Thesis for M.D.

Cancer; Its Increase, Origin & Cause.

by.

Gregory Sprott M. B; C. M. D.P.H.

Resident Medical Officer

General Hospital

Hobart: Tasmania.

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

The subject of Cancer increase, all over the world has been exciting the minds of the medical profession as well as Statisticians. It would seem undoubted that it is increasing whatever the cause may be. Walshe writing in the Cyclop: of Practical Surgery 1841 page 630 quoting Scott, states. "That out of 30,102 cases admitted into the Hobart Town Hospital during twelve years there were but four cases of "Scirrhus:" which I presume meant at that time all Kinds of Cancer.
This has been repeated by Paget & more recently by Snow in his book & might lead many to believe that Cancer is not one of the prevalent diseases of Tasmania -
Davidson in his Geographical Pathology. states p. 568 "That Cancer is more fatal in Tasmania than in the other Australian Colonies."
Neither of these statements are quite correct at the present time. I hope with the aid of a few figures which I have obtained from the Government Statistician of this Colony W. R. Dr. Johnstone to show that Cancer is very Common in Tasmania - & further that Victoria has a higher death rate than this Colony - New Zealand when the rate is corrected for the disproportions of age will also show a death rate equal to Tasmania.
There seems to be little doubt that Cancer is rapidly increasing in the Australasian Colonies.
I will show this by a Table A. which represents the death rate for all ages: Table B. which is corrected for age disproportions will also show an increase - & a Comparison of death rate in Tasmania - Victoria, New Zealand & South Australia
The necessary figures to work out this comparison

for the remaining Colonies were not obtainable —
Of Course the death from Cancer for all ages would be of no comparitive value, between different Colonies different periods, if not corrected for varying disproportions of persons living at different age groups:
Now in a normally constituted population the proportion of persons living at these important age groups, as regards their freedom from or liability to attack from Cancer would be nearly as follows.

Ages 0 to 35 years:	75 per cent	15
" 35 " 60 "	20 " "	or 4
" 60 & over	5 " "	1

This proportion is adopted from experience of all Countries. The percentage of Cancer deaths however have a very different force as regards these age groups indicated by the experience of 21 years in Tasmania and shown in the following Summary:

Per Centage of deaths at these age groups from Cancer for the years 1873 to 1893.

	Per Centage living to normal population	Percentage of deaths from Cancer
0 — 35 years:	75%	4·06
35 — 60 "	20%	40·86
60 & over	5%	55·08
	100	100

It follows - seeing 5% of the population living over sixty years of age contribute 55·08% of all the deaths from Cancer - that, if there be the slightest difference between two age periods or two Colonies in the proportion of persons living at 60 years & over the total death rate would be so disturbed as to be altogether false or misleading

in comparison. Hence before any one can arrive at a safe conclusion as to the increase, decrease or intensity of Cancer between two widely different periods or between any two Colonies it is absolutely necessary in the first place to make a Correction for age disproportion.

The column in the following Table B. marked * with this heading may therefore be depended upon for giving true approximations as to the progress or intensity of the disease between different periods & different Colonies. In figures relating to young Colonies this Correction is especially necessary as in the different Colonies of Australasia the per centage proportions between the years 1881 & 1891 for ages living 60 years & over have varied from 2·72 to 8·04 per Cent. Seeing that a population of only 5% at this age group 60 yrs & over usually yields over half the total deaths from Cancer, it is obvious that the slightest variety in the proportions living at this age will have an enormous influence in determining the total death rate even if the death rate at each age in detail remains Constant.

It will be seen from Table A that Victoria has the highest death rate. Tasmania next; then comes New Zealand, with Queensland. At the bottom of the list for the Australasian Colonies, but neither of the Colonies show a death rate nearly so high as that of the United Kingdom If we look further at the table we will see the mean for 9 years ending 1890 is Considerably lower than for the year 1890 alone except in the case of Western Australia. Here the average of 9 years is higher, the figures being for

(40)

TABLE A

Year:	Death rate for all ages per 1000 living.								
	Tas:	Vic.	N.Z	S. A.	Queensland	N.S.W.	W.A.	U. Kingdom	year.
1873.	463			202.				444	1873
1874	457	332.							1874
1875	625								1875
1876	402								1876
1877.	376.								1877
	mean 463								
1878	488							503	1878
1879	548								1879
1880	519								1880
1881	477								1881
1882	502								1882
	from 502								
1883	548	495	299	282.	261	258.	320	649	1883
1884	519								1884
1885	468								1885
1886.	437								1886
1887.	501	(518)							1887
	mean 494								
1888	496	495.	434.	364	244	390	425	621	1888
1889	499	(577)							1889
1890	550				303.	356.	315.		1890
1891	457								1891
1892	451	590.	478.	446.				690	1892.
1893.	514.								
	mean 494								
ean of 9 years									
m 1882 to 1890.	502	504	376	352	268	325	387	608	1882 to 1890.
r 1890 alone	550	560	475	408	303	356	315	676	1890

the years 1882 to 1890. average 387. for the year 1890 alone 315 per 1,000,000 living: This is a favourable year because in 1888 & 1889 we find the rate respectively 425 & 465. This table however conclusively proves that Cancer is increasing in the Australasian Colonies & further though Tasmania has not the highest death rate - it is one of the most frequent diseases met with in this Colony.

But as I have already mentioned in order to get a true comparison as to the increase, or decrease of Cancer in two different periods or between any two Colonies it is necessary to make a correction for age disproportion.
Taking the normally constituted population, & representing the 3 age groups (see page 2) as 15 · 4 & 1. we multiply the number of deaths in groups 0 to 35 years by 15. result.
" " " " " " 35 to 60 " " 4 this
" " " " " " 60 & over " 1.
add the results together & divide by 20 (15+4+1). & the result will be the per centage corrected for age disproportions.
This I have done in Table B. for the Colonies of Tas: Vic. N.Z. & South Australia - the necessary figures for the remaining Colonies of Queensland. N.S.W. & W. Australia were not available -
This table shows that the death rate when corrected for age disproportions, in the Colonies of Victoria & Tasmania is much less than that of all ages: In New Zealand in 1883 the death rate was much higher when corrected for age disproportion so also with S. australia.
In Tasmania & Victoria we have a large proportion of persons living over 60 years of age hence the death rate in "all ages" column when corrected for age disproportion is much reduced in these two Colonies, while in New Zealand & South Australia - the reverse holds good -
Table B. in both columns - "all ages" & "Corrected" shows

Table B

Deaths from Cancer per 1000000 persons living.

	Age Groups.				*
	0–35 yr.	35–60	60 & over	all ages	all ages corrected for age disproportions.
Tasmania 1873-77. mean.	–	–	–	463.	
" 1878-82	24	1105	3356	507	407
" 1883-87	26	899	3690	494	384 } Tas:
" 1888-93	27.	1062	4023	494	434.
Victoria 1883	38	1247	3847	495	470 } Vict.
" 1892	35	1404	4632	590	539
N. Zealand 1883	26	946	2991	299	358 } N. Z
	32	1128	4534	478	476.
S. Australia 1883	39	717	2690	282.	307 } S. Aus:
	53	965	3935	466	430.

that Victoria has the highest death-rate of all the Colonies & also that there is a steady increase in the whole groups. Not only in the Australasian Colonies but in all the progressive Countries of the world Cancer appears to be on the increase: In England in 1864. the death rate was 385 per 1,000,000 living while in 1892 it was 690 per 1,000,000 living. According to Fordyce Barker it has gone up in New-York from 400 in 1875 to 530 in 1885 per 100000 living.

Now how do we account for this increase in Cancer? Many theories have been advanced.
D. Snow writing in the 19th Century July 1890 tells us that the increase is a marked feature of the Victorian era & he attributes it to the augmented wear + tear of civilised life.
There are others who believe the reduced rate

of mortality from Phthisis, has increased the death rate from Cancer: The drainage of the Soil which tends to reduce the former, causes the rivers to overflow their banks & increase the death rate of the latter.

King & Newsholme try to explain that the increase is only apparent & not real & they state at page 228 Royal Society Proceedings Vol 54. "The increase in Cancer is only apparent & not real & is due to improvements in diagnosis & more careful certification of the causes of death: This is shown by the fact that the whole of the increase has taken place in "inaccessible" Cancer difficult of diagnosis, while "accessible" cancer easily diagnosed has remained perfectly stationary".

I am fully convinced that better diagnosis & more accurate returns of "Cause of death" has increased the death rate of Cancer to a great extent: I find in Tasmania whereas the number of deaths as Constitutional diseases for the 6 years 1882 to 1887. was 187 per 100,000 while for next 6 years 1893. the mean was 173. Most probably the decrease in this case would account partly for the increase. I do not agree with Newsholme & King that the increase has taken place solely in inaccessible cancer which occurs mostly in Males: In Tasmania the the increase has taken place in Females as well as in Males & what is more unusual the death rate in Males is higher than that of Females. In 21 years the mean was. Males: 497 per 100000 living
" " " Females 483. " "
The mean of both being 491. " "
One thing however is perfectly certain, wherever

a country or Nation is prospering – Cancer is on the increase. It seems to be an attribute of Civilisation for whereas the Australasian group was at one time comparitively free from this disease it is now clear that it is on the increase both in the number of deaths in the aggregate & the ratio to the population living.
There are but few Countries that are free from this disease & all these are more or less of the less-Civilised groups; but more will be said of the distribution of Cancer when we come to speak of its Geography.

Origin of Cancer.

Having shown that Cancer is rapidly & assuredly increasing to a somewhat alarming extent both in the old Country & the new, I will now proceed to review the many theories that have been advanced as to the origin & cause of this disease within the last century.
Until we can arrive at some conclusion as to what is the real cause, we cannot hope for any very great success in the treatment.
It was popular in the Hunnean School to regard almost all diseases due to irritation of Worms, Grubs or Insects & Justiamond who wrote towards the end of last Century believed that Cancer was the result of a Worm or Grub.

Justiamond

Adams.

Adams states in his "observations on Morbid Poisons" written in 1795 that there was an Entozoon the "Hydatis Carcinomatosa" present the growth & multiplication of which produced Cancerous disease.
Nearly a Century has gone & many of our best Pathologists of today believe that the parasitic origin is for many reasons the most feasible, & possibly the true one.

bernethy: Abernethy believed Cancer was the result of the deposition of Coagulable part of the blood which was extravasated in injuries, inflammations or disease of the vessels. Now we Know that Cancer is not a deposit like tubercle for instances, but a distinct growth.
Further that injury, inflammation or disease of vessels does not always precede Cancerous formation & the experience of today teaches one that blood clots are very readily absorbed.

roussais, errus, others: Broussais, Ferrus & others believed in the theory of irritation or inflammation which always preceded Cancer in one or other form.
With regard to the irritation theory very much has been argued & is still argued in its favour.
That Epithelioma of the lip occurs mostly in men & particularly those who smoke a pipe cannot be denied, while Chimney Sweepers Cancer of the Scrotum is recognised as peculiar to those who follow occupations of Sweeps & Subject in this part of the body to much irritation from the Soot.
I will not argue the irritation theory further here than to say that the very exhaustive experiments of Dr D'arcy Power on the Vagina of Rabbits & Rats whereby he sought to produce Cancer by irritating them with Liniment of Iodine, have failed to produce the true "Cancer bodies". It is just possible that a certain amount of irritation is necessary to prepare the soil so to speak

well: D. Carswell writing in the Cyclop. Practical Medicine 1834 in his article Scirrhus page 659 states.
"Cancer investigated in its first stage, we ascertain with greater or less facility that this substance becomes manifest to our senses as a product of Nutrition or Secretion. In the former case it is deposited

Carswell

deposited in the same manner as the nutritive elements of the blood enter into the molecular structure of the organ. In the latter case it makes its appearance on the free surfaces after the manner of a natural secretion as on serous surfaces in general." He goes on to say "Proceeding further we arrive at the important discovery that the Carcenomatous matter exists in the blood under circumstances which can leave no doubt as to this fluid being the primary seat of its formation." Now this theory is simply that Cancer is a blood disease & Carswell tried to prove his theory by showing that there was cancerous matter either in the bloodvessels of the part affected or in those at some distance having no direct communication.

Now if Cancer were a blood disease we could hardly expect disease blood to carry on the functions of the body such as repairing wounds, injuries & nourishing the body generally - Nor could we hope by the removal of the tumour to benefit our patients. But not only do we get the functions of the body carried out properly - we get complete cures after the removal of the diseased part which to my mind refutes the idea of a blood disease.

And again if the disease was such surely more than one organ would be affected, but in no case do we get multiplicity of tumours in the first instance. Paget in his - Surgical Pathology edited by Turner page 789 states = "There is not so far as I know anything in the blood, which we recognise as a Cancerous structure Its cells nor any visible germ of cancer existing in the blood only needing to be separated from it to make up or grow into the Cancerous disease". Carswell may have seen cells in the bloodvessels but these were either there by absorption through

Carswell. the lymphatics or from the tumour growing into a blood vessel – artery or Veni – as it sometimes does. Cancer – does not originate in the Serous membranes & therefore cannot be known out as a natural Secretion on these membranes.

Hodgkin. Dr. Hodgkin writing in the Medic. Chirurg. Transactions Vol XV. describes Cancer as having its origin in the Serous Membranes, which have a Cystiform arrangement. He believed the existence of Cancer to be due to the development of these Cysts: That Cysts do occur in tumours no one will deny. They are the results not the cause, but there are many tumours in organs in which no cysts can be found & therefore cannot be essential to development of them.

Cruveilhiers Cruveilhiers theory was that the proper tissues were only capable of undergoing hypertrophy or atrophy & that the heterologous formation called Cancer was the result of a deposition of morbid products in the cellular elements of organs. This deposit was supposed to be formed in the Venous Capillary system & poured into the cell elements either by exhalation or through lacerated openings. This seems to me to be a blood theory in which the formation takes place in the Veins.

Blood theories It would appear that many of the earlier writers of the Century believed that Cancer had its origin in the blood.
Velpeau believed it had its origin in the Vena Cava In Andrals cases – it was the Pulmonary Artery that was at fault. Cruveilhier as already mentions in the Venous Capillaries while Carswell believed the blood was the primary origin of its formation

Blood theories

Paget also believes that the blood plays an important part in the formation of Cancer. In his Surgical Pathology page 388 he says - "For the present I will only say that I think Malignant tumours are local manifestations of some specific morbid states of the blood & in them are incorporated peculiar morbid materials which accumulate in the blood & which their growth may tend to increase".
At page 785 he further remarks "I believe it to be Constitutional in the sense of having its origin & chief support in the blood by which the Constitution of the whole body is nourished".
Paget admits however that while a certain morbid Condition of the blood is a predisposing element before Cancer can be produced there must be some part appropriate to be the seat of a growth incorporating that Material. He quotes cases to show that the one without the other cannot develope Cancer. What this morbid Condition of the blood is neither Paget nor any one else as far as I know can tell us. It was at one time thought that there was a Superabundance of albumen or fibrine but Chemists have failed to show that it is so, though they hoped to find some "carcinomatin" they failed. It was argued to support the blood theory that you never get Tubercle & Cancer in one Subject as the blood could not be affected with two dyscrasiae simultaneously.
It was these blood theories that led up to the belief that Cancer was a Constitutional disease of course if it were a blood disease it must be Constitutional - On the other hand it might be Constitutional & yet not have its origin in the blood.

Constitutional Theory.

No one has argued more favourably of the Constitutional theory than Paget. This views were at one time fully accepted in not a few instances, but of late years the general opinion seems to be that Cancer is a local disease at any rate at the outset.

Recurrence

Those who argue it is a Constitutional disease do so because it so often recurs, but it does not always recur & patients have lived for 20 years after removal of original tumour & died from other causes.

When recurrence does take place it is almost certain to be in the Lymphatic glands nearest to the original site of the tumour or some other organ easily accessible by the blood from the tumour. No doubt in these cases of recurrence the cells have been carried away beyond the local manifestation of the disease before the removal of the tumour & again sprout into activity at some future period. Snow. in his "Cancer & the Cancer Process" page 13 states "The bone marrow serves as a bed in which the Carcinoma cells remain for months or years as "Resting spores". eventually passing into the blood & producing death with multiple metastasis.

Rapid growth } Greater Virulence }

The rapid growth & greater virulence in some cases rather than in others were also argued to support the Constitutional origin but so much depends upon the nature of the growth - if medullary we may expect a quickly growing tumour -

Age also plays an important part; the younger the patient the more active the formation.

The Seat of the tumour has also to be considered if the Mammary gland be affected in pregnancy

we should expect a very rapid growth as the gland would be in a physiological state of activity.

Heredity. The Constitutional theory gave rise to Heredity & this was supported & lent support to the Constitutional theory, but heredity is not peculiar to disease of Constitutional origin – we know that warts are hereditary but no one would argue they were Constitutional in origin. I had recently under my care an adult brother & sister suffering from a Cystic tumour of the neck this may have been simply a Coincidence, at any rate it was not in the family.
Such were the arguments put forward in support of the Constitutional origin but no one of them will hold water, for the reasons I have given.

Local Origin The local origin of Cancer is one which I think has many good reasons to support it.
Amongst the earlier Surgeons who considered Cancer a local disease were. Baily. Cullen. Abernethy Velpeau while Morgan, Billroth. Jennings & Snow of recent date all support the local view.
I mentioned before if Cancer were a blood disease we might expect more than one tumour to develope primarily but this is just what never happens I have not been able to find a recorded case where two or more Cancerous tumours developed simultaneously in the same subject.

We are told that there is always a Cachexia present which shows a Constitutional taint, but in many – very many cases the patients are in the very best of health. I have seen a Scirrhus of the Breast in a woman who

Local origin

had been under observation for 18 years tyel her health was good. I believe the Cachexia is Secondary to the tumour.

In many cases we get Complete cures after removal of tumours & the patient is as well as ever. In no other way could we account for this than by considering Cancer to be a local disease.

The same applies to Cancers which are produced by violence or irritation as in Smokers lip &c besides the growth is much favoured by local circumstances as in the Case of a Mammary in Pregnancy.

Dr Hanau has been able to transfer from the Vulva of one rat to that of another which was previously quite healthy & surely this would indicate a local origin of this disease.

I have already explained the recurrence in the nearest glands & would further mention that the secondary tumours are always true types of the primary one. We find these secondary tumours rarely occur in organs which are subject to primary tumours & the same may be said of primary occuring in organs that are generally affected with Secondary formations

This goes to show that it is easy to explain Secondary formations as a process of metastasis & not the result of a Constitutional affection.

I have now argued the Local (illegible); against the Constitutional origin of this disease & it seems to me there is no doubt the local origin is the true one

Conheim.

Conheims theory is that Cancer & other tumours can only arise from a Vestige of Embryonic tissue which has been Suddenly aroused into activity, He maintains that cancer frequently arises at a Spot where complicated processes take place in the development of the Embryo. i.e. Pylorus &c
He scouts the idea of injury having anything to do with the origin of cancer, but he does not tell us in what way this embryonic tissue should Suddenly spring up into active growth after having remained quiescent for years.
Against Conheims theory we have the fact of Cancer occurring in Scars of Wounds & burns & of which I have a case now under my care.
The patient - is aged 64 years - had a large wound on the back of his hand many years ago. I first saw him for advice on a warty growth of his tongue. I removed the growth an ordinary papilloma & since then he has developed a quickly growing Epithelial Cancer in the Cicatrix on the back of his hand.
In the Invertebrates we dont find Cancer - which we might do, if it were simply due to an Embryonic fold.
Conheims theory may be applicable according to Snow page 347 to Such cases as Parovarian Dermoid & Parotoid Cysts.

Virchow.

To Virchow we have much to be thankful for in connection with the origin of Cancer.
In 1847 he showed that all tumours corresponded with some natural tissue of the body. His view was that the tumour was developed by the growth of the Connective tissue Cells & structures of which it was composed. It is of course now

Virchow

Known to all Pathologists that true Cancer only developes in the Epithelial cells & that Virchows idea of Connective tissue cells becoming Epithelial was erroneous. Cancer is therefore a true epithelial cell proliferation but the cells are not limited to the part ordinarily covered with Epithelium but extend into the other tissues: During the proliferation of Epithelial cells a certain amount of inflammatory action is going on & we get a Connective tissue i.e Stroma - formed with numerous Leucocytes about. That the Leucocytes do not play any part in the Actual formation of the Epithelial cells is well known by every day experience otherwise we should have Epithelial tumours in the repairing of wounds &c.

These then are a few of the more important theories advanced during the present Century as to the origin of Cancer - there are others which I have not thought worth while to mention.
I will however when advocating the parasitic theory of cancer bring two more theories - namely the Contagious & Geographical - to support my views.

While I believe that Cancer is due to a Specific Agent I am satisfied that there are certain Conditions which predispose the disease & will now discuss what these predisposing Causes are.

Predisposing Causes.

Heredity.

Many writers even now believe in heredity as a predisposing cause & this has led Assurance Offices to load their proposers where there was a history of Cancer in the family: The hereditariness was looked upon as one of the strongest arguments in favour

Heredity

of its being a constitutional disease & the proof of the heredity was that several members of the same family were similarly affected in some form or other.
Napoleon Bonaparte died of Cancer of the Stomach his father of Scirrhus of Pylorus – see an account of the last illness disease &c of Nap. Bonaparte by Arnold 1822).
This fact alone made many think it must be hereditary
Perhaps no one has done so much to advance the idea of inheritance as Paget. In 791 page Surgical Pathology he says: 'It is evident a disposition to cancer may be derived by inheritance – that something may be transmitted from the parent to the offspring which shall ultimately produce ~~be~~ the Cancerous condition of the blood in some instances the locality apt for the growth.
He quotes cases to show that numerous members of one family have died of cancer. In Hospital cases he found one in six had Cancerous relatives
In private cases where history is more accurate he found one in three.
Sibley – Med Chirurg Trans: Vol 42 page 120 traced heredity in 8 3/4 per cent.
In 42 Males only 4 had Cancerous relatives
" 263 Females " 30 " "
Baker in a paper communicated by Paget to Med Chirurg Socy. Vol 45 page 397. found 24·2 per cent had Cancerous relatives. 14·9 Hospital as against 27·4 per cent in private cases.
Snow found in 1075 cases 169 had Cancerous relatives = 15 per Cent. but in some control experiments he made he found that out of 78 Medical Practitioners 15 – or 19·2 per cent had Cancerous relatives. In 79 patients suffering from Phthisis 9 = 11·3%. In 175 Non consumptives 46 = 26·33 had Cancerous relatives.
So we see that in order to prove anything by

Heredity

figures. we require to find that a very large per centage of those affected with Cancer - had parents one or more affected with Cancer also; & of those unaffected only a very small minority were born of Cancerous relatives one or both.
I have not seen enough of cases to proove anything that would settle the question, but in about 30 Cases examined very particularly only two cases Cowed give a history of Cancer relatives.
J. B. Male aet 43 died of Cancer of Pancreas & liver.
Father died of Cancer of Stomach aet 49
Mother " " " - Womb. - 55
Fathers Mother & Sister died of Cancer of Tongue.
M. H. Female aet 45 Suffering from Cancer of Uterus.
Mother died aet 55. - " - " -
Sister " 46 " " - - -
Mothers Mother - 50 - - - -
In these two cases the family history was reliable
That some are more subject to Cancer than others Cannot be doubted, but is there no other explanation of the tendency than hereditary transmission?
The theory of Paget is that the impregnating germ is wanting in some of the normal materials which departure from the normal state will develope Cancer after the lapse of many years.
It is very hard to believe that a parent who is as yet non cancerous can transmit - something to the offspring which will develope cancer.
My own opinion is that Cancer is not a hereditary disease in the same sense as Syphilis, but that a certain type of body or as Cattle well put it- "A want of resistance in a certain tissue" may be a peculiarity in a family & given the exciting cause Cancer will develope.

Heredity

The fact of cancer running in families may also be partly accounted for at any rate by the fact that they live & are brought up pretty much under the same influences of climate soil &c &c.
Snow in his "Cancer & Cancer Poisons page 16 says "We cannot in the present day discover any grounds for holding that any one individual sets out in life with a greater liability to the development of cancer than another. The like cause will always produce the like effect. Under due provocation all appear equally liable to suffer except cancer development from vestigial remnants. In the genesis of Cancer no appreciable influence can be ascribed to heredity".
This is a very strong statement while I believe cancer is not hereditary as generally understood I am convinced an exciting cause which in one will produce cancer, will not in another — that is it would be resisted.

Sex Rhocality

It has been generally believed that Cancer is more frequent in females than in males & this would seem to be due to the large number of Breast & Uterine Cancer in women.
King Newsholme in their paper, show from the records of cancer in Frankfort on Main, that if the female sexual organs be left out that Cancer attacks the Males & females in about equal proportions.
In Med. Chirurg Soc. Trans: Vol 42 page 114 Sibley gives the primary seat of 520 cases =
105 Males & 415 Females:
Of the females cases no less than 191 were Breast & 156 Uterine while in Males 27 were lip as against 3 in Females
& Vol 45. Baker page 394 gives the result of 500 cases

Sex/Locality

167 Males & 333 Females: of Female cases no less than 269 were Breast as against 7 in the Male. Of 165 cases admitted into Hobart Hospital 119 were Males & 46 Females: Of the 46 Females 9 were Breast. & 17 Uterine - more than half the total number: 6 Stomach - 3 liver 3 tongue 2 Bones: One each Lip Rectum. Fauces. Neck. Jaw Nose.
Of the 119 Males no less than 53 were Lip. 16 Tongue 20 Stomach 7 liver the remainder were of different organs:
The small proportion of Female cases might be accounted for partly by the fact that Women often seek a Special Hospital & partly by the fact that we have so many more old men than Women in the Colony.
The death rate for Tasmania in 21 years ending Dec 1893. was for males 497 per 1,000,000 living.
" Females 483 " " "
As far as Tasmania is concerned the death rate seems less in Females than in Males.
In Victoria the deaths for 20 years 1871 to 1890 were Males 4,810 Females 3720: & the average for these 20 years of Women over 30 years of age to men was 77 to 100 men.
So that in Victoria Female Cancer is not so Common amongst Women in England as compared with men.

Age.

Cancer is essentially a disease of mature years & old age It is very rarely seen before 20 years of age, although cases of Medullary Cancer have been reported in infants before one year old: Sir Astley Cooper reports a case of Congenital Cancer of Eyeball.
In Females the highest mortality is between the ages of 50 & 65 years of 879 cases quoted by Walshe 360 occurred at this age while in Males 124

Age

out of 321 deaths took place between 60 & 75 years.
Of 593 deaths in Females 241 occurred between the ages of 50 & 65 years the highest mortality being between 50 & 55 years at this period alone there were 95 deaths.
In 687 deaths in Males the highest mortality was between 60 & 75 years. 348 or just about the half occurred between these years:
Of the 348 + 125 cases were between 65 & 70 years.
It will be seen then from these figures that the highest mortality occurs in Women between 50 & 55 years and in
Men " 65 & 70 years of age.
These figures confirm Walshe's table as above.
It has been already shown that Cancer increases with age - up to 35 years the per centage of deaths are 4·06
35 to 60 " " 40·86
60 & over. 55·08
100.
These age groups are represented respectively by the figures 15: 4: 1 of the population living in a well developed country.

Age has some influence in determining the locality of Cancer: In infants & those under 20 years of age we generally find it in the Eye or Brain. I saw a case recently originate in a Pigmentary Naevus of leg in a youth of 14 years of age.
The high mortality in Women between the ages of 50 & 65 years is due to Breast & Uterine Cancers while the high mortality in Men between 60 & 75 years of age is due to Lip Cancers.
Age also influences the nature of the growth - Scirrhus is essentially a disease of the old & Medullary cancer of the young.

Mental Emotions

Every one who has taken much interest in Cancer must be struck with the frequency in which it occurs in those who are subjected to some great grief or anxiety. How Mental anxiety grief or distress act is not yet known but as Paget says in his book. page 800 "Deep Anxiety, deferred hope, disappointment & Mental depression are a weighty addition to other influences that favour the development of the Cancerous Constitution."

Mental Emotion cannot produce the disease but it might be the nervous system acts in some mysterious manner on the cells causing a perversion of nutrition.

In three cases I know of Mental distress seemed to play an important part - of these I will only mention one. A Lady aet 45 years moving in the best society living in luxury ease - with a splendid record of health herself & the family history also good was much grieved one day to find her eldest daughter had Contracted a secret marriage the second daughter had become practically the Mistress of a Man. Cancer of Breast developed soon after - it was removed - returned & she died two years after the first onset of the disease. That Mental emotion plays some part in the growth of cancer is supported by the fact that those Organs which are chiefly affected by emotions are most frequently attacked

Social Condition

Cancer is not a disease of the poor as Dr. Brow seems to think - All classes are liable to it - the rich as well as the poor. the strong healthy as well as the sick & weakly.

Besides Heredity. Age. Sex. Mental Emotion. there are other causes which might be considered as predisposing causes. Geographical theory - Climate & Soil - but this will be considered fully when I speak of the Parasitic theory. Violence - Long continued Irritation.
Violence & Irritation were at one time considered to be exciting Causes - but Darcy Powers experiments show that irritation will not alone produce Cancer.

Violence. We are all familiar with violence as a supposed exciting cause, but why this particular violence in one subject does not produce it in another we are not told: Besides many of cancer cases have no history of violence at all. Paget found 1/5 of his cases had a history of violence - his exact figures are 17.5 % per cent.
The cancer Hospital records of 8,998 cases show 11.5 per cent were attributed to injury.
I recently saw a large Round Celled Sarcoma in the breast of a man which developed after a violent blow on the chest.
Another case was that of a lady who while walking through a crowd in the street was hustled by some one. The breast became very painful & Cancer quickly developed & she died in twelve Months. Previous to this injury she was in good health. & had no history of Cancer -
I think injury like irritation produces a certain amount of inflammation in the part. & this way prepares the soil for the Specific excitant - this idea would harmonise with Darcy Powers experiments.
He was not able to produce the "Cancer Bodies" by irritation alone but by irritating first with Iodine & then transferring Cancerous tissue

he got the Cancer Bodies from the Vulva of the rat:
See his experiments recorded in B. Med. J. Oct. 14. 1893.

Irritation. The effect of Chronic irritation is well seen in the Cancers of the lip. Scrotum &c I have not seen a case of lip Cancer but one in a non smoker. When we come to look at the different seats of Cancer we notice that they occur nearly in every instance at a place where irritation is produced in some way or other. i.e. Breast. Uterus. Pylorus. Rectum &c. The effect of irritation is well seen in warty growths which are first simple & then become Malignant. I saw recently a man with a large Epithelioma of jaw - which he declared began in a little wart. He began to turn this wart, poulticed it &c. Soon after I saw him a large 'Core' about the size of a Hens egg came out of it: The tumour then grew very fast extending down the back of the throat & terminated fatally in seven months from the time he began to Cauterize this wart.
This case seems to bear out J. Hutchinsons idea that Simple tumours do sometimes become Malignant. This irritation has been also looked upon as an exciting cause of cancer - for it is said that the irritation caused by long continued administration of arsenic has produced Epithelioma As I have already mentioned this irritation & injury only prepares the soil for the specific excitant which will be most probably found in the parasite found in the Cancer cell.
At any rate this irritation would certainly point to Cancer as being a local disease.

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Parasites of Cancer.

The parasitic theory of Cancer is one which has excited the minds of many of our Pathologists & Scientists for some years. & the view of Paget that Cancer was a specific disease just as tuberculosis or Syphilis was led observers & they if they could not find some Specific Cause in the shape of a Bacillus or parasite.

In 1884. Scheuerlen read a paper before the Medical Society of Berlin in which he stated that he had discovered a Specific Bacillus, this micro-organism was soon afterwards shown to be one of the many bacilli, which are found on the cutaneous surfaces, belonging to the vegetable Kingdom & having no pathogenic action

In looking for an exciting cause of Cancer, it was necessary to look for an agent, which was capable of keeping up a continuous irritation by increasing in quantity & activity some which would have a Specific action upon the Epithelial Cells. Now there is a disease in rabbits known as Coccidiosis which exactly fills these conditions the proliferation of the Epithelial cells in the bile ducts of the rabbits liver suggested the idea to Malassez that Cancer might be due to a Parasite.

Coccidiosis of Rabbits.

Perhaps before proceeding to show that Cancer is in many respects similar to Coccidiosis of Rabbits it might be well to briefly note the Characters of this disease & how the parasite produces this proliferation of Epithelial Cells.

An excellent account of the Coccidium Oviforme with its effects on the liver of rabbits is given in Leuckarts Parasites of Man translated by W. E. Hoyle page 202.

The disease chiefly affects young rabbits

Coccidiosis

d is most fatal to them. It is endemic + non-Contagious except in a very special way. It has never been communicated from one animal which to the other seven Coccidia which have passed through the stage of development outside the body will not produce the disease if injected into the veins.

The life history of the parasite itself consists of two stages - external + internal. The organism as it passes out of the alimentary canal is merely a Cyst of granular protoplasm which very soon after expulsion under favourable conditions such as moisture warmth etc. divides into four spores with a Cyst wall. Each spore has two Embryos + may remain for weeks in this Condition, but if taken into the System again the Cyst wall is dissolved by the gastric juice & the Embryos freed. They then become rounded & have the power of locomotion. The parasite then travels into the Epithelial cells of bile ducts + small intestine + once it gets fixed in the cell, it begins a process of development whereby the encysted parasite is formed, which is finally discharged by the bowel to again rebegin the Cycle of development.

Pfeiffer according to Jackson Clarke. British Med. Journal Nov. 7. 1893. describes the formation of Sickle shaped Swarm spores within the body in the early stages of acute Coccidiosis. I have not seen Pfeiffers paper.

The effect of these Coccidia is to produce small tumours from the size of a pins head to that of a pea. These little tumours contain a

Coccidiosis

thick caseous substance consisting of pus. Epithelial cells & Coccidia are found in the bile duct & Mucous Coat of intestine.
Around this little tumour a fibrous Capsule is developed & should the animal survive this becomes a fibrous nodule inside of which Coccidia may be found years after.
This Capsule is entirely protective in function.
Coccidiosis may occur in man & Leuckart - at pages 222. & 224 relates three Cases - One Gubler of Paris - was diagnosed as Echinococcus but the Post Mortem revealed an enlarged liver with 20 Cancerous looking tumours which contained a creamy fluid, altered Epithelial cells & egg like bodies characteristic of Coccidia.
In the other two Cases he found Epithelial tumours & Coccidia.
Here then we have a parasitic disease occurring in the lower animals & sometimes in man which in many respects resembles cancer as I will show.

What evidence then have we that Cancer is a parasitic disease?
The parasite has been found in the Cancer cells by a great many of our best pathologists & there are few now who deny its existence.
I will not go into the history of the discovery of the parasite but amongst those who have done much good work on this subject I might mention Thoma. Malassez. Darier Foa. Metchnikoff Sondakewitch & Sjobring on the Continent who all believe in the parasitic theory. Amongst Englishmen

we have Russell, Jackson Clarke, Calloway, Woodhead, Cattle, Steven + Last but not least. Ruffer + his Assistants Wicker + Plimmer.

Parasite

Whatever may be the real nature of these parasites the different writers whose papers I have read are almost unanimous as to the appearances, staining reaction + situation of them. Many of the bodies once considered parasitic have been shown to be nothing more than hyaline degeneration of the nuclei of cells, invaginated cells or endogenous formation of cells.

Russell.

The testimony of those gentlemen mentioned is worthy of note: Wm Russell of Edinburgh read a paper before the pathological Soc. of London afterwards printed in the B. M. J. Dec 13. 1890. He states that he has discovered bodies + he calls them "Characteristic Organisms of Cancer or Fuchsine Bodies". He concludes his paper page 1360 (Vol II.) "From all this there is in my mind absolutely no doubt that the organism is a fungus belonging to the Sprouting fungi. The bodies he was unable to find in simple tumours or warts, but Shattock + Ballance who were working at this subject also reported in March 14th 1891. B. M. J.) that they had seen the Fuchsine Bodies in Diphtheritic Tonsils lymphatic glands &c.

I have myself seen them in various structures including tubercular nodule + actinomycosis. Although Russell did not describe the parasite as we now know it his paper was the means of opening up the subject afresh.

Ruffer.

Early in 1892 Ruffer + his assistants began to make observations + their first paper appeared

Ruffer & others. in the Journal of Pathology & Bacteriology of 1892 Since then they have written numerous papers to this & other journals. They describe the parasite as an intracellular body with a nucleus surrounded by protoplasm & the whole enclosed within a capsule, having well marked features of reaction to staining which differs from the staining reaction of the Cancer cells.
The nucleus of the parasite will not stain with the ordinary nuclear dyes but only with protoplasmic dyes. If you stain a section with Haematoxylin & Eosin - the nucleus of the parasite will take up the Eosin & that of the Epithelial cell the haematoxylin.
Such then is briefly the parasite as described & the beautiful drawings affixed to his (Ruffers) paper would I think convince any one of the truth of the presence of a parasite.
Speaking at the discussion at Rome this year. Medical week page 162. Ruffer is reported to have said. "On examining these (fresh specimens) taking care to lower the Condenser & make use of oblique light the parasites are well seen in the cell. It is even possible to perceive the nucleus & we have sometimes we could observe movements which we hope to be able to photograph."

Woodhead. Woodhead in his Morton Lecture May 7th 1892. B. M. J. page 958 Vol I. after having seen some of Ruffers slides with the so called parasitic bodies said " They are certainly not the results of degenerative processes They are not Leucocytes nor red blood Corpuscles taken into Epithelial cells - They are not Vacuoles they have all the appearances of Coccidia".

Woodhead

Since that Lecture was delivered he has from time to time at the Pathological Society meetings confirmed the above opinion & believes the bodies to be parasitic

Galloway & Cattle

Galloway & Cattle have also described the parasites & have seen them in the lymphatic spaces.

Clarke

Jackson Clarke has stated at the Pathological Society that he has even seen the parasites in Sarcoma a statement which however has not been confirmed.

Besides those who have described the parasites there are others who are willing to accept the parasitic theory but consider enough proof has not been advanced that the bodies are parasites.

Amongst them may be mentioned Coats. Steven & Brown, Darcy Power, Delepine &c

Coats

Coats in his address to Med. Chirurg. Society B. M. J. Jan 14th 1893 states at page 59 "Where is not the slightest doubt that the Epithelial cells of cancerous tumours do contain structures which are separate both from the nucleus & the protoplasm of the cell."

Steven & Brown

Drs Steven & Brown wind up a very able paper in the Journal of P. & Pathology Oct 1893 thus "In Conclusion we have to say that we can go no further in the expression of an opinion as to the nature of the Inclusion Bodies (Parasite) than to state that they seem to us to be organised elements."

Delepine

Prof. S. Delepine who has taken a great

Delepine — interest in Psorospermosis of Rabbits & who is doubtful of the parasitic theory, ~~&c~~ discussion at the British Medical Association 1892. said "I do not say the bodies in question are not parasitic. I only say that certain endogenous productions are much like them. & that no one has proved that these bodies have a life independent of that of the cell".

Duplay & Cazin. — Prof. Duplay & Cazin. "are perfectly willing to admit the likelihood of the parasitic hypothesis but we maintain no proof has been forthcoming of the existence of Sporozoa in Cancer, as yet no one has been able to show conclusively that the theory is not simply based on an erroneous interpretation of the facts in question."
Medical Week Apr. 6th 1894

There are those who are entirely opposed to the parasitic theory — Cornil. Snow. & Prof. Boyce

Cornil — Prof Cornil - says "The bodies described as parasites appear to be nothing else than modifications of cells & nuclei, resulting from the movement of the nucleus & paranucleus & related to their excessive growth & variable manner of degenerations. Med. Week. Apr. 6th 1894.

Snow. — Snow page 9. of "Cancer & the Cancer Process" speaking of Ruffer's papers says "There is no evidence in favour of the parasitic nature of the bodies therein described. The appearances appear to be those of ordinary nuclear degeneration long recognised."

Boyce: — Prof. Boyce speaking at the discussion of the Pathological Society March 7th 1893 considered "the bodies to be cell vivifications & degenerations".

I have given the conclusions arrived at by those who have had good opportunities of studying the question & there can be no doubt that the weight of evidence is in favour of there being a parasite protozoon or whatever it may be called present in the Cancer cell. I will now give my own observations as briefly as possible, illustrated by some drawings which were done by a Layman as he saw the sections through the microscope.

I might state that in preparing my sections I have followed Ruffer. My specimens were all taken from one case except Fig 6. The tumour was fixed in Corrosive Sublimate, hardened in Spirits embedded in paraffin Cut & stained with Biondi Mounted in the usual way.

I have been careful to produce ~~nothing~~ nothing in the drawings there could be any doubt about. The first case I examined from which I write my observations was one of Cancer of Pancreas. The case was interesting to me clinically as being one of Diabetes Mellitus in a man about 45 years of age. He had been ill for over twelve months when I saw him first & was very much emaciated. He had symptoms which led me to suspect there was something more than Diabetes but nothing further was diagnosed during life. He lived for three months & after death I made a post mortem & found cancer about the size of an egg of the pancreas with a secondary nodule in the liver I fixed parts of the tumour of both organs & prepared sections in the way above mentioned.

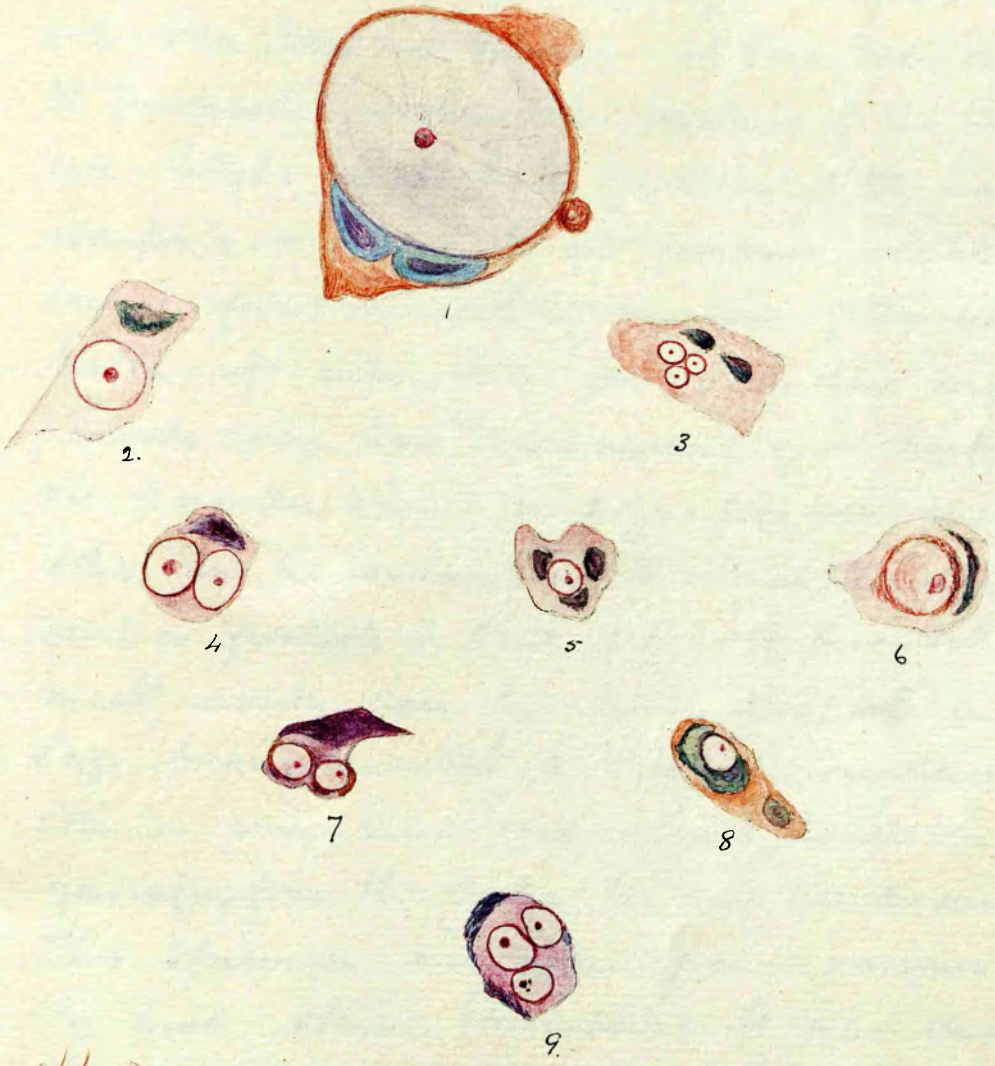
On examining them I was satisfied from the drawings of Ruffer, Calkin & Stevens that there were Parasites present but as the subject was new to me I was one had

here on this side of the World as far as I know was familiar with the Subject. I resolved to send my Sections to my late teacher - Dr. Steven. Pathologist. Glasg Royal Infirmary & here is an extract of his reply to me.

"I would also like to say that you have managed your Sections admirably. Unfortunately the liver has too thick a cover to permit of my examining it with the 1/12. oil Immersion lens the other two I have carefully examined. In the Pancreatic tumour there are numerous "Inclusion Bodies" quite similar to those I have described myself & which I believe are the same as those depicted by Ruffer, Sondahewitch Galloway, Calleja & others. For the most part they are perfectly Circular in outline, intracellular in position, have a red nucleus & a red capsule. .....
Now it would be quite worth your while to make a few drawings, write the whole thing up full & send it to me I'll publish it for you in the Glasgow Medical Journal". I have to thank Dr. Steven for his kind letter & will avail myself of this promise to publish the case as soon as I have a little more time to go into the Clinical features of it.

Parasite.

It will be noticed from the drawings that the parasite in every instance is intracellular — I have not seen it out side of the Cancer cell.
They were either quite circular or slightly oval in outline. with a distinct red nucleus & capsule surrounding them - the protoplasm of the parasite was either Colourless or slightly red - I did not observe the Cambridge blue so well brought out in Ruffers drawings -
While in most instances there was only one parasite in each Cell. I was able to get



J.L. Fleury
1894

two m. some & three m. others. In Fig 3 there are three little parasites lying close together with distinct Nuclei & capsules- the nucleus of the Cancer cell is seen broken up into two pieces & stained a dirty greenish colour. Fig 4. is almost the same except in the lower parasite of the three, there seemed to be three little red nuclei. I have not noticed the parasite within the nucleus of the Cancer cell though fig 8 looks, just as if the parasite was escaping & in fig 5 the parasite occupied a very central position with the nucleus of Cancer cell broken up into three pieces. In these instances the parasite may have been intra nuclear & just breaking through. The parasites varied in size; some were nucleated others had no nucleus. but to assist the artist as much as possible I have figures of those that were most easily seen by him. Fig 1 is a very large parasite with a central nucleus which stained very deep red & lines could be seen radiating from the centre towards the circumference This Specimen was taken from a scraping & fixed by heat stained Mounted: It was drawn from the Camera Lucida 1/12 ol. Imm. of B. Swift & Son. Fig 7. is the only one I could find in the liver Nodule & it was close up to the line of invasion There were two parasites in the cell. They stained pinkish red with deep red nuclei with the nucleus of the cancer cell stained rather more greenish I fancy than that of the drawing.
The parasites stood out in contrast to the nucleus of the Cancer cell which stained greenish & where the Nucleolus was observed it was of a reddish colour.
I need not go further into the details of the parasite here as my only object is to show

that I have seen them & am able to recognise them I hope to give a more detailed description of them along with some other observations I have made in other cases in another paper. I will just mention fig 6. It was a section of a lymphatic gland secondary to Epithelioma of jaw & was such a nice specimen that I got the artist to add it to the drawings The parasite here stained a pretty deep pinkish with a deep red nucleus:- to one side the capsule was well marked - & the nucleus of the cancer cell was pushed aside & is seen stained greenish with a concave surface towards the parasite-
I will now detail the figures given in the drawings.

Fig I. Large Parasite from scraping of Pancreas: fixed by Heat- stained with Biondi: Oc. 3. 1/8 ob. Imm: Swift & Son.
Note a blood corpuscle attached to margin of cell-
Drawn to Scale Camera Lucida.

Fig II. Cancer of Pancreas: showing Parasite: with nucleus of Cell above. Stained greenish - Natural Size: Leitz Oc 1- 1/8 ob. Imm.

Fig III. Cancer of Pancreas: 3 bodies with Cancer cell nucleus divided into two fragments.

Fig IV. Cancer of Pancreas: Two parasites - with Cell nucleus above

Fig V. Cancer of Pancreas: Parasite - with Cell nucleus broken up into three pieces.

Fig VI. Lymphatic gland Secondary Cancer. showing deeply stained parasite also its nucleus to one side - & the remainder of Cancer cell nucleus pushed to one side.

Fig VII Secondary Cancer of liver. Two parasites with nuclei to one side & Cell nucleus pushed upwards.

Fig VIII. Cancer of Pancreas: Parasite almost in Centre of cell nucleus looks as if parasite was escaping.

Fig. IX. Cancer of Pancreas: three parasites - one showing three little nuclei

Fig II to IX. all stained with Biondi & drawn natural Size with No 1 Oc. 1/8 ob. Imm. Leitz. Magnified about 750 Diameters.

Besides the evidence of those who have demonstrated the presence of the parasites in the cancer cells, there are other good reasons why Cancer should be considered a parasitic disease. In cancer we have a proliferation of Epithelial cells with consequent tumour, now this is exactly what happens in Coccidiosis of Rabbits as already mentioned.

Pfeiffer also believes that the little growths in Molluscum Contagiosum are due to the action of a parasite. Might not then the same happen in Cancer? We know, or believe, at any rate that Cancer is in the first instance a local disease that it may become secondary by an infection of the whole system. The same is true of tuberculosis which is undoubtedly due to a Bacillus. It is many years ago since tuberculosis was considered an infective disease but not until Koch has demonstrated the Bacillus could it be proved. We know further that we can have a local tuberculosis by inoculation which becomes general by infection & this is exactly what happens in cases of general carcinosis.

The evidence of Cancer being a local disease has already been put forth, but there is one point which ought to be specially mentioned in this respect: that is - that after removal of cancer we sometimes get complete Cures - and even when recurrence does take place - this comes rather fit in with disease which we know to be of Parasitic Origin, namely Coccidiosis & Malaria. In this respect Cancer is very like these two diseases.

In Coccidiosis we have a fibrous Nodule in which we have Coccidia. Epithelial Cells pass & there is nothing to prevent a fresh attack if these Coccidia were set free - if they were not in the encapsuled stage

In Malaria we have recurrent attacks years after the patient has been removed from the malarious district How does this happen? we dont know what becomes of the parasite during these years but reasoning by analogy most probably they are stored up in the bone marrow. In Birds which are very liable to be affected with Malaria - the parasites have been found in the Medulla of bones - & their escape - the encysted parasites — into the blood will produce a fresh attack of fever. May these not correspond to the "resting spores" of Grow. Which he alleges are the true cause of recurrence in Cancer. He shows that the Cancer cells are carried into the bone marrow in the earlier stages of the disease & may return after removal reproducing a second tumour.

We have already noticed that the secondary tumour is always a true child of the parent: & this is the case no matter what organ the infective material is carried to. It is as if the epithelial cells were still under one & the same influence. & surely this fact of reproducing true is very suggestive of an intracellular influence, parasite, & the observation of all go to show that the parasite is intracellular.

Ruffer. Ruffer in the Hunterian Lecture B. M. J. Oct. 14: 1893 shows further that the manner in which the organism resists Cancer, Cachexia, Malaria is practically the same in all three.

In Malaria according to Dr. A. Laveran - see his book "Marsh Fever & its Organism" translated by J. W. Martin for the New Sydenham Society 1893. page 115. — we have large Leucocytes or Macrophages which eat up the parasites.

Ravenau

These macrophages seem to be the principal Curative agents because the fewer in number the less chance of the patients recovery.
In Coccidiosis the protective character of the fibrous nodule needs no Comment, while in Cancer according to Ruffer we have an infiltration of lymphocytes which become mononucleated then Connective tissue & gradually surrounds the Cancer cells killing them by a process of digestion & not by pressure as generally believed.

Contagion

One of the arguments much used against Cancer being a parasitic disease, is that it has never been communicated from man to animals either by inoculation or transplanting except in very exceptional cases. That is, it is non contagious.
The idea that Cancer was a Contagious disease occured to Gooch who attended a patient with Cancer of Stomach, supposed to be due to his drinking some fluid in which was Cancerous ichor exuded from an ulcerated cancerous breast.
Copland in his Dictinary of Medicine 1866. page 141 States that in two cases which came under his notice, Cancer of the penis seemed to have caused Cancer of the Os & Cervix Uteri.
Snow has notes of three cases in which Husband & wife were both affected with Cancer: I know two cases where both husband & wife dies of Cancer
Dr Hanau has also transferred cancer from the Vulva of one rat to that of Another & Dr Boinet records a Case in the Medical Week June 15: 1894 in which he protruced a cancer in the rat by intraperitoneal inoculation with a piece of Cancer from a mans penis. Nodules were formed

in the rabbits liver elsewhere after death.

" A Subcutaneous injection of the juice from a lympho sarcoma of the testicle into a rabbit produced a Cancerous Nodule & the same into the pleura of an old rat determined a Large Cancerous growth in the lung at a corresponding point. He adds "from these facts I conclude that human Cancer is capable of being transmitted".

As already mentioned Dr Gay Power B.M.J. Oct 14: 1893 – was able after irritating the Vaginae of two rabbits & transplanting Cancer to produce the true 'Cancer Bodies'.

Auto inoculation of Cancer is of course well known either from one habitat to another or as in Cripps's case where the arm became infected after being in Contact with an ulcerated Scirrhus of the breast.

But while we have these exceptional cases the rule seems to be that Cancer cannot be inoculated or transferred in the ordinary way from human beings & the lower animals. Many experiments have been tried – Dupuytren tried by introducing cancer into the Stomach & failed: Alibert inoculated himself & some of his pupils at the St Louis Hospital with ichorous discharge & suffered no bad effects save a little inflammation at seat of puncture. The Many experiments of Drs Shattock & Ballance who have worked hard at this Subject – related at the International Congress 1891 & further in the Bruton Lecture 1894 have all failed to produce Cancer in this way. According to the Medical

weekly Aps. 13th 1894. the experiments of Drs Duplay & Cazin. have scarcely been more successful.

If then Cancer cannot be produced in this way, that is, if it be a non contagious disease can we consider it to be due to a parasite?. Yes: because it seems to me to be only communicated in some very special way. As in Cancer save in exceptional cases so also in Coccidiosis all attempts have failed to inoculate one animal direct from the other. Is it not Contagious in a special way? In Malaria we have the parasite according to Laveran in the blood Corpuscles instead of the Epithelial cells, but Malaria has never been produced by transfusion of Malarial blood into birds: see Laveran page 93. Here then we have two undoubtedly parasitic diseases which are infective & yet are not Contagious or transmissable in the ordinary way

Might we not then Consider Cancer to be of the same class & that it can only be transmitted in some very special way where there would be outside influences at work. For the development of Coccidiosis a certain amount of moisture, heat & Marshy ground are desirable while Malaria is peculiarly endemic now shall see that Cancer has a Geographical as well as a Geological distribution.

Geographical & Geological Theory —

The distribution of Cancer is pretty general

all over the civilised world but there are places where Cancer is unknown & others where death rate is much lower than the average. Its widespread ravages were at one time looked upon as evidence of its Constitutional nature but local diseases have a Geographical distribution also such as Goitre Elephantiasis &c.

Erichsen. Erichsen (Principles of Surgery page 1015) tells us that Cancer is unknown in the Frigid Zone. While Davidson (Geographical Pathology page 13) states that it is unknown in the Faroe Islands while the inhabitants of Norway & Sweden who are the same race of people are exceedingly liable to it. No reason is given why - the Climate & Soil seem to be much alike in all the three places.
In Arabia it is "practically unknown", Persia "seldom met with" page 216. Davidson.
Bechuanaland extremely rare so also in Central Africa - Livingstone never met with a case amongst the MaRalolo or Barotse of the Upper Zambesi.
Davidson page 694.
On the other hand the death rate is very high in the following Countries. Austria; Denmark Sweden Switzerland, Italy. Holland all of which have a death-rate higher than England. America the Australasian Colonies, Prussia & the rural districts of Austria have a lower death rate than England.
From Statistics it is easily seen that Cancer is most prevalent amongst Civilised people & Snow accounts for this page 42 "By the severe strain upon the nervous system which modern civilised life involves".

Haviland. Havilands idea of Cancer is, that those Countries & districts which have rivers overflowing their banks with deep valleys are likely to have a high death-rate from Cancer. In a paper which he read at the International Congress of Hygiene 1891 his conclusions were:

(1) Wherever there is a chalk or limestone formation the death rate is below average.

(2) Where there is a clayey soil & subjected to be flooded seasonally the death rate is above the average.

In the chalk districts the death rate is 30% less than in the flooded "a difference too striking not to demand investigation".

The chalk districts owing to power of absorption are freest from cancer, the moisture & clay conducing to the development of the disease.

His theory of the increase is, that the draining of the soil into rivers causing them to overflow their banks in some way predisposes the disease.

Climate & Soil. The question of climatic influence is one of very great importance not only in regard to preventive treatment but in connection with Cancer being of parasitic origin.

The extraordinary cases reported in the Medical Journals lately would lead one to suppose that we have not only Cancer countries but even cancer fields & houses.

In the B. M. J. Nov 11th 1893 a

French Surgeon states that in a rural district near the River Ourcq the death rate from cancer was fourteen times greater than that of Paris. & in a little village in the Ardennes out of 51 houses, 17 had 21 cases amongst them in 30 years.
In this instance water was supposed to be the Contagious Media.
I will not go into the many cases quoted by Shattock & Ballance nor the Cancer houses of Darcy Power in the B. M. J. June 9th 1894 but the cases reported by Dr Scott in B. M. J. June 16th 1894 are worthy of special mention
A man lived in a house of two apartments & slept in a concealed bed in one of them He developed Cancer of the liver & died aged 50 yrs
Next man came took up his duties & slept in same bed. He also died of Cancer of Bladder 2 years after. aged 54 yrs.
The third man took up same duties as the second & slept in the same bed & he died of Cancer of liver aged 60 years eighteen months afterwards.
In these three cases there was no relationship nor history of heredity of Cancer they all did the same work & died in the same bed.

The facts of Haviland that cancer is most frequent in clayey & damp soils seems to me to favour the parasitic theory – we know that Malaria & Coccidiosis are endemic & most common in marshy

ground; that a certain amount of moisture heat & contact of air with the strata of the earth are necessary for the development of the parasite. May not this be the same of the Cancer parasite.?
Is it not likely that Cancer may prove to be a miasmatic disease like Malaria? I hold the fact, that there are no Cancer cases in some parts of the world i.e. Faroe Islands goes to support this theory. How otherwise can we account for the high death-rate in Norway & Sweden - while the same race of people living under the same conditions of Climate have never had a case as far as is known amongst them.
D'Arcy Power has thrown out the suggestion that the parasite of cancer requires to undergo a cycle of development outside the body. It seems to me, further that this development can only take place in certain soils probably damp & boggy as mentioned by Haviland & under certain favourable climatic influences - whatever they may be. In this way only could we account for the Cancer fields & Cancer houses.
We know that the tubercular Bacillus remains in the dry spore form - if introduced into the system, is able to infect the body. I hope we shall one day be able to find out how the Cancer Parasite gets into the System.
If then the parasite has an external life it is easy to understand why Cancer is not Contagious in the ordinary way.

One of the greatest arguments against Cancer being a parasitic disease is that the organism has never been isolated nor cultivated, but the same may be said of the Haematophyllum Malariae which has never been isolated from the soil - nor cultivated.
Laveran states pages 27 & 28 that he was unable to cultivate the Malarial parasite even in blood. & we have this author authority for saying the Filariae of Human blood has never been cultivated either.
We cannot therefore lay aside the parasitic origin of Cancer simply because the organisms have never been isolated nor cultivated because in the two parasitic diseases already mentioned - the parasite has neither been isolated nor cultivated:
Still, so long however, as the organisms of Cancer cannot be cultivated, & so long as we are unable to inoculate the healthy & produce the Cancerous disease, so long will we be unable to prove that Cancer is a Specific Parasitic disease, reasoning however by Analogy there are good reasons for suspecting its being parasitic.

I have spoken of the Cancer organism as a Parasite but as yet it is not very certain what place it will occupy in Natural history, though probably amongst the Protozoa.

The Conclusions I have arrived at then are briefly:-

(1) Cancer is increasing in all progressive countries.

(2) That it is a local disease as already described.

(3) That Heredity is all but disproved.

(4) That there are certain predisposing causes of Cancer, but the Specific cause is the action of a parasite.

(5) That the Parasitic theory is supported by the facts:-

(1) Cancer is a local disease in the first instance spreading slowly & ultimately becoming generalised in the system.

(2) It can be transmitted in animals of the same Species & in exceptional cases from Man to animals Auto inoculation is well known.

(3) Geographical theory in which districts & houses are peculiarly liable to be affected with Cancer, amounting in some cases to be almost Endemic.

(4) That other diseases which are undoubtedly parasitic have many things in common with Cancer though differing in some respects.