On the

Intimate Nature of

Cancer

by

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Within the last twenty years, pathology and more especially the pathology of tumors has assumed a new character or interest on a new phases if I may so express it. Even in the time of Percival Pott, an able and most successful surgeon, a contemporary of the celebrated John Hunter, the true pathology of many surgical diseases was absolutely unknown and the expression "thoroughly disorganized" so frequently used by Pott, expresses this fact in language not to be misunderstood. For this great advance which assuredly we may venture to call improvement, the profession is mainly indebted to refinements in dissection and in microscopic observation by means of glasses possessing powers infinitely superior to those of our predecessors. A more refined Chemistry has also contributed to aid in carrying out the
researches of modern physiologists and pathologists into the constituent characters of healthy and diseased solids and fluids, and although it may be admitted that hitherto such researches have contributed but little to the improvement of therapeutics (the ultimate aim of all medical research) yet it may I think, be predicted with all confidence, that in time such researches will and must lead to highly beneficial changes in the treatment of disease. Vogel, in his admirable work on the pathological anatomy of the human body has made some judicious remarks on this subject, to one of which I may here advert. He is speaking of the influence exercised by a sound pathological Anatomy and practical medicine." It not merely points
out what requires healing, but in many cases also, the
course that must be adopted in order to aid the
curative tendency of nature. It serves likewise as a
check on therapeutics exposing in a most conclusive
manner the absurdity of many pretended methods of
cure. It points out, for example, that in a certain
stage of inflammation of the lungs a fibrous fluid
separates from the blood and by its coagulation renders
a portion of the parenchyma of the lungs impermeable
to air; and further that it requires several days for
this coagulated matter to reassume the fluid condition
and be removed. Now if any one should assert
that in this stage of the disease, he could apply
a remedy which would cure the patient in a few
hours a very superficial knowledge of pathological
anatomy would show the folly of such an assertion.
The importance of the refined pathological anatomy of modern times is in no instance more fully proved than in respect of the ultimate nature of tumours, to the consideration of one class of which the object of this memoir is more especially limited and with a few additional preliminary remarks bearing more or less on the history of the pathology of the disease I shall proceed at once to the matter in hand.

Although it may be admitted that as early as the times of Hippocrates, physicians and surgeons were well aware of the intractable and indeed incurable nature of certain malignant diseases, amongst which Cancer has ever held the first place it yet does not appear that any correct ideas existed as to the true or essential nature of such
diseases, until a period which in the lapse of ages seems to be but yesterday. For the discovery of this we as far as it is as yet known, we are indebted to the microscope, and mainly indeed, to the distinguished pathologists of modern Germany. 

Long prior, it is true, an attempt of a highly philosophic character had been made in Italy to place pathological research on a proper basis. This effort is said to have commenced with Montagnanae, Beneventus, and Benedictus between 1460 and 1525. But however this may be, and admitting or not that the form of pathological Anatomy which prevailed in Europe so late as Hallis and even subsequent to his time, originated in Italy and was carried to the highest point the form admitted by Morgagni, if this we are assured that Malpighi had at a
very early period proved by his researches into
the intimate nature of the healthy formed the great
importance of microscopic research. In this direction
he was followed by Lavenoeb and others in Holland
and it now appears that had this direction been
followed up much of what has been discovered of
late years would have been made known to the
world by these illustrious men. After a lapse of
fully two centuries the French school of observation
rose, at the head of which as regards our present
subject may be placed Lannel and Bajole. They
cling to what may be called the natural
history method of description, attaching great
importance to all external characters. Bichat
had previously played his part in the analysis of
pathological appearances neglecting, no means of
surgery which his fertile brain suggested; but
The school was speedily led astray by Bernard, and was it until the German pathologists, following in the track of Malpighi, and Leeuwenhoek, restored pathological science to its true aim. It were invidious to enumerate the names of distinguished observers of all countries still alive and actively engaged in microscopic research in the meantime; it may, I think, be admitted that an inconceivable field of inquiry has been opened by the microscope, for which we are indebted to the German school.

Cancer is now generally admitted to be a special malady, differing from all others, dependent for its development on a particular predisposition in the individual like other predispositions in mind and body, the tendency to the disease seems unhappily to be, but too often hereditary, to which there are
of course, as with all other precursors, many exceptions. It forms a subdivision of the class malignant tumours, which pathologists also call heterologous as being composed of histological elements other than those entering into the composition of the nonmalignant class of tumours. The nonmalignant tumours obviously consist essentially of the persistent elements of the body, the malignant on the other hand are composed of elements of a wholly different character. There exists it is true a debatable ground between the two classes of disease respecting which pathologists are not agreed. Into this I mean not to enter, confining my remarks, as far as I can, to those observations, the truth of which most are disposed to admit. It may be conceded without materially injuring the character of other well observed facts, that there occur tumours
corresponding in all other points with the malignant but in which the destruction by ulceration or otherwise is merely local, whilst new tubercles and ulcers may heal spontaneously or after operation without recurring, a fact it is true still denied by some but of which I think there cannot remain a doubt. But however this may be these malignant tumours do not arise as was formerly supposed from a metamorphosis, change or transformation of the normal or regular healthy tissues, but rather from new formations which penetrate amongst the previously existing histological elements of the body. On this point many distinguished pathologists have expressed themselves in the most precise terms leaving no doubt as to their meaning. The fundamental character of cancer as a tissue they affirm to
be the substitution of a new matter for the normal tissue in the midst of which it is developed. They now go further according to some most careful observers, the Cystoblastema or original matter when first poured out by the Vessels is always fluid and only subsequently becomes solid; it is said to fill the interstices of the tissue amongst which it is deposited as completely as mortar does the spaces between the stones of a Wall. Thus a malignant tumour and especially Cancer, differs in all respects from all other pathological conditions. It shows a well marked tendency to extend, at first locally causing the healthy tissue to disappear; at last (I speak of Cancer more especially) it radiates, becoming generalised or diffused, but in a somewhat capricious manner...
The true reason for which has not as yet been fully made out; what renders the subject all the more difficult is that the disease appears not infrequently in persons seemingly enjoying the most robust health, and this condition they occasionally retain even when the disease has made alarming progress. At last however the constitution breaks up; the nutrition of the body becomes affected and impaired with or without diffusion of the cancer and death closes a scene, the most painful perhaps which falls to the lot of humanity.

One of the most remarkable features in the history of Cancer (as well as of other malignant tumours) is the occurrence of what is called softening. This usually commences not upon their surface but in their interior; and may have proceeded to an extraordinary length before
being suspected to be present. Thus the product of the softening of such humourous may not be immediately discharged, and the ichorous pus and humour continue for some time in contact with the surrounding healthy tissues. To this contact it is natural to ascribe the general cachexia which often follows, still it must be admitted that the manner in which this is effected is not well understood. The ichorous matter has not been found in so far as I can learn in the general mass of the blood. However, this may be the evil effects of the increase of the softened Cancer we hear so loudly by all the times upon the tissues implicated; although, generally speaking the normal structure continues sound up to the very edge of the disease. Surgeons therefore dread the occurrence of softening in Cancer.
and have recommended the speedy removal of the disease by a radical operation, that is by an operation so complete as to leave no portion of the diseased structure. But unhappily it must be admitted that too early, bold and radical operations have but too often failed in screening the patient from that event which he most of all dreads, a relapse or a return of the complaint. The disease may return in the cicatrix of the wound or adjoining to it in a structure which appeared sound at the time of the operation or in some distant part. Upon what this depends is not known now as pathological anatomy as yet throw any light on this obscure subject anymore than it has on the causes giving rise to the original deposition of the cancerous humours. Vander Holte certainly suggests that the fluids——
contained in these tumours may mingle with the juice of the pathologic substance around them and that in the latter there are deposited molecules and granules which having received from the former certain tendencies to evolution are ultimately transformed into similar structures and to this view Dr. J. H. Bennett of Edinburgh would also seem to incline.

Some distinguished pathologists have divided malignant tumours into several sub-divisions amongst these they enumerate 1. deposits in syphilis described as composed of three elements namely an amorphous semi-transparent thorn Molecular granules, varying in size, extremely minute 2. and lastly larger corpuscles from the 200th to the 300th of a line in diameter
On this form of malignant deposit I need not dwell. It were equally foreign to the object of this memoir to describe the scrofulous deposit or tubercle. Histologically it is said to be perfectly similar to suppurous matter and to consist of the same elements. It is sometimes difficult even with the aid of the microscope to determine the presence of scrofulous matter. Its origin is as obscure as is that of Cancer. These forms of malignant tumours or deposits have been classed together. Those of a more highly organized character are known under the names of Cancer Carcinoma etc. This terrible form of malignant tumour shows itself under a variety of appearances and hence the variety of names bestowed on it. The conscientious and painstaking
Lebert in his great pathological work now in course of publication suggests that all these forms may be reduced to the following heads

1. The encephaloid called also cellular by some
2. The fibrous cancer or Schirnus
3. The gelatini from gelatinous or colloid cancer
4. The very vascular or hematode, possibly a modification of the encephaloid
5. The melanin
6. The dendritic or arborecent

These malignant tumours vary in volume and in form; some tend to become diffused; as happens when the disease attacks the neck; whilst in the liver they are defined and limited. They vary also much in consistence; the dendritic composed of vegetations occurs
most frequently on mucous membranes according to Harell and Klotz who first described it. The term of epithelial Cancer is usually given to the disease when it attacks the lips, skin, uterus etc., but this form of malignant disease is not viewed by Lebert as true Cancer. But an opinion seems to gain ground than all or most of these affections are if not identical, at least analogous or strongly affiliated. Pathologists respecting their views on positive research and not on surgical or medical references proceeded therefore to determine the presence of some element or structure common to certain tumours admitted by all to be Cancerous but absent in tumours either avowedly not Cancerous or at least of a doubtful character, and in this according to
many distinguished observers they have succeeded by the discovery of the Cancer cell. It is but
right, however, to state that some excellent practical surgeons and good observers amongst
whom is M. Valpman, the celebrated surgeon to the Hospital la Charité, Paris, denies to the
celebrated Cancer cell that universality of constancy in cancerous diseases which others
attribute to it. Before considering carefully this important question which may be thus stated—
an isolated cellule being placed under the microscope can it be always recognized as a cancerous cell or cellule? I may first briefly review the character of the other
histological elements found in various —
cancerous tumours

I find it stated that in cancerous tumours occurring in various individuals there are found though not simultaneously:

1. A form dense amorphous substance closely resembling and supposed to be identical with coagulated fibrin. It is considered as the solid matrix of Cystoblastoma of Cancer, and as characterizing a definite stage of the development of Cancer and is therefore at times absent in perfectly developed specimens.

2. Molecular granules occur also in Cancer but they are not characteristic of it, they are sometimes wholly absent.

3. The characteristic Cancer cell said never to be absent in perfectly developed forms of
cancer. These cells sometimes predominate to such a degree as to found nearly the whole armour, and this happens more especially in the encephaloid form of cancer. These have been subdivided into

1. Transitory cells; these are the true cancer cells
2. Into those capable of development into fibres, and are thus viewed as cells in a transition state

The true cell is nucleated or presents a nucleus, highly characteristic; but pathologists esteem the candidate ramifying cells as equally characteristic of cancer. Some cells contain a large number of nuclei, or one, what seems to be perfect young cells. Double cells have also been found and cells filled with granules, lastly some enclosing a pigment.

The elongated cell which has also been called the
fibre cell must not be confounded with another histological element of which I may next speak.

This consists of fibres of extreme delicacy or minuteness, they have been estimated at times to measure no more than the 2000th of a line in diameter but some are as high as the 3000th of a line. It is asserted that in some forms of cancer these fibres are wholly absent but in other forms as in cervix, they predominate. The presence of these fibres renders it at times difficult to say whether a cancerous or a fibrous tumour had first existed, indeed it has been asserted that the malignant character of the tumour is in the reverse ratio of these fibres and in the direct ratio of the predominance of the Cancercell, so that it may almost be admitted as a fact that in proportion as the Cancerd cell prevails which characterises in so remarkable a manner
these terrible forms of Cancer which all admit to be real Cancer, so is the danger to the Patient.

The important question respecting the import of the presence or absence of the Cancer cell in cancerous tumours has been formulated in different ways by different pathologists and surgeons. M. Lebert, after stating the question to be this:—in isolated cells, being placed under the microscope, can it be always recognised as such?—answers that he thinks this is not possible. But he offers another and I think a more practical way of stating the question: given a certain morbid tissue, can its cancerous or not cancerous nature be always decided on? He means I presume by the microscope. He replies to this question in the affirmative. On the other hand M. Tulpian, a most distinguished practical surgeon, puts
the question under a somewhat different form. A carcose cell presents itself in a young man seemingly of a good constitution: M. Velpeau pronounces it to be a cancer and by his advice it is removed by operation. Immediately after its removal, though examined by some of the first microscopists of Paris, the Cancerous cell or cellule is not found and they consequently affirm it not to be cancerous.

But in due time as was predicted by M. Velpeau, the disease returns and becoming generalised, destroy the patient. Upon such facts as these this distinguished surgeon bases his opinion which I think amounts to this. That the absence of the Cancerous cellule is no proof that the disease is not cancerous nor its presence any proof that it is. For my own part in a matter presenting so many difficulties I hesitate on
venturing any positive opinion but feel disposed to think that whilst the pathologist may fail from a variety of circumstances in detecting the undoubted cancer cell in any given case, yet when clearly shown to be present, the disease will prove in the sequel to be true cancer.

I may here be permitted to make a remark which may possibly assist in showing that the difference in opinion between the disputants is less than might be at first supposed. Much depends on the meaning attached to the terms true cancer. If it be required that to constitute a true cancer, the disease must be incurable, a wide field is open for a discussion not likely to terminate amicably. Cancers admitted by all practical men have unquestionably yielded to the powers of the constitution.
occasionally assisted by medical and surgery, whilst other tumours less characteristic have resisted all treatment. M. Lebert seems to me to attach too much importance to the curability or non-curability of the disease and of this M. Velpeau as distinguished diarapeutist as he is well known to be has skillfully availed himself. I have elsewhere proved he remarks without the possibility of a reply. I believe contrary to the pretensions of the most advanced micrographers,

1. That the cellule called Cancerous is not the specific element of Cancer.

2. That Cancers well proved to be do not contain such Cellule.

3. That this Cellule has been found in tumours not cancerous.

Many others have arrived at the same conclusion, as for example M. Von Miller,
Alquic of Montpellier, Michel of Strasbourg, Marjolin, Robert Forget et une Paris.

The principle laid down by Lebert and those who entertain the same opinion is this: a certain determinate cellule forms the element of each kind of tumour. Thus every tumour formed of homomorphic cellules ought to be arranged with harmless tumours and that all tumours which possess a heteromorphic cellule are necessarily cancerous.

There cannot be a doubt that by pushing this doctrine to the length done by Lebert and his school practical surgeons felt themselves called on to offer a quite contrary opinion. They objected to such doctrines as those proposed by Mr. Lebert on grounds drawn from practice. "To assert continues Mr. Velpeau, that cancer of the lips, face, arms
uterus, penis, integuments in general are merely hypertrophied follicles or masses of epithelium; that warts, corns, horny productions, chalazomata, and these kinds of cancers are identical must appear now as priorly always strange to experienced surgeons.

Again, as a consequence of his doctrine Mr. Lebert has not hesitated affirming that ulcers, pustules, tumours, vegetations of the lips, face, etc., studied by surgeons under the name of heli me tangere covering letters, cutaneous cancers, were not cancers, were only pustule cancers—cancerous; and that when completely removed by the knife, these tumours are not susceptible of being reproduced; and that thus may be explained why cancers of the lips, for example, return only in the spot and are not in general followed by any relapse.
To such assertions Mr. Volpean from his great experience gives the most positive contradiction. He indeed asserts that cancers of the lips are not exempt from relapses, and that perhaps even they return as obstinately as cancer of the mamma. Moreover, that they return after operation as readily at a distance as in the spot of their origin. Thus Mr. Volpean concludes that canceroid is in reality a cancer that it spreads by continuity, by dissemination in the neighborhood and at a distance by the lymphatic system or in some other way, like cancer, that it never heals of itself and terminates always by causing death; no treatment, whether topical or internal is of any avail and its destruction by the knife or by caustics is pretty nearly as often followed by relapse as cancer properly
so called.

With every respect for this distinguished surgeon, whose labours have so highly advanced the profession and benefited humanity, I would still venture to think that the discovery of the Cancer cellule forms an important step in the history of cancerous disease. Carcinoids may be as intractable as true cancers of the Mammary, they might be even more disposed to relapse, which does not however seem to be altogether the case; still we feel that such forms of cancer, since we must continue to call them so, differ notwithstanding materially from those tumours in which the Cancer cell not only abounds but seems at times to constitute the larger part. If it can be shown that there are certain forms of disease as intractable as a true sarcoma
or an exception not let the fact be admitted and recorded; but unless the elements composing such a form of disorder be shown to be identical with those other forms known as true cancers, pathological anatomists are not called on to place them under the same category, simply because the surgeon finds them equally malignant, equally incurable.

There exist many other important facts in the history of cancer of which pathological research has as yet furnished no explanation. Boeck and Schroeder, VanderKoch have asserted that of the three great classes of vessels, arteries, only are found in cancers. But Lebert states in the most positive manner that the veins are equally abundant, and that the capillary system is also well developed. On the other
hand neither lymphatics nor nerves have been observed in cancerous tumours so far as I
know to me. It were out of place to discuss here the hypothetical views advanced by some
authors respecting the generalisation and involution
of cancer; the causes assigned for the emaciation
and cachexia which generally appear at last.
The period of the incubation of Cancer if such
really exist; its average is, duration said by
Robert to be about 18 months; finally the
connexion it has with advanced life rather
than with the young; the rate of secondary
affections, to those in which are such appear
the sad preference it gives to women as
proved by the ratio of 131 men to 215 women.
These are considerations foreign to the object.
I have had no view throughout this memoir, in all future pathological inquiries one thing however ought not to be forgotten: Cancer under many of its forms attacks the domestic animals nor does it even spare the world.

The dog is said to be frequently its victim. Dr. Livingstone, the African traveller seems disposed to think that Cancer seldom or ever attacks the Caffre inhabiting Southern Africa and he seems disposed to accribe the same immunity to the other dark races of that Continent. But this cannot be the result of climate for the Dutch farmers inhabiting Southern Africa are I have been informed just as much disposed to cancerous affections as their European forefathers.

Hasty generalisations however prove the
a theory of cancer to be admitted as true must be proved equal to the
demonstration of its unvarying intimate nature under all circumstances, together with such a
history of the inducing causes of this frightful malady as is not in opposition to fact. Carefully observed by conscientious and trustworthy
inquiring.