pains for months, but refused examination, dreading severe hæmorrhage as had occurred when examined by another medical man. Tried the opium treatment, but her condition got gradually worse.

December 26th. Examination. Hard cauliflower mass within half an inch of the mouth of the vagina, growing from the anterior lip of the cervix, and the anterior wall of the vagina. Uterus fixed. Soft debris coming away and hæmorrhage. On starting the oxygen treatment improvement at once set in, discharge began to lessen and she experienced some alleviation of pain.

January 29th. Tumour not diminished, but feels smooth, more consistent, does not break down and no blood on examination. Improvement not as great as might be wished as she is able to retain very little of the medicine.

February 20th. Patient during the last month has been quite unable to take any of the peroxide in any combination. Been going down the hill very fast since the medicine has been vomited. Pain worse than formerly. Emaciation very marked.

May. Have since continued with the opium treatment, but her vital powers have rapidly and markedly declined.

July. Dead.

S U M M A R Y.

By the adoption of the Oxygen treatment I may claim that all the above cases have been benefited, that their lives have

been lengthened and alleviated, that the greatest benefit has resulted where the greatest amount of oxygen has been taken and where it has been partaken of regularly and systematically. The preparation I have used is unfortunately imperfect. It is unstable, often varying in the amount of Oxygen held in solution, and it is frequently irritating to the gastric mucous membrane, probably caused by the presence of traces of the products used in its manufacture. I have very good reasons for conjecture that if I could have employed a more stable unirritating preparation in a more concentrated and tolerant form, my results would have been much better than they are. Sickness too often prevented the patient taking the medicine even when largely diluted. It is rather singular and suggestive that the nausea began to manifest itself in nearly all cases about the same time—the early months of 1899, when I received my first supply of the mixture from the new works.

In the administration, the most marked effects locally in all cases were gradual absorption of the fibrous stroma, a checking or a lessened tendency to hæmorrhage, and diminished pain, while at the same time the soft degenerated debris was diminished, indicating a retarded growth. The development of the fibrous tissue has been alleged to be due to the irritation caused by the presence of the cancer parasites or by an irritating product to which they give rise. Oxygen in restraining the vitality of the parasites would diminish their numerical growth, also the amount of the product which it engenders, and thus the exciting influence being weakened the fibrous tissue becomes less, tending to become absorbed by surrounding cells.

Hæmorrhage is caused through the breaking down of necrosed tissue, and the exposure of the bloodvessels. The Oxygen causes an arrest of the degenerative process. Of this these cases supply both positive and negative evidence. When the administration was pushed the hæmorrhage disappeared. When the Oxygen was neglected or stopped it tended to reappear.

The pain in a cancerous growth has been ascribed to the contraction and pressure of the fibrous stroma upon the nerve filaments. If this view be the correct one, the sedative effect of the Oxygen may be attributed to its action on the fibrous tissue.

The Oxygen must also exert a beneficially antagonistic effect upon the septic products always present in a cancerous process. It has also a strengthening purifying tonic influence on the body, and is infinitely to be preferred to the risk incurred in treatment by mixed toxins, a remedy which only augments a body already surcharged with poison, and whose apparently good results are open to doubt.

Lately I have tried another preparation of H_2O_2 , made by a different process, in two cases, one of uterine cancer and the other rectal. Both showed some improvement, lessened discharge and an almost entire disappearance of blood in the uterine case with marked freedom from pain, and an increase in weight during the treatment. Tampons of peroxide and

glycerine were daily used and prevented any foetor there had previously been, from making its presence felt.

Inhalations of Oxygen have been tried by a medical friend of mine in hospital, but beyond a temporary increase of weight, he got no encouragement to continue with the treatment. Oxygen inhaled into the lungs and Hydrogen Peroxide taken into the stomach are two different things.

Dr. More Madden in the Medical annual of 1900, speaking of the deodorisation of cancerous discharge from the uterus by means of injection of antiseptic lotions, says: "Of such agents one of the most effective is Peroxide of Hydrogen, which even for some hours after its use leaves the patient free from this horrible addition to her miseries. But the cost of this agent is a bar to its general use by hospital patients." This difficulty of cost might, I venture to think, be overcome by employing some simple antiseptic lotion first and then using the peroxide with glycerine on a tampon a short time afterwards.

Rodent Ulcer. It is now agreed that rodent ulcer is an ulcerated carcinoma. Its characteristics are scanty discharge, very little pain, and even after years of steady progress it produces scarcely any effect upon the general health. It does not become disseminated, the lymphatics are not affected, and it does not return after complete removal. Though it affects all tissues impartially, it progresses so slowly that 15, 20, or even 30 and 40 years may elapse without the production of more damage than most malignant tumours would affect in an equal number of months.

Why its malignancy should be so limited to local extension and its development so slow has not yet, I venture to think, received any satisfactory explanation. The difference between the rapid course of epithelioma and the slow development of rodent ulcer might perhaps to some extent lie in the difference in the method and direction of growth. Epithelioma or squamous celled cancer consists of columns of epithelium which have grown into the connective or other underlying tissue surrounded by an imperfectly fibrillated stroma, and a small cell infiltration. At the same time the epithelium is usually also proliferated outwards, forming a warty excrescence or cauliflower growth. Breaking down ensues, and an epitheliomatous ulcer is the result.

Amongst the cells forming the columns of invading epithelium are found in places small collections of cells of a crescentic shape, arranged concentrically around one or more central rounded cells. These collections, spoken of as cell-nests, are probably due to the more rapid growth of the epithelium at certain spots; the shape and arrangement of the peripheral layers of cells being due to their compression between the rapidly growing central cells and the surrounding tissues. Thus it will be seen that the actively growing part where the parasites lie is completely shut off from the air, and even when ulceration occurs the cell-nests are buried deep in the connective tissue.

Rodent ulcer begins in the subcutaneous tissue, and grows upwards, and ulceration speedily commences. The microscopic appearance shows masses or groups of cells in alveoli, formed by fibrous tissue, or more often widening out and filling irregularly shaped interstices between bands of fibrous tissue. The cells are smaller and rounder than in epithelioma, and cell-nests are either absent or ill-formed; they are so closely packed together that no intercellular substance can be seen between them. The processes of the growth spread superficially and not deeply, and the structure of carcinoma is apparent not much more than two lines beyond the obvious limit of the disease.

Is it not possible that the marked exposure of the disease to the air, which means Oxygen in the case of rodent ulcer, may be held to account in some measure for its very slow development? The growth of what apparently is an anærobic parasite is checked in one case, while in epithelioma it flourishes in the cell-nests deep down in the connective tissue. This view quite accords with Plimmer's experiments.

Other Palliatives. Relief of pain. There are many agents that are employed, for which purpose opium holds a first place. It may be necessary to ring the changes on sedatives, so the bromides and allied remedies are tried.

Lately Orthoform has been much praised in uterine cancer, but it must be used with caution, as several accidents have occurred.

The administration of methylene blue is advocated and is also applied locally. An injection into the tumour is said to cause a temporary abatement in the growth.

Cold in the form of a freezing mixture applied to the breast is useful, followed by Leiter's Iced Water coil, and cold compresses.

General Surroundings. Cancer patients should always live on high and dry ground in a warm dry climate where there is plenty of sunshine, and exercise in the open air is beneficial. They should cultivate cheerful company. Seek diversion by entering freely into the social amenities of life. For the thought, though not exactly father, is often wet-nurse to the growth.

In the foregoing pages I have not attempted to discuss cancer in all its aspects. Within the limits of this paper that would be impossible. Many well-established undisputed facts in its symptomatology, pathology, and treatment I have omitted. I considered that it would have been idle to recapitulate axioms that have passed unchallenged through editions of text-books. My object has been to discuss points in connection with the disease on which there is divergence of opinion, and to note with some care what I understand to be the modern trend of medical opinion on this puzzling problem of Cancer.