A CONTRIBUTION
TO THE
STATISTICS OF CANCER,
COLLECTED FROM THE
CANCER RECORDS OF THE MIDDLESEX HOSPITAL.

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THE object of the present communication is to lay before the Society the result of an examination of a somewhat large number of cases of cancer, which have been treated in the wards of the Middlesex Hospital.

The notes from which these results have been collected, were principally taken from cases treated during the years 1853, '54, '55, and '56. In order, however, to make them as satisfactory as possible in a statistical point of view, I have availed myself of the previous cancer records of the hospital. In many instances these notes are full, and the cases com-

plete, whilst many of the older records are less perfect, and can only be made use of for the deduction of a limited number of facts. The total number of cases noted is 520, with records of 173 post-mortem examinations. Out of these, 250 cases and 120 post-mortem examinations passed under my own observation.

These numbers are of sufficient magnitude, when the cases are considered in mass, to avoid the errors usually attending inferences drawn from the examination of a limited number of cases. On viewing separately, however, the examples of cancer in the various organs of the body, the numbers become so much reduced, that the conclusions derived from their consideration must be received with greater caution. It is not proposed in this communication to examine the cases upon all the numerous points in the pathology of the affection which might attract attention; but to select for investigation those subjects only, for the elucidation of which the cases appear to be more especially adapted.

Before proceeding further, it is necessary to explain what forms of disease have been comprehended within the limits of the present inquiry. The term Cancer has been used in a wide and extended sense, all the varieties of scirrhus, medullary, and epithelial growth having been included. The latter form of the disease presents so many points of distinction from the other two, that it seemed doubtful whether it would not be more desirable to reserve these cases for separate consideration. However, the numerous features of analogy between epithelial and true cancer, the occasional occurrence of transitional cases, and the association of the two forms in the same individual, led to a different conclusion. The results are, however, in most instances, so arranged, that the examples of epithelial cancer may easily be eliminated, if thought advisable.

Melanotic cancer has of course been included; and, for reasons hereafter to be stated, cases of "rodent ulcer" of the uterus have not been separated from the instances of true cancer in that organ. On the other hand, several

forms of disease sometimes considered to be cancerous have been excluded. Thus, cases of Lupus, forming a tolerably well-defined and distinct group, should be considered separately. The same may be said of the examples of Colloid.¹ Then, again, I believe Villous disease² to be simple and distinctive in its characters, and, although admitting that true Cancer may occasionally take on a villous or dendritic mode of growth, there is still no difficulty in distinguishing between simple Villous disease and dendritic Cancer.

PART I.

Seat of the primary cancer.—The table below exhibits the seat of the primary cancer in the cases forming the subject of the following statistics. It should be remarked that it does not show the relative liability of the different organs of the body to become affected with cancer, as there is an undue proportion of certain forms of the disease. This is doubtless owing to the circumstance that many of the class of hospital patients suffering from an external cancer, and knowing the nature of their complaint, naturally apply for admission to a cancer hospital, whilst those who are afflicted with the disease of the internal organs, and therefore ignorant of the cause of their illness, seek admittance into either of the general hospitals; and thus, in the wards of an hospital especially devoted to cancer, there is a preponderance of cases of the disease affecting the external parts of the body.

¹ See "The Structure and Nature of the so-called Colloid Cancer," by the Author. 'Med.-Chir. Trans.,' vol. xxxix.

² The examples of this form of disease which have occurred recently in the Hospital, are described in the 'Trans. Path. Soc.,' vols. vii and viii.

Table showing the seat of the primary cancer.

	Males.	Females.	Total.
Breast	1	191	192
Uterus	—	156	156
Labium, clitoris, &c.	—	13	13
Ovaries	—	2	2
Penis	6	—	6
Scrotum	2	—	2
Testicle	4	—	4
Lip, mouth, &c.	27	3	30
Tongue	9	5	14
Tonsil, palate, parotid, &c.	5	1	6
Esophagus	2	1	3
Stomach, intestines, &c.	9	5	14
Rectum	4	7	11
Anus	4	1	5
Lungs	2	—	2
Liver	—	2	2
Kidneys	2	—	2
Lymphatic system	1	2	3
Thyroid body	—	1	1
Nose, face, scalp, &c.	10	9	19
Skin in other situations	5	5	10
Bones	9	6	15
Muscles, tendons, &c.	1	2	3
Eye	2	1	3
Moles, &c.	—	2	2
	105	415	520

Age.—In recording the ages of the cancer patients, care was taken to note the period at which the symptoms of the disease were first noticed; and in all that follows, the age spoken of is that of the patient at the time of the attack, and is not the age at which death took place. In considering this subject, it is convenient to separate the cases of cancer in each sex, and in the various organs. Among the female patients there were—

	Breast.	Uterus.	Other organs.	Total.
Under 10 ..	—	—	—	—
From 10 to 20 ..	—	—	1	1
„ 20 to 30 ..	3	12	5	20
„ 30 to 40 ..	31	34	12	77
„ 40 to 50 ..	58	49	10	117
„ 50 to 60 ..	40	19	13	72
„ 60 to 70 ..	16	5	9	30
Over 70 ..	5	—	2	7
	<hr/> 153	<hr/> 119	<hr/> 52	<hr/> 324

Among the cases of cancer of the female breast, the earliest age at which the disease commenced, was twenty-six. The oldest patient attacked with cancer of the breast was eighty-four. The average age at the time of attack of the 153 cases is 48·6 years.

In the cases of uterine cancer, the youngest was twenty-seven, the oldest sixty-five. The average age of the 119 cases is 43·28 years.

Among the instances of cancer in the female, neither the uterus nor the breast being the organ affected, the youngest was attacked at the age of fifteen (cancer of the hand), the oldest at the age of seventy-one. The average age of the 52 cases is fifty-three years.

In order to observe the effect of the climacteric on the numbers attacked with cancer, the decennial period from forty to fifty may be divided into two parts; the result is—

	Breast.	Uterus.	Other organs.	Total.
From 40 to 45 ..	29	19	6	54
„ 45 to 50 ..	29	30	4	63
Total from 40 to 50 ..	<hr/> 58	<hr/> 49	<hr/> 10	<hr/> 117

And with these numbers the following may be compared :

	Breast.	Uterus.	Other organs.	Total.
Under 45 ..	63	65	24	152
Over 45 ..	90	54	28	172
Total, all ages ..	<hr/> 153	<hr/> 119	<hr/> 52	<hr/> 324

It is thus seen that, although there is some difference in this respect between the cases of breast, and those of uterine cancer, there is, on the whole, no great difference in the gross numbers of those attacked before and after the age of forty-five. If, however, these numbers be compared with the total number of females living under and over the age of forty-five, it will be seen that the attacks are much more frequent after that age.

The ages of the male patients were—

			Of the lip.		Other organs.		Total.
Under 10	..	..	—	..	3	..	3
From 10 to 20	..	..	—	..	—	..	—
„ 20 to 30	..	..	1	..	6	..	7
„ 30 to 40	..	..	—	..	3	..	3
„ 40 to 50	..	..	5	..	12	..	17
„ 50 to 60	..	..	4	..	7	..	11
„ 60 to 70	..	..	1	..	14	..	15
Over 70	..	..	2	..	2	..	4
			13		47		60

Of the male patients attacked with cancer of the lip, the youngest was twenty-nine, the oldest seventy-nine. The average age of the 13 cases is 53·3 years.

Of those attacked with cancer of the other organs, the youngest was six months old (cancer of the eye), the oldest was eighty-two years (scirrhus of the mamma). The average age of the 47 cases is forty-seven years.

Or, taking the cases in both sexes together—

			Males.		Females.		Total.
Under 10	..	..	3	..	—	..	3
From 10 to 20	..	..	—	..	1	..	1
„ 20 to 30	..	..	7	..	20	..	27
„ 30 to 40	..	..	3	..	77	..	80
„ 40 to 50	..	..	17	..	117	..	134
„ 50 to 60	..	..	11	..	72	..	83
„ 60 to 70	..	..	15	..	30	..	45
Over 70	..	..	4	..	7	..	11
			60		324		384

Of these the youngest was six months (male, encephaloid of

the eye), the oldest was eighty-four years (female, scirrhus of the breast). The average age of the 384 cases is 47·5 years.

From these tables it is seen that the age at which the patients were attacked, presented every possible variety, ranging from the earliest infancy to the extreme of old age. This great variation, however, is noticed only in a few isolated cases, the bulk being attacked after the middle period of life; the numbers increasing with age up to fifty; the highest proportion being in the ten years, forty to fifty.

It need hardly be observed that, in order to form a correct idea of the relative liability of the different ages to become attacked with the disease, it is necessary to compare these numbers with the relative numbers of persons living at these various ages.

The early years of life exhibit a remarkable freedom from the attacks of cancer; thus, under the age of twenty there were but four cases, their respective ages being six months, three, seven, and fifteen years. It is therefore seen that, during the period of life at which the nutritive powers are most fully exercised, and rapid growth is taking place, cancer hardly ever occurs. Directly, however, the frame is matured, growth having ceased, the liability to cancer shows itself; and this rapidly increases with advancing years till the maximum is reached, in the female about the climacteric period, and in the male soon after the full vigour of manhood is past.

There are some differences observed in the various groups into which the cases have been classed. For instance, among the cases of cancer in the female, there is a great difference in the age of those attacked with the disease in the breast, and in the uterus. The proportion of cases of cancer of the uterus between the ages of twenty and thirty is very large, as compared with that in the instance of cancer of the breast. Among the uterine cases, the number increases rapidly to the age of fifty, and then suddenly drops, no instance being met with after the age of sixty-five.

Among the instances of breast cancer, however, the number, increasing up to the age of fifty, only falls slightly to the age of sixty; and if the number is compared with the proportion of females living, the ratio of the attacks is as great between fifty and sixty as between forty and fifty. Again, the attacks in the case of the breast continue to a much later period of life. The same fact is also shown by comparing the average age of those attacked, this being 43·28 in the case of the uterus, and 48·6 years in the case of the breast.

It is also seen that the ages of females attacked with cancer in other parts, are somewhat greater than in the uterus or in the breast. This circumstance is partly owing to the fact that this group includes a considerable number of cases of epithelial cancer—a form of the disease which probably attacks the body somewhat later in life than the varieties of true cancer.

Among the male patients, it is noted that the variations in respect to age are greater than in the female. The first group, that of cancer of the lip (nearly all being epithelial), shows the average age of those attacked to be 53·3 years.

The second group includes cases of epithelial and true cancer, and exhibits very great variation in respect to the age of the patients.

The influence of marriage, pregnancy, the state of the catamenia, &c.

On taking the whole number of cases of cancer in the female, in which the civil state of the patient is recorded, it is found that there were—

Married	.	.	.	.	183
Widows	.	.	.	.	77
Single	.	.	.	.	55
Total	.	.	.	.	<hr/> 315

which shows that rather over 17 per cent. were single

the remaining 83 per cent. either were, or had been married.

In order to exhibit more correctly the influence of marriage, &c., on the production of cancer, it is necessary to separate the cases of uterine disease from those of the affection attacking other organs.

1. Among the cases of cancer of the uterus there were—

Married	.	.	.	.	97
Widows	.	.	.	.	26
Single	.	.	.	.	12
Total	.	.	.	.	135

The fertility or barrenness of the patient is recorded in 100 cases. Of these, it is noted that 86 had borne children, and that 14 had not. Out of these 14, however, 3 had had one or more miscarriages, so that 11 only had never been pregnant.

The number of children borne by each of the 86 women varied from one to fifteen, the average number being 5·2.

As regards the interval between the last pregnancy and the attack with cancer, very great variation is observed. Among the 86 cases mentioned above, in 10 the attack was either during pregnancy or within a few months of it. The greatest interval recorded is twenty-seven years. The average interval of the whole 86 cases is 10·33 years.

Relation to the climacteric period.—In 85 cases in which the point is especially noted, the catamenia were still present, with greater or less regularity, in 62 cases, but they had ceased, either for many months, or for some years, in 23 cases. The longest interval noted between the cessation of the catamenia and the attack of cancer was seventeen years.

2. The cases of non-uterine cancer. Of these there were—

Married	.	.	.	.	86
Widows	.	.	.	.	51
Single	.	.	.	.	43
Total	.	.	.	.	180

The fertility or barrenness of the patient is recorded in 124 instances. Of these 98 had had children, of whom 26 had never borne a living infant; 9 had had one or more miscarriages; 17 had never been pregnant.

The number of children borne by each of the 98 women varied from one to eleven, the average proportion being 3·89.

As regards the interval between the last pregnancy and the attack, there is a similar amount of variation to that observed among the cases of uterine cancer. In 6 cases pregnancy either occurred during the existence of the cancer, or preceded it by a few months. The longest interval noted is thirty-seven years. The average interval among 80 cases in which the dates are recorded, is 10·2 years.

Relation to the climacteric period.—The catamenia had entirely ceased in 44 cases; they were still present in 50. The longest interval between the cessation of the catamenia and the attack of cancer was nineteen years.

These results show a great difference between the proportion of single women attacked with uterine cancer and those attacked with cancerous disease in other organs. In the instance of the uterus, the per centage of single women is under 9, whilst in the other organs it is over 23. So, again, a much smaller proportion of widows was attacked with cancer in the uterus than with similar disease in other parts of the body. So great a disproportion as the above can hardly depend upon accidental causes.

In a certain number of cases pregnancy took place while the patient was suffering from cancerous disease. The principal features of a few of these cases are given below.

CASE 1.—J. C—, æt. 43, under the care of Mr. Moore, noticed that the left breast was indurated and nodulated. Six months after this discovery she became pregnant, and, after going her full time, was delivered of her second

child. The infant, however, only lived three weeks. After this the disease advanced; it attacked the other breast, and she died, aged 45, two years after first noticing the disease in the breast. No post-mortem examination.

CASE 2.—E. R—, æt. 31, was attacked with cancer in the breast. Six months after this she miscarried. Subsequently she was operated on, and died aged 35.

CASE 3.—C. N—, æt. 27, under the care of Mr. Shaw. Had had three children previously. In the second month of pregnancy the breast became hard and knobby. The disease advanced during pregnancy. She was confined at the full period, but no milk appeared in the breast. She died five months afterwards. Cancer was found in the internal organs.

CASE 4.—H. F—, æt. 41, under the care of Mr. Arnott. Had had three children. When aged 38, attacked with scirrhus of the breast, with nodules in the skin around. When aged 40, she again became pregnant, and was delivered of a living child.

The general conclusions that these facts as to marriage, &c., point to, are—

1. That cancer attacks the married and single in different proportions according to the seat of the cancer, a much larger relative number of married women being attacked with uterine than with breast cancer.

2. That uterine cancer does not frequently occur in single women.

3. That when cancer attacks those who are, or have been married, it occurs among those who have had children and among the barren in about the same proportion as such individuals exist in the community. There is, therefore, no special proneness of cancer to attack the barren.

In this respect it may be observed, there is no difference between the cases of cancer of the uterus and of the other organs, the proportion of barren women being about the same in all.

4. That there are cases in which a patient already suffering from cancer has become pregnant, and that instances are also met with, in which the cancerous disease appears to have commenced during pregnancy.

5. As to the influence of the climacteric, it is observed that a larger proportion of persons affected with the uterine than with the other forms of cancer were attacked before the final cessation of the catamenia.

6. That as regards the fertility of those affected with cancer, the patients suffering from uterine cancer, as a rule, had had much larger families than those affected with the disease in other parts. This result is perhaps more remarkable, as the patients were attacked with uterine cancer at an earlier period of life than with the affection in other situations, and it is fair to believe that the occurrence of the disease in the uterus interfered with the subsequent childbearing of the patient.

If the average fruitfulness of all marriages be considered to be four (a number, it is believed, somewhat in excess of the real amount), it is then seen that the number of children borne by the patients suffering from uterine cancer (5·2) is 30 per cent. in excess of this number. On the other hand, the number of children produced by the other cancer patients (3·89) is $2\frac{3}{4}$ per cent. less than the average.

This comparison, however, is not perfectly just. There are two principal reasons why the average number of children borne by the cancer patients cannot be fairly compared with the average fruitfulness of marriage. In the first place, a few of the cancer patients had been married more than once, and some had borne children by each marriage. Secondly, many of the patients were attacked with cancer before the child-bearing period was passed, and the number of children they might have had, was no doubt thereby diminished. These two

sources of error to a certain extent compensate each other, and, in the absence of more accurate data, the conclusions here given may be accepted as offering a fair approximation to the truth.

Duration of life in cases not operated on.—In order to determine the duration of life in patients suffering from cancer, those cases only are available, in which all the dates have been fully recorded; the number of cases thus complete is 225.

It should be premised that there is considerable difficulty in estimating the exact duration of the disease. In all internal cancers, the period given is less than the real duration, as it includes only the time during which the symptoms were present, the disease itself probably having existed for some months previously.

Among the female patients it is necessary to consider the duration of life—1st, in the case of the breast; 2dly, in that of the uterus; 3dly, in the other forms of external, or surgical, cancer; 4thly, in cases of internal cancer.

The number of available cases of cancer of the breast is 78. Among these the shortest duration of life was three months; the longest 172 months; the average being 32·25 months. This statement applies only to actual deaths from cancer; many other cases were noted as living, the disease having existed for a considerable time. In one only of these cases the period exceeds the maximum above given, the exception being a patient still living in the hospital, in whom the disease (scirrhus) had existed for twenty years (240 months). It is clear that a correct result would not be obtained if these cases were included, as the numbers above given include *all* patients *dying* of cancer, and are therefore likely to take in the proper proportion of examples of the acute and of the chronic forms of the disease.

Among 69 cases of uterine cancer the most rapid was two months, dating from the occurrence of the first symptoms. The longest duration was thirty-seven months. The average was 14·1 months.

This result shows a very striking difference in the average duration of life between those suffering from cancer of the breast, and those labouring under uterine cancer. It, however, exaggerates the real difference, as the duration of cases of cancer of the breast represents the whole period of the disease, whilst in the uterine cases the period is that of the duration of the symptoms, which, as a rule, is only the period of ulceration.

Among the 23 cases of external cancer in the female, (labium, skin, face, bones, &c.) the most rapid terminated fatally in four months (melanosis of the parotid); the longest duration was 113 months (epithelial cancer of the face). The average duration of the disease was 34·5 months.

Among the cases of internal cancer, (stomach, liver, ovaries, &c.) the most rapid was six months (cancer of the liver); the longest duration noted was twenty-eight months (scirrhus of the rectum); the average length of life after the first symptoms were observed being 21·3 months.

The cases of cancer in the male may be divided into two groups. In the first, the external cancer, (lip, face, penis, bones, &c.), the most rapid cases died in three months (one case of cancer of the femur, and one of cancer of the testis). The greatest duration of life was 124 months (epithelial cancer of the scrotum). The average of the 23 cases was 25·8 months.

Among the cases of internal cancer (stomach, lung, kidney, &c.), the most acute case died in two months (cancer of the stomach); the most prolonged case lived ninety-six months (encephaloid of the kidney). The average duration of life was thirteen months.

Or, taking the whole of the cases together, the average duration of the cancer in forty male patients was 20·4 months. In the 185 females it was twenty-five months. Of the total 225 cases of both sexes, it was 23·6 months, or rather less than two years.

As regards the variation in the duration of life dependent upon the situation of the cancer, the following gives the

periods in those organs, in which the number of examples is sufficiently great to form an average. (Both sexes.)

Breast	32·25 months.
Uterus	14·1 „
Stomach	8·5 „
Rectum	34· „
Lip, face, &c. . . .	53· „
Penis	34·5 „
Bones	10· „
Labium	29· „

Comparative duration of life in the different varieties of cancer.—To determine this point in a satisfactory mode it would be necessary to obtain the particulars of a considerable number of cases of the different forms of cancer attacking the same part of the body; but, as each part is affected by one form of cancer in particular, it is scarcely possible to obtain a sufficient number of instances to build a conclusion upon. It is necessary then to compare the different varieties of cancer, as they affect different parts of the body.

The cases of cancer of the breast may be taken as consisting entirely of examples of the scirrhus or medullary forms, the number of examples of the epithelial variety of the disease being too small to disturb the result. The average duration of life in these cases was 32·25 months. On the other hand, the instances of cancer of the lip may be looked upon as being epithelial (a very large majority being of this variety), and among these the duration of life was fifty-three months.

This fact indicates the great difference which exists in the rapidity of true, and of epithelial cancer. The two sets of cases are not of course perfectly comparable, in consequence of the different diseases which complicate the progress of cancer in these parts. The result, however, may be taken as indicating a difference in the duration of life, the causes of which are sufficiently obvious.

From what has been stated, it will be seen that it is useless to attempt to ascertain the difference in the

rate of progress in scirrhus and in medullary cancer, the line of demarcation between these two forms of the disease being so indistinctly marked. The present cases, however, bear out the received opinion that the softer forms of cancer are more rapid in their progress than true scirrhus; but there are among them several striking examples of encephaloid assuming a chronic form.

The effect of operation on the duration of life.—The foregoing results, derived from cases left to nature, should be compared with the duration of life in those cases, in which the disease had been removed by the knife. It will, however, be advisable to speak only of the cases of cancer of the breast, as the operations performed on other parts are not sufficiently numerous.

The total number of cases operated on is 57, and of these 6 were operated on twice, making a total of 63 operations. Out of these, 60 recovered from the effects of the operation, and 3 died, the mortality being 4·8 per cent.

Of the fatal cases, the first died thirteen days after the operation, the cause of death being pleuritis. In the second case, death also took place thirteen days after the operation, but was from pyæmia. The third died eighteen days after, from erysipelas, the patient also suffering from Bright's disease in an early stage.

Of the 60 cases in which recovery took place, the wound healed, or nearly healed, in 57 cases; in the remaining 3 cases the disease returned at once.

Cancer is recorded to have recurred locally sooner or later in 24 of these cases of recovery, this number being exclusive of the 3 in which the disease recurred at once. The latest period at which the local return of the disease was noted, was 108 months. The average period of the 24 cases was 14·8 months.

It is thus seen that, out of the 57 individuals operated on, 3 died of the operation, and in 27 the disease recurred in the part. Twenty-seven cases remain to be accounted for. Only 6, however, of these were traced for some time

subsequently to the operation, and they remained well when last seen. The periods of latest observation on 4 of these cases were seven, twenty-nine, thirty-six, and sixty-four months respectively.

Among the 24 cases in which the disease recurred locally, the earliest death was twelve months from the original appearance of the disease, the latest was 138 months; the average being 56·6 months. In order to make a just comparison with cases not operated on, it is necessary to include the 3 cases which died from the operation. This reduces the average duration of life, in cases operated on, to 53·2 months.

Or, again, taking the period at which death took place after the operation, it is found to vary from five to seventy-two months; the average duration of life after operation being 30·5 months.

It is thus seen that the patients operated on lived fifty-three months, whilst those on whom no operation was performed lived only thirty-two months, showing that the cases operated on lived twenty-one months longer than those left alone.

This result should not, however, be accepted without making due allowance for certain disturbing causes. In the first place, the cases submitted to operation are certainly more or less selected, and, as a rule, are to be looked upon as somewhat favorable forms of the disease, and thus the duration of life may be only apparently lengthened. Again, in the results just given, *all* the cases operated on have not been traced to their end; it is, however, right to infer that the numbers stated include a due proportion of cases in which the disease recurred quickly.

On the hereditary nature of cancer, and on the diseases affecting the families of cancerous patients.—The consideration of the question, whether cancer is hereditary, is a subject of great importance in its bearings upon the pathology of the disease. It is hardly necessary to observe that the relative degree of influence exercised by the local, and by

the constitutional causes which operate in the production of cancer, differs greatly in the various forms of the affection. Thus, in certain cases, as in soot cancers, the local irritation by itself appears to be sufficient to produce the disease, whilst in numerous other instances the cancer arises solely from the state of the constitution, there being an absence of local cause. It is thus seen that, although an apt state of constitution is considered necessary for the production of cancer, this apt state may arise in almost any individual, and that it may originate in families, in which the cancerous disease has not previously existed.

In order, therefore, to determine in what degree this state of system is hereditary, and how far acquired, it is necessary to ascertain whether cancer is more likely to occur among the members of a family in which some individual has already suffered from the disease, than in a family never previously affected.

It is obvious that the method of obtaining most satisfactory information as to the hereditary character of this, and, indeed, of any other affection would be, by noting in several families the diseases to which each member had been subject during life, and the cause of death of each deceased relative. However desirable it may be to investigate the subject according to this method, it is clear that the difficulties, especially among hospital patients, are so great as to prevent its being fully carried out. The number of instances in which any complete family history has been obtained, is too small to form the basis of conclusions. It is, therefore, proposed, in the present paper, to speak only of the occurrence of cancerous and of tubercular diseases in other members of the families, to which the cancer patient belonged.

The proof or refutation of the hereditary nature of cancer then rests on the solution of the question, "Does the proportion of instances of cancerous patients whose families had been previously affected with cancer, to those whose families had not been so, exceed the proportion of cancerous to non-cancerous families throughout the community?"

In obtaining a numerical solution to this question, many difficulties and numerous sources of inaccuracy present themselves, and the grounds of fallacy should be borne in mind.

The chief of these is perhaps the very imperfect knowledge which all, but more especially hospital patients possess as to the diseases to which their relatives have been subject. Even supposing a member of the patient's family to have died of cancer, and the fact to be distinctly known to the other relations, in the course of a few years the knowledge would become traditional, and probably the fact would cease to be remembered. The event of an individual dying of external cancer is, perhaps, less likely to be forgotten than if the death occurred from any less remarkable disease. If, however, the relative had died from internal cancer, the cause of the disease would probably be unknown, and thus the effect of these cases in increasing the proportion of cancerous relatives is nearly lost.

Compared with the foregoing, the inaccuracies dependent upon errors of diagnosis would scarcely produce any perceptible result, and as they would tell in both directions, causing some cancerous diseases to be considered non-malignant, and some simple diseases cancerous, the errors arising from this cause would nearly compensate each other.

All these sources of fallacy are reduced by taking a large number of cases; and, with a view of making the result as satisfactory as possible, the inquiries have been made with considerable care, the patients being not only asked, "Did any relative suffer from cancer?" but the age and the manner of death of each near relative was noted.

Out of the total number of 305 cases, in which it is stated whether cancer had, or had not been traced in any relative of the patient, it was found to have been present in the families of 34. One of these instances, however, was somewhat doubtful. Cancer was, therefore, traced

in $8\frac{2}{3}$ per cent. of the total number of cases. The sex of the patients was as follows:

		Males.		Females.		Total.
No. of cases	..	42.	..	263	..	305
Cancer traced in	..	4	..	30	..	34

The patients who remembered to have had a cancerous relative were—

			Males.		Females.		Total.
Breast	..	..	—	..	17	..	17
Uterus	..	..	—	..	8	..	8
Vagina	..	..	—	..	1	..	1
Rectum	..	..	—	..	1	..	1
Anus	..	..	—	..	1	..	1
Scalp, face, &c.	..	..	—	..	2	..	2
Lip	..	..	1	..	—	..	1
Bones of face	..	..	1	..	—	..	1
Antrum	..	..	1	..	—	..	1
Stomach	..	..	1	..	—	..	1
			—		—		—
			4		30		34

Out of the 34 in which cancer was traced, in 27 it existed in only one relative of the patient, and in the remaining 7 more than one relation was affected with the disease. The degree of relationship of the cancerous subjects was as follows:¹

In the mother or father	.	.	.	.	13
„ grandmother	.	.	.	.	2
„ great aunt	.	.	.	.	1
„ aunt or uncle	.	.	.	.	10
„ cousin	.	.	.	.	6
„ brother or sister	.	.	.	.	8
					—
					40

¹ In this table the cases in which more than one relation was cancerous, are included, the total number therefore exceeds the number of patients who had relations affected with the disease.

The hereditary taints in question may be arranged as follows :

On the father's side	.	.	.	.	7
„ mother's side	.	.	.	.	19
On both sides	.	.	.	.	1
Not noted	.	.	.	.	5
					<hr/> 32

A different degree of importance is to be attached to the presence of cancer in relations of the various degrees of kinship. Thus, its presence in a brother or sister (except that here other causes interfere with the deduction) should be an argument of the strongest force, as brothers and sisters possess constitutions nearly identical, or, as it is said, are of the same blood. Its presence in one of the parents is an argument of less force, for supposing the father and mother to contribute their constitutional peculiarities in equal proportions, the child and either parent have but half their constitutions identical. In like manner the presence of the disease in a cousin proves still less, as they have but one fourth of their constitutional peculiarities in common. And so on with any other relationship, the force of the argument to be derived from an example of a cancerous relative varying in proportion to the amount of constitution the two possess in common.

The cancerous relations of the cancer patients were thus affected—

Breast	.	14 cases	Eye	.	1 case
Uterus	.	5 „	Liver	.	1 „
Labium	.	1 case	Leg	.	1 „
Lip	.	2 cases	Not noted	.	6 cases
Throat	.	2 „			

The instances in which cancer affected more than one relative of the patient, were—

CASE 5.—A. S—, female, æt. 44. Cancer of the breast. Her father's sister and a cousin died of cancer.

CASE 6.—S. S—, female, æt. 28. Cancer of the nose. Her uncle, and a cousin died of cancer.

CASE 7.—C. M—, female, æt. 59. Cancer of scalp. Her mother, and a sister died of cancer.

CASE 8.—D. F—, female, æt. 32, died of scirrhus of the cervix uteri. Her mother died, aged fifty-two, in the Middlesex Hospital, some years before, of cancer of the uterus. A maternal aunt had died of cancer of the breast.

CASE 9.—E. L—, æt. 29, had cancer of the uterus. Her father's mother died aged, of cancer of the anus. A maternal aunt had been operated on for what was considered cancer of the breast.

CASE 10.—S. H—, married. Was born in 1803. A cancerous tumour formed in the left breast in 1846, and was excised a month or two afterwards by Mr. Arnott. The tumour again returned at the end of 1855, and was excised in the following April by Mr. Shaw. The patient recovered, and remains well.

The patient's family consisted of the following members :

1. The eldest being the patient herself.
2. A brother who died of phthisis in 1847.
3. A single sister born in 1811, died in 1844 of cancer of the breast. Had not been operated on.
4. A single sister born in 1817, died in 1847 of cancer of the breast. Had not been operated on.
5. A married sister had a scirrhus of the breast removed in 1845, and again in 1856; is still living.
6. A single sister had a cancer of the breast removed in 1852, and died of erysipelas after the operation.
7. A married sister, who remains at the present time in good health.

The mother of this family died of cancer of the breast in 1829. She had three sisters, two of whom died of phthisis, and one of dropsy.

The father died from an accident. His brothers and sisters were long-lived and healthy.

The patient's father's father died of hæmoptysis, and his father lived to the age of 101.

In all the instances in which cancer affected any members of this family, the left breast was the seat of the disease.

The occurrence of phthisis in the families of cancer patients.

—It is noted in 130 cases whether phthisis existed, or not, in the family of the patient. The question was answered in the affirmative in 48 instances.

Out of these 48 cases in which there was a history of phthisis in some member of the family, 43 were females and 5 were males.

The form of the disease in the 43 females was—

Breast . . . 18	Skin . . . 2
Uterus . . . 19	Tongue . . . 2
Ovary . . . 1	Hand . . . 1

Among the 5 males the disease existed in the following organs—femur, lip, skin, anus, soft palate (there being one example of each).

Again, out of the 48 cases, in 20 instances more than one relative was affected with phthisis, and in some cases as many as 6 relatives had been affected.

The relations suffering from phthisis in these cases were—

Father or mother	32
(Both being affected in 2 cases.)	
Brothers or sisters	27
(In 11 cases more than one brother or sister affected.)	
Grandmother or grandfather	2
Children	7
(In 2 cases more than one child affected.)	

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In the foregoing, only cases of pulmonary consumption have been included, instances of the other forms of tubercular disease, such as scrofula, hydrocephalus, tabes, &c., being neglected, as offering numerous sources of fallacy.

It is thus seen that in $8\frac{3}{4}$ per cent., or in about one eleventh of all cases affected with cancer, the same disease had existed in other members of the family.

From this fact taken by itself little can be inferred, and its value as an argument for or against the hereditary nature of cancer, must rest on the solution of the question, "Does this ratio exceed the proportion of hospital patients suffering from other diseases, and taken indiscriminately, who would remember to have lost a relative from cancer?" Without possessing sufficiently extensive information upon this subject, I can only state my belief that the above number ($8\frac{3}{4}$ per cent.) is not greatly in excess of the proportion of hospital patients who remember to have had cancerous relatives. The circumstance, therefore, taken alone is not to be regarded as convincing evidence of the hereditary nature of cancer.

A much stronger reason, however, for believing that the disease may be transmitted from parent to child, is derived from the fact that, in 6 instances out of 34 in which cancer existed in the family, more than one member had been affected. In 5 instances 2 members had suffered from the disease, and in the sixth case 5 relatives were cancerous.

Out of the total number of patients who had cancerous relatives, (34) it might be expected that the same ratio would again hold true, and that 2, or even 3, of these patients would have more than one relative affected with cancer. The proportion, however, which is found to exist being so much larger than that which would be accounted for upon this principle, it is clear that other causes beyond mere accidental coincidence must come into operation in producing the result.

The last quoted case by itself forms as strong an argument in favour of the hereditary nature of the disease as an individual case possibly could, and taken in connexion with the other facts, it constitutes all but conclusive evidence that cancer is, to a certain extent at least, hereditary.

It is also seen that phthisis and cancer coexist with great frequency in different members of the same family. Phthisis

was present in 48 out of 130 cases, or in nearly 37 per cent. The disease, moreover, existed in a brother or sister of the cancerous patient in 27 cases, or in more than 20 per cent. It need not be discussed here, whether the fact indicates simply that the two diatheses may coexist in the same family, or whether it tends to show that the one diathesis may be a modification of the other.

It might have been expected that a larger proportion of relatives should have been affected with phthisis than with cancer, because the former disease is so much more common, and also from the fact that patients die from it at a much earlier age, and that, therefore, a larger number of relatives may be included. Owing to this latter circumstance it is evident that, in obtaining the family history, all the instances of consumption in the brothers and sisters of the patient would be recorded, as they would probably have passed the age liable to the attacks of this malady. In the case of cancer, however, it is equally likely that the brothers and sisters should be attacked after as before the patient, and in the former case these instances would not be included.

The great differences in the age of those attacked should be borne in mind in estimating the relative influence of the hereditary causes in cancer and in phthisis. The fact of several members of the same family, living under precisely the same conditions as to residence, food, habits, &c., being attacked with phthisis, is by no means a very convincing argument in favour of the hereditary nature of the disease. On the other hand, several members of a family being attacked with cancer at a time of life when they would be living under different conditions, in different places, and following separate occupations, is an argument of much greater force in favour of the hereditary transmission of cancer.

PART II.

An analysis of the records of the post-mortem examinations of cancer patients.

The number of post-mortem examinations available for the purpose is 173. The following table exhibits the seat of the primary cancer in each instance :

			Males.		Females.
Breast	..	..	—	..	61
Uterus	..	..	—	..	44
Vagina	..	..	—	..	2
Ovaries	..	..	—	..	2
Clitoris, labia, &c.	..	..	—	..	2
Penis	..	..	2	..	—
Scrotum	..	..	2	..	—
Testicle	..	..	2	..	—
Lip	..	..	7	..	—
Skin in various situations	..	..	6	..	3
Alveolus	..	..	2	..	—
Tongue	..	..	1	..	—
Throat, palate	..	..	1	..	3
Œsophagus	..	..	1	..	—
Stomach	..	..	5	..	—
Peritoneum	..	..	—	..	1
Intestines	..	..	1	..	—
Rectum	..	..	2	..	4
Anus	..	..	—	..	1
Liver	..	..	—	..	3
Lung	..	..	1	..	—
Lymphatic glands	..	..	1	..	1
Parotid gland	..	..	1	..	1
Thyroid gland	..	..	—	..	1
Bones	..	..	4	..	2
Muscles	..	..	—	..	2
Eye	..	..	1	..	—
Total	..	..	40	..	133

The first subject which presents itself in analysing these

cases, is that of the dissemination of cancer structures in different parts of the body. It is well known that the multiplication of the disease is observed only in a certain proportion, and not in all examples of the affection. In one group of cases the cancer is strictly local, it does not even affect the lymphatic glands of the part. In a second group there is, in addition to the local affection, disease in the lymphatics, the internal viscera, however, being unaffected. In a third group the whole system appears contaminated, and the disease is scattered among the various organs of the body. The foregoing cases may therefore be arranged—

Disease of the part only	29
Affecting also the lymphatic glands	44
State of lymphatic glands doubtful	12
Disease affecting the system	88

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In the above it should be remembered that the affection is considered local, when there is but one mass of diseased structure. For instance, there are cases of scirrhus of the breast passing into the chest, and involving the mediastinum and pleura, there being no disease elsewhere. These are classed under local cancers, as there was but one mass of diseased growth in the body.

In order to judge of the indications of the above table, it is necessary to bear in mind the proportion of the different varieties of cancer which enter into the above. They are—

Scirrhus	103
Medullary (including melanosis)	41
Epithelial (including rodent ulcer)	29

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The distribution of the secondary cancers in the various organs of the body is shown in the following table :

	I. Breast.	II. Uterus.	III. Epithelial, of various organs.	IV. True Cancer, various organs.	V. Total.
1. The disease not extending beyond the lymphatic glands	13	34	12	24	83
2. Affecting lungs, &c., but liver healthy	5	—	—	2	7
3. Affecting liver, &c., but the lungs healthy	25	5	1	14	45
4. Involving both lungs and liver	8	2	1	4	15
5. Involving other parts, but both lungs and liver healthy	10	3	1	9	23
	61	44	15	53	173

This table exhibits the comparative frequency with which the various internal organs are affected in the different forms of cancer. In the first and fourth columns all the cases are examples of true cancer, those in the first being almost entirely scirrhus, but those in the fourth being partly scirrhus and partly medullary. Among the cases of uterine cancer there are a few epithelial, and some cases of rodent ulcer, the rest being examples of true cancer. The third column consists entirely of epithelial cancer of the external organs.

I. *Cancer of the breast.*

Among the 61 cases of cancer of the breast the state of the lymphatic glands was healthy in 8; more or less diseased in 53.

The cancerous disease found among the various organs of the body in these cases was as follows :

In the lungs	.	.	.	.	13
„ liver	.	.	.	.	33
„ kidney	.	.	.	.	1
„ spleen	.	.	.	.	1
„ pleuræ	.	.	.	.	17

In the pericardium	9
„ peritoneum	9
„ arachnoid	2
Extensive cancer in the bones	6
In the supra-renal capsules	2
In the other breast	9
Very numerous nodules beneath skin	8

The mode in which the various secondary cancers were associated together, is shown in the table before given.

The following non-cancerous diseases were found in the bodies of those affected with cancer of the breast :

Pleuritis, with effusion	21
Pleuritis and pericarditis	3
Pericarditis	1
Bright's disease	2
Abscess near the cancer	2
Pyæmia	1
Tubercle, phthisis	2
Caries of the spine	1
Cystic disease of the ovary	1
Fibrous tumour of the uterus	3
Cirrhosis of the liver	1
Apoplectic cysts in the brain	1
Disease of the mitral valve	1

II. *Cancer of the uterus.*

There are 44 examples of uterine cancer. This number, however, includes several examples of the "rodent ulcer." The principal reason for classing these cases with the examples of true cancer of the uterus is the extreme difficulty, if not impossibility, of distinguishing between them. This difficulty is no doubt owing to the fact, that ulceration commences very early in cases of cancer of the uterus, so that by the time the life of the patient is destroyed, nearly all the cancerous tissue is destroyed, and therefore the remaining ulcer can hardly be distinguished from the rodent ulcer. In some instances even of apparent rodent ulcer, the

nature of the disease is proved by the presence of cancer in other organs. This condition was exhibited in a recent case, in which the cervix uteri was destroyed by what appeared to be a rodent ulcer, no cancerous tissue being detected about its edges, but in connexion with the uterus the two ovaries were converted into large cancerous tumours.

The following secondary cancers were found in these patients :

In the lungs	.	.	.	.	1
„ liver	.	.	.	.	7
„ kidney	.	.	.	.	1
„ pleura	.	.	.	.	2
„ pericardium	.	.	.	.	2
„ peritoneum	.	.	.	.	1
„ ovaries	.	.	.	.	1
„ intestines	.	.	.	.	1

The lymphatic system was affected as follows :

The disease strictly local	.	.	.	15
Affecting only the part and lymphatic glands, &c.	.	.	.	19
Affecting other organs	.	.	.	10

The non-cancerous diseases found in the bodies of those suffering from uterine cancer, were as follows :

Vesical fistula	.	.	10	Fatty liver	.	.	1
Rectal fistula	.	.	2	Hydatids in liver	.	.	1
Ileus	.	.	1	Rickets	.	.	1
Pyelitis	.	.	1	Pleuro-pneumonia	.	.	2
Abscess of the kidney	.	.	1	Fibrous tumour of uterus	.	.	5
Tubercle in the lung	.	.	4	Cystic ovary	.	.	2
Bright's disease	.	.	4	Arachnoid hæmorrhage	.	.	1

III. *Epithelial cancer.*

Among the 15 instances of epithelial cancer, the state of the lymphatic system was quite healthy in 4; cancerous in 8; extensive disease of the lymphatic system in 3.

That is to say, the lymphatics were quite healthy in 4

cases, and cancerous in 11; but in 3 out of these 11 instances nearly the whole of the lymphatics of the body were affected with epithelial cancer. In one or two of these cases an appearance of cancer of the lung was presented, owing to a lymphatic gland imbedded in the lung-tissue being affected with epithelial cancer. It is obvious, however, that it would not be just to place these cases as examples of epithelial cancer of the lung.

It will be seen in the table before given, that the disease was confined to the lymphatics in 11 out of the 15 cases; in the remaining 4 cases cancerous disease was found in other parts of the body. There is, however, only one genuine example of two distinct epithelial cancers in one individual. In the other 3 cases the secondary tumours were examples of another form of the disease. The following are the chief features of the case in which there were two distinct epithelial tumours.

CASE 11.—*Epithelial cancer of the leg and of base of tongue*.—M. S—, male, æt. 63, a wood-sawyer, married; a tall man of slight make. Twelve months before he came under observation, a tubercle formed beneath the skin on the inner aspect of the left leg. When he first discovered it, it was not larger than a pin's head; but having scratched the surface, it became sore, and has never healed since. When admitted in November, 1853, under the care of Mr. Henry, there was a tumour the form and size of half an egg; the surface covered with fine granulations, and a fissure separating it from the skin around. Soon after admission he began to complain of a sore throat, and in the course of a short time an ulcer was discovered at the base of the tongue, which soon extended into the tonsil. The glands beneath the jaw became enlarged. After this, the sore on the leg remained in a stationary condition, the throat gradually became worse, the ulceration extending and producing great difficulty in swallowing food. An opening made its appearance over the glands beneath the jaw. He gradually sank, and died on May 12th, 1854.

In the post-mortem examination, the tumour in the leg and that at the base of the tongue exhibited the usual characters of epithelial cancer, both to the unassisted eye and beneath the microscope. The glands beneath the jaw were affected by the disease, but the femoral glands were quite healthy.

The following is one of the cases, in which soft cancer became developed as secondary tumours to epithelial cancer.

CASE 12.—*Old-standing epithelial cancer of the scrotum ; extensive disease of the lymphatic system ; medullary cancer in the liver ; secondary syphilis ; caries of the spine.*—James G—, æt. 30, a chimney-sweeper, married, was admitted into the hospital October 9th, 1855, under the care of Mr. De Morgan. In the spring of 1850, a tumour formed in the scrotum, over which the skin became ulcerated, but healed at the end of twelve months. A year after this another similar tumour formed, and remained ulcerated about the same time as the first, and healed, and shortly afterwards again became ulcerated. A twelvemonth before admission, he had venereal disease, which is described to have been without sores. Six months before he came to the hospital, the glands in the groin became enlarged. When admitted; there was a portion of skin in the scrotum, the size of a shilling, which was hard and thickened, the surface over being abraded. Close at the side of this, is the cicatrix of the original lump, which is perfectly healthy. In the left groin an irregular sore, with thin discharge, the skin being excavated around. A similar opening in the right groin. On the face a copious eruption of red elevated tubercles.

After this, the openings in both groins extended, and discharged more profusely. He became rapidly emaciated, and suffered from intense neuralgia in the thigh. The eruption gradually faded, and he died in January, 1856.

At the post-mortem examination, the lymphatics of the

pelvis and lumbar region were affected with extensive cancerous disease, which presented the same appearances as the tumour in the scrotum. The only other cancer was a tumour in the liver; the structure of this was distinct from that of the scrotum, and did not exhibit the characteristics of epithelial cancer. Extensive carious disease of the spine was also discovered.

The relative frequency of the occurrence of secondary Tumours in the different forms of Cancer.

From the foregoing, it will be seen that there is a great disproportion as to the number of instances in which secondary tumours occur in the various forms of cancer. Thus, in cancer of the breast there were secondary tumours in 79 per cent. of the total number of cases; in true cancer of other organs in 54 per cent.; in uterine cancer in 23 per cent.; and in epithelial cancer in 20 per cent.

The table before given (page 140) moreover exhibits the different modes in which the secondary tumours were associated in the same body. In each form of the disease nearly every possible combination of the secondary tumours was observed, with the exception that among the cases of cancer of the uterus there was no example of the disease attacking the lungs, the liver remaining healthy.

The multiplication and dissemination of Cancer.—Without attempting to discuss fully the various means by which the multiplication and dissemination of cancer occurs, a few words may be said on the bearing of the present cases upon this subject. There appear to be three principal modes in which a cancerous growth may be multiplied.

1. By the development of cancerous nodules in the immediate neighbourhood of the original tumour.

2. By the growth of cancerous disease in the lymphatic glands of the part.

3. By the formation of tumours in distant parts of the body, and more especially in the lungs and in the liver.

By the first method, the development of cancerous nodules probably depends on the infiltration of a blastema endowed with the property of cancerous development in the meshes of areolar tissue near the tumour. By the second mode, the growth of cancer in the lymphatic glands may be supposed to arise from the absorption of cancer-germs, which either become developed, or excite the formation of cancer-cells in the lymphatic glands. In a few instances, however (and chiefly, in cases of epithelial cancer), the disease in the glands may be traced to have extended from the part originally affected, along the lymphatic vessels. In the third instance, the growth of tumours in distant parts of the body, the blood itself is contaminated, and carries the cancer-germs to the various organs of the body.

It is probable that the multiplication of cancer takes place by each of these methods. The first is necessary to explain the occurrence of the numerous nodules which are found so frequently in the parts adjacent to a cancer, as in cases of scirrhus of the breast, and in some instances of epithelial cancer. Then, again, there are several instances in which secondary tumours were discovered, but both the lungs and the liver escaped the attacks of the disease. Thus, in 22 out of 172 cases there were secondary tumours, the lungs and liver remaining healthy. So, also, in 10 out of 61 examples of cancer of the breast, the same fact was observed. In a large proportion of these cases, the secondary tumours were not very distant from the original cancer; but in a few examples, the other viscera (spleen, kidney, &c.) were affected. In all these instances, the multiplication of the cancer appears to have depended on local, rather than on constitutional causes; for if the system itself were much involved, the viscera would not be more likely to escape the ravages of the disease, than the parts near the original tumour.

The blood becomes secondarily contaminated by the agency of the lymphatics, or by the blood-vessels. In the

lymphatics, cancerous material was frequently observed ; but in the veins, although clots were often noticed as having a somewhat cancerous appearance, yet, on careful examination, the structure of cancer could not be demonstrated.

In this enumeration, I have not alluded to the theory, which supposes that the formation of secondary tumours depends solely on the state of the system, and that there is no subsequent contamination of the vital fluids ; that, in short, the same state of blood which gave rise to the first tumour, produces the second. If this theory were true, secondary tumours should form in the favourite seats of cancer, and not, as occurs in most cases, in the lungs and liver. Thus, for instance, a patient suffering from scirrhus of the breast should be attacked with the disease in the uterus, another with cancer of the eye should have the secondary affection in the stomach. Such a distribution of the disease, however, does not occur ; the foregoing cases do not afford a single example of what might be called two primary cancers, the secondary tumours in nearly every instance being arranged in a determinate method.

The diseases affecting cancerous patients.

The inquiry into the laws which govern the association of various diseases in the same individual, is one of the most interesting branches of pathology, and it is of greater importance in a disease of obscure origin, like cancer, as by such an inquiry some light might be expected to be thrown on the causes of the affection.

The non-cancerous diseases which were found in the bodies of the cancer patients, may be placed in two groups.

1st. Those diseases which were obviously brought about, or produced by the cancer.

2d. Those which appear independent of it.

Among the first group we find—

Pleuritis	25	Pyæmia	1
Pleuropneumonia	9	Abscess near the cancer	2
Vesical fistula	11	Pyelitis	1
Rectal fistula	2	Abscess of kidney	1
Pericarditis	6	Œdema of the glottis	1
Extensive phlebitis	1	Ileus	2

All the foregoing were clearly produced by the cancerous disease. The second group is of greater interest, as showing some of the constitutional diseases which may affect cancer patients.

Tubercle in lungs	15	General dropsy	3
Caries of the spine	2	Diseased mitral valve	3
Rickets	1	Fatty degeneration of heart	2
Active syphilis	1	Apoplectic cysts	1
Bright's disease	10	Congestion of brain	1
Cirrhosis of the liver	2	Arachnoid hæmorrhage	1
Waxy liver	2	Plugging of cerebral arteries	1
Hydatid of liver	1	Fibrous tumour in uterus	9
Enlarged spleen	1	Cystic diseased ovary	3

From the above, it is seen that nearly any of the more common diseases may co-exist with cancer. Rheumatism and gout appear to form an exception to this, none of the foregoing cases affording an example of the concurrence of either of these diseases with cancer.

The diseases which are less frequently, as well as those which are most commonly associated with cancer, should be noted. Cardiac affections are perhaps the most remarkable in this point of view, it being very rare to meet with advanced cardiac disease in those dying of cancer. Among the post-mortem examinations, there are only three cases of marked valvular disease. Hypertrophy of the heart is extremely rare among cancer patients, the present cases not affording a single example of decided hypertrophy; and in connexion with this circumstance, it should be remembered that many patients suffered from Bright's disease. The explanation of this somewhat remarkable absence of examples of hypertrophy, probably rests in the fact, that among

cancer patients the quantity of blood in the body is reduced to such an extent, as to require but little force to propel it along the vessels. The tendency of the heart to become hypertrophied, which is so usually met with in patients suffering from Bright's disease, would thus be counteracted.

The concurrence of Tubercle and Cancer.

Tubercle was found in the bodies of cancer patients in the following cases :

CASE 13.—T. P—, male, æt. 59, dying of encephaloid of the stomach, under the care of Dr. Hawkins. A large nodule of calcareous tubercle in the apex of the lung.

CASE 14.—M. H—, female, æt. 48, dying of scirrhus of the breast, under the care of Mr. De Morgan. A large quantity of recent tubercle in upper lobes of both lungs, with large cavities. (See Museum of Middlesex Hospital.)

CASE 15.—W. B—, male, æt. 38. Cancer of the tongue, under the care of Mr. Moore. In the lung, a cavity of the size of a small orange : infiltrating semi-transparent tubercle around. Old tubercle in the mesenteric glands. Ulceration of the colon.

CASE 16.—T. B—, male, æt. 53, under Mr. De Morgan. Medullary cancer of the head of the femur. A nodule of cheesy tubercle was found in the upper lobe of the lung.

CASE 17.—A. E—, male, æt. 69, under Dr. Seth Thompson. Firm medullary cancer of the root of the lung, there being cancerous disease also in the kidney and in the mesenteric glands. In both apices there was cretaceous and recent tubercle. In the apex of one of the lungs there was a cavity, of the size of an orange.

CASE 18.—A. R—, æt. 54, under Mr. Shaw, scirrhus of the uterus. Several deep-seated calcareous nodules were found in the right lung.

CASE 19.—M. R—, female, under Dr. Stewart. Medullary cancer of the ovaries, there being also cancer of the liver. In this instance there was recent tubercle in both apices.

CASE 20.—G. O—, male, æt. 50, under Dr. Hawkins. Encephaloid cancer of the stomach. In both apices miliary and crude tubercle, a small cavity in the right apex.

CASE 21.—E. W—, æt. 41, under Mr. Moore. Medullary cancer of the uterus and glands. A large quantity of miliary and crude tubercle in both apices. A small cavity in the right.

CASE 22.—J. S—, æt. 57, under Mr. Shaw. Firm medullary cancer of the breast. A cicatrix was found in the left apex. There was also caries of the vertebræ.

CASE 23.—W. N—, under Mr. Moore. Epithelial cancer of the lip, and of the lymphatic glands. Large cicatrices, with old tubercle (partly cretaceous) in both apices.

CASE 24.—S. C—, female, æt. 48, under Mr. De Morgan. Scirrhus of the vagina, and of the lymphatic glands. Recent tubercle and cicatrices were found in both lungs.

CASE 25.—W. H—, male, æt. 64, under Dr. Stewart. Encephaloid of the stomach. A few tubercles were found in the apices.

CASE 26.—J. C—, male, æt. 48, under Dr. Seth Thompson. Scirrhus of the pylorus, with cancer in the lymphatic glands, liver, peritoneum, &c. There were cretaceous tubercles in both lungs. In this case the liver was affected with cirrhosis.

CASE 27.—R. S—, female, æt. 65, under Mr. Shaw. Encephaloid of the face, there being also similar disease in the kidney. In this case there were recent tubercles in the apices of both lungs.

The cases in which tubercle was found, were therefore as follows :

Epithelial cancer	1
Scirrhus	5
Soft cancer	9

And the form in which the tubercle was formed was :

Cretaceous	4
Crude and miliary	6
With cavities	5

The disease was therefore of recent date in 11 cases, whilst it was of old standing in 4.

*The immediate causes of death among cancerous patients.
Influence of cachexia, &c.*

In watching the progress of cancer among the patients of the hospital, it is remarkable to find that the cachexia is closely proportional to the amount of hæmorrhage, discharge, and pain. In cases in which there is but little hæmorrhage, and a small amount of discharge, the cachexia is hardly obvious, and this is usually observed, even where the cancerous tumours have attained great magnitude. It sometimes happens that the cachexia becomes well marked, even where there is but little hæmorrhage, or discharge; but, in these cases, the cancer is usually found to have involved some important internal organ, and to have interfered with some vital function.

On the other hand, in those patients with whom there is profuse discharge, and frequent attacks of hæmorrhage, the wasted sallow visage of advanced cancerous disease becomes obvious at an early stage of the complaint. In no class of cases is the cachexia more pronounced than in uterine cancer, or even in the instances of rodent ulcer of the uterus. The amount of cachexia is therefore wholly independent of the size of the cancerous tumour; it is often absent in cases of enormous growths, and may be present where there is but little cancerous tissue.

Moreover, in instances of benign tumours, which pass

on to ulceration, a form of cachexia often makes its appearance. Thus, in a recent case, a woman suffering from ulcerated proliferous cystic tumour of the breast presented a condition of extreme cachexia.

From these conditions I cannot but come to the conclusion, that the presence or absence of cachexia is valueless as an aid to diagnosis. It appears to be the result of the local disease, and is not to be regarded as evidence of a state of system which leads to the production of cancer.

On analysing the results of the post-mortem examinations, it does not appear that any patient has actually died of cancerous cachexia, the death in each instance having arisen from an amount of disease which would have been quite sufficient to kill, even had it been of a benign nature, and not from its peculiar character affecting the composition of the blood, or the powers of the system. The immediate cause of death is shown in the catalogue of diseases induced by the cancer. Thus, in 61 cases of cancer of the breast, pleuritis with effusion was present in 24 cases, and in this number only well-marked instances were included. Among the uterine cases, the frequency of the occurrence of fistula is scarcely less than that of pleuritis in cases of cancer of the breast. So again, cancer in other situations induces secondary diseases, which in a large proportion of cases are the immediate causes of death.

The more important conclusions to which the foregoing analysis leads, may be thus arranged :

1. In respect to age, it was observed that nearly all the patients had arrived at maturity, four only being attacked under the age of twenty years. The average age of those attacked with the disease in the uterus was forty-three and a quarter years; in the breast forty-eight and a half years. The patients with epithelial cancer were somewhat older than those with uterine, or breast cancer.

2. Childbearing appears as one of the predisposing causes to the formation of cancer, sterility being to a

certain extent a protection against it. Among the female cancer patients, 55 out of 315 were single; and among the uterine patients taken separately, there were 12 single women out of 135. Of the married women, 86 per cent. among the uterine patients, and 71 per cent. of those suffering from cancer in other organs, had borne children. The average number of children produced by each married woman, was 5·2 among the uterine cases, and 3·89 among those with cancer in other situations.

3. The duration of life was found to vary greatly, according to the seat of the disease. In the cases of cancer of the breast, those who had been operated on, lived fifty-three months, whilst those in whom the disease was allowed to take its natural course, lived only thirty-two months.

4. As regards the hereditary nature of the affection, it was found that cancer was traced in $8\frac{3}{4}$ per cent. of the cases. There were five instances in which the patients had two cancerous relations, and in one very remarkable case five relatives were affected with cancer.

5. Phthisis was traced in 37 per cent. of the families of the cancer patients.

6. In reference to secondary cancer, it was found that the disease was either local, or did not extend beyond the lymphatic glands in about half the cases. There were secondary tumours in 79 per cent. of the breast cancers, in 23 per cent. of the uterine cases, and in 54 per cent. of the instances of true cancer in other organs.

7. That a great variety of diseases was found in the bodies of those dying with cancer. Tubercle was found in 15 out of 172 examinations.

8. That cachexia appears to be rather an effect of ulceration than the sign of a state of system preceding the evolution of cancer.

In conclusion, my best thanks are due to all the medical officers of the Middlesex Hospital, for their constant kindness in affording me every opportunity of observing their

cases, and also for placing their own records at my disposal. My obligations are especially due to Messrs. Arnott, Shaw, De Morgan, Moore, and Henry, for their kind counsel and aid during the time I have been engaged in collecting the information which has here been analysed.