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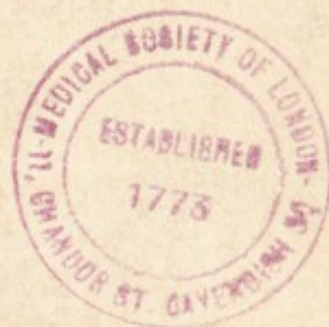
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THE
BRADSHAW
LECTURE



Delivered before the Royal College of
Surgeons of England, on Thursday,
November 14th, 1918

D'ARCY POWER,
M.B. Oxon., F.R.C.S. Eng.

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THE BRADSHAW LECTURE



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THE END OF THE WORLD

ON CANCER OF THE TONGUE

The Bradshaw Lecture

*Delivered before the Royal College of Surgeons of England,
on Thursday, November 14th, 1918.*

BY

D'ARCY POWER, M.A., M.B. OXON., F.R.C.S. ENG.

*Surgeon to, and Lecturer on Surgery at,
St. Bartholomew's Hospital.*

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TO
SIR GEORGE HENRY MAKINS, G.C.M.G., C.B.,
PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND,
AND TO
THE MEMBERS OF COUNCIL, FELLOWS AND MEMBERS
OF THE COLLEGE,
THIS BRADSHAW LECTURE DELIVERED BEFORE THEM
IS DEDICATED.



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ON CANCER OF THE TONGUE: THE BRADSHAW LECTURE, 1918.*

BY D'ARCY POWER, LONDON.

MR. PRESIDENT AND GENTLEMEN,

It was, I think, a wise latitude on the part of Mrs. Bradshaw when she founded this lecture in the year 1882 in memory of her husband—Dr. William Wood Bradshaw, M.A. Oxon., D.C.L.—to lay down no limitations as to its scope. It was to be a lecture on Surgery, and it is thus left to each lecturer to choose his own subject.

When the President invited me to undertake this honourable duty, I hesitated to accept, because in the hurry of these latter days it is difficult to find time for the original research which can alone render it of permanent value. I reflected, however, that you had recently nominated me to serve as one of your representatives on the Executive Committee of the Imperial Cancer Research Fund, and this gave me an opportunity of dealing with a topic which embraces the clinical and scientific sides of that dreadful disease. I have therefore chosen for your consideration this afternoon the subject of 'Cancer of the Tongue,' one of the most distressing forms of cancer which afflicts the human race. I have done so the more willingly because it brings into close relationship the historical, clinical, and scientific sides of inquiry, and it seems to me that these three lines must be closely followed if any satisfactory conclusion is to be arrived at.

PECULIARITIES OF CANCER OF THE TONGUE.

Cancer of the tongue, as is well known, presents several peculiarities which make it worthy of careful consideration. In the first place, it is almost entirely a human disease, and this is remarkable, because the tongues of many animals are more liable to injury than is the human tongue. Secondly, cancer of the tongue is always primary, and is always of one type—a squamous-celled carcinoma. This is noteworthy, because the tongue of all animals contains many varieties of epithelium, any one of which might be expected to undergo malignant change as easily as the squamous epithelium. Cancer of the tongue is unknown in children; it is rare in young people; becomes frequent between the ages of forty and sixty; and, until lately, it has diminished in frequency in extreme old age. It is common in men; rare in women. Moreover, it does not run the same course in men as in women: in men, it generally ends in death within eighteen months of the onset; in women, it appears more often to follow an erratic course. I shall presently mention the cases of women in whom recurrence took place with such rapidity, after a complete operation by a competent surgeon, that nothing more could be done three weeks later, and of others whose sufferings were mercifully ended by death after eighty-four months and one hundred and eight months respectively of constant pain. Lastly, the inherited predisposition to cancer, which is thought to be a feature in some forms of carcinoma seems to be nearly absent in cancer of the tongue. Each of these peculiarities is deserving of more careful consideration than it has hitherto received, for each must be due to some discoverable cause. I propose therefore to offer a few suggestions which may be interesting to you and serviceable to those who choose to work further upon the subject.

* Delivered at the Royal College of Surgeons of England, November 14, 1918.

I. HISTORICAL.

I will deal first with the historical side, and in doing so I find a virgin page in the history of medicine. No one, so far, has made any attempt to write about the literary history of surgical disease, though such a study would be of great interest and value. Such a history would be easier to write than that of medical complaints, because visible pathological conditions are more readily observed than those which are hidden.

The classical writers were well acquainted with cancer of the breast, of the uterus, of the penis, and of other parts of the body. From Hippocrates downwards, they give directions for the treatment of these diseases either by medical or surgical means, and state when they may and when they may not be removed. Cancer of the tongue, at any rate in its later stages, is no more difficult to recognize than epithelioma of the penis; yet Dr. E. T. Withington, who is making a special study of the old Greek writers for a new edition of Liddell and Scott's *Lexicon*, tells me that he has noticed a curious absence of any direct mention of cancer of the tongue in the Greek medical writers. The twelfth section of the second book of the *Prorrheticon** contains an injunction to examine the teeth in cases of chronic ulcer on the side of the tongue. The passage immediately preceding it treats of the deep and superficial *κακίροι* occurring in elderly persons, and it looks therefore as if the writer thought that chronic ulcers of the tongue might sometimes be of this nature, but did not like to say so definitely.

Galen (b. A.D. 131) describes functional disorders of the tongue, but says that he purposely omits organic diseases because he is considering them elsewhere. This treatise, unfortunately, has not come down to us.†

Oribasius (A.D. 326–403) in his *Synopsis* has a chapter on 'Malignant Ulcers,' where he mentions cancer and malignant ulcers of the pudenda, testes, and breasts. He also has a chapter on cancer of the vulva, which he says is incurable, and gives some methods of relieving the pain, but gives no hint of any similar affection of the tongue. It is probable, therefore, that he was unfamiliar with cancer of the tongue, and had never seen a case.‡

In like manner Rufus, commenting on Oribasius (45, ii), gives a detailed account of the different forms of carcinomata and their usual localities, but omits all mention of the tongue.

Rhazes (A.D. 850–923 ?), says nothing about 'apostema durum' when enumerating the different forms of 'apostema' which occur in the tongue.

Avicenna (A.D. 980–1037), in his *Canon of Medicine*, devotes a long chapter to the tongue. He may have obtained his account of the 'apostema durum' and cancer of the tongue from the lost treatise of Galen. At any rate he mentions cancer as distinct from 'apostema durum.' It is possible, therefore, that he had seen or heard of a case, but he gives no detailed description of one.§

Arnold of Villanova (A.D. 1238–1314), who was an epitome of the medical knowledge of the school of Salerno, wrote a chapter on 'Ulcers and Pustules of the Tongue,' but without mentioning any condition which can at all be described as cancer.

Bernard Gordon (fl. 1285), his contemporary, devoted a long chapter to 'Diseases of the Tongue' in his *Lily of Medicine*. He there speaks of 'ulcera maligna,' but states that

* HIPPOCRATES, *Opera*, Genève, 1657, p. 96 E.

† The tongue, he says, is liable to "inflammationes, tumores duri, tumores molles, erysipelata, suppurationes, de his vero, utpote quae tum visu tum tactu discerni possunt, nihil aliud in hisce commentariis dicemus, quippe eas duntaxat affectas partes hoc in libro prosequi proposuimus." (*Galen's Opera*, Basil, 1549, vol. iv; *De Locis Affectis*, Liber iv, cap. ii, p. 88 c.)

‡ The passages occur in the *Synopsis*. Under 'De Ulceribus Malignis,' he mentions "medicamenta ad carcinode, malignaque ulcera, ad pudendorum, testium et mammarum inflammationes." (Liber vii, cap. xi.) A little farther on is the chapter 'De Cancro Vulvae,' of which he says, "Hic morbus curationem non recipit."

§ AVICENNA, *Canon*, Liber iii, fen. vi, cap. 14, 'De Apostematibus Linguae.' "Quandoque accidunt linguae apostemata calida, et apostemata phlegmatica, et apostemata ventosa, et apostemata dura, et cancer. Et signa omnium illorum manifesta erunt cum redierint ad illud quod dictum est in signis apostematum."

they are seen chiefly in children, and are easily cured by simple remedies. In all probability, therefore, they were aphthous ulcers.

William de Salicet (fl. 1245), Lanfrank (d. 1306), Henri de Mondeville (1260-1320), Jan Yperman (1275-1330), Gui de Chauliac (d. 1368), and John Arderne (1307-1390), all writers of the great surgical text-books of the thirteenth and fourteenth centuries, neither mention cancer of the tongue, nor do they describe any condition which in the least resembles it.

John of Vigo (1460-1517), with his keen surgical instinct, and Fernelius (1497-1558), who wrote on *Universal Medicine and Pathology*, would certainly have alluded to the condition had it been of frequent occurrence in their practice. Both are silent.

Riverius (1589-1655) devoted the fifth book of his *Praxis Medica* entirely to diseases of the tongue. The first edition was published in 1640, and he there says expressly, "Tumours of the tongue do not for the most part endanger life unless they grow so large as to cause suffocation, or come from a certain malignant or melancholic humour, when a cancerous swelling may be produced which is known by its hardness, blueness, and pricking pain."* It would seem from this passage that Riverius had actually seen cancer of the tongue, but it is noteworthy that he gives no details of any case in the volume which he published containing accounts of the many patients who had been under his care during his long and busy life.

The first definite notice of cancer of the tongue which I have been able to find is in English. It occurs in *The Chirurgical Lectures of Tumours and Ulcers*, which were given by Dr. Alexander Read to our predecessors, the United Company of Barber Surgeons, in their Hall in Monkwell Street, on Tuesdays in 1635. Dr. Read says,† "It falleth out sometimes that sores in this member (the tongue) prove maligne and very fretting, as it happened to the late Lord Mayor of London, Ralph Freeman. Hee lacked neither Physitians nor Physicke, yet old age, weaknesse and the malignitie of the sore hindered the procuring of his health, which his Physitians and Chirurgeans aimed at and wished for. The ulcer was so corrosive that it fretted asunder the veines and arteries of the tongue on that side which it possessed and caused a great flux of blood which exceedingly weakned him, for that present causing a strong syncope, so that afterward nature could not re-collect her selfe. When such griefes befall great personages their case is worse than that of the poorest in the like infirmities, because Physitians and Chirurgians are not permitted to use the like libertie in the application of medicaments to the one as to the other. If the like case fall out hereafter at any time, I advise you to use medicaments borrowed of the vegetables so that you contemne not the minerals. What hurt I pray you can come from the use of Merc. Dulcis and Merc. præcipitat. with gold? None I assure you; for these medicaments are familiar to nature and are true balsams for maligne sores.

"But you may aske what was the reason these medicaments were not used? I answer, because there was no mention made of these medicaments at the first, and it was too late to minister them at the last, nature being surprised: for this only would have made the medicaments odious, and the Physitian (who should have advised this course) obnoxious to calumnie and reproach."

Ralph Freeman died on March 16, 1633-4, during his year of office as Lord Mayor of London, evidently from secondary hæmorrhage due to cancer of the tongue. Dr. Read wished to administer mercury, but was overruled. It is possible, therefore, that he thought an antisymphilitic course might have been useful; on the other hand, mercurius dulcis, which was the precursor of calomel, was just coming into vogue, and was being employed in every form of inflammation by those advanced physicians who had adopted

* "Tumores lingue ut plurimum vite periculum non afferunt nisi in tantam molem excreverint ut inde suffocatio metuenda sit, aut ex humore quodam maligno atque atrabiliario ortum duxerint unde cancerosus tumor generari potest quod duritie, lividitate, ac dolore punitivo internoscitur."

† "The Chirurgical Lectures of Tumours and Ulcers, delivered on Tusedayes appointed for these exercises and keeping of their Courts in the Chirurgeans Hall these three yeeres last past viz. 1632, 1633 and 1634. Lond. 4to. 1635." Treat. 2, lect. 26, p. 313.

the new chemical pharmacy then replacing the treatment by herbs which had been in use from time immemorial.

It is interesting that this first record of a case of cancer of the tongue which I have been able to discover should have been presented just two hundred and eighty-four years ago to an audience similar to that which I am now addressing—the Master, Wardens, and Members of the United Company of Barbers and Surgeons: the only difference being that attendance on Dr. Read's lecture was compulsory, the attendance here to-day is voluntary. At that time it was enacted that "every man of the Company using the mystery and facultye of surgery—be he freman, fforeyn or alian straunger—shall come unto the lecture, being by the Beadle warned thereto. And for not keepinge their houre both in the forenoone and also in the afternoone and being a ffreman shall forfayt and paye at every tyme iiiid."

From the middle of the seventeenth century onwards, cancer of the tongue was a well-recognized surgical disease in England, for Wiseman and other writers on surgery make frequent mention of it, and were devising methods for its cure.

It was, however, still rare in Germany, for Paul de Sorbait published a case in 1672. "We saw," he says, "an ulcer [of the tongue] degenerating into cancer in the case of the noble Baron Vertemali, which caused such a hæmorrhage from destruction of the sublingual arteries and veins that the patient was suffocated. He recognized with great penitence that the cause of this cancer was a divine punishment because he had often abused the clergy." *

Bonetus (1620-1689), writing on the tongue and its diseases thirteen years later, seems to have been unable to find another case—unless, indeed, he wished to point a moral—for he quotes the same case with some elaboration of details. "There was lately," he says, "a certain Baron who had a very poisonous tongue. He not only directed his jibes against all and sundry, but kept his most venomous shafts for the clergy and those who devoted themselves to God's service. He was caught at last in the very act when he was peeling this cursed bell, by a holy brother of good repute, who said to him, 'Your foul tongue has overlong deserved that punishment from an offended God which it will shortly receive.' The Baron went off undismayed, but a few days afterwards a small swelling began to grow on the side of his tongue. Little by little it increased in size until it became an inoperable cancer, and at length, the tongue having become incurved, twisted, and drawn back to the fauces, miserably afflicted, but penitent and confessed, he was summoned before the Great Judge who calls his servants to a most strict account." †

I think from the historical side it is fair to assume that cancer of the tongue has always existed; that during the classical and mediæval periods it was so rare as hardly to merit attention by the ordinary writers on surgery; in the seventeenth century it became common; and, as I shall show presently, its frequency is still increasing.

During the sixteenth century, therefore, something occurred to increase the frequency of cancer of the tongue; and three causes at once suggest themselves, for they were new factors, and greatly influenced the social life of the time—syphilis, tobacco, and the consumption of alcohol in the form of spirits. Of syphilis I shall speak in greater detail presently.

* *Universa Medicina*, Tract. I, cap. 34. "Vidimus in Illustrissimo Barone de Vertemali, utpote qui, in cancrum degenerans, corrosis sublingualibus venis et arteriis, hæmorrhagiam tantam excitavit, ut ea suffocatus fuerit Aeger. Causam hujus cancri, summa ductus pœnitentia, agnovit ipse divinam, eo quod Religiosis graviter et frequenter detraxisset."

† "Nuper quidam Baro in more habuit venenatissima Linguae jacula, non tantum in quemlibet sed maxime in Deo devotos religiosos frequentissime jaculari; in flagrante a pio honestæque vitæ religioso deprehensus fuit, cum infernale hoc pulsaret tintinnabulum; ad quem religiosus ait, quam maledicta tua lingua jamdudum meruit poenam ex justa Dei vindicta intra breve tempus experietur. Relicto et minime commoto Barone, elapsis paucis diebus Tumor exiguus ad Linguae latera pullulare coepit, qui paulatim crescens carcinomatis inexpugnabilis naturam manifestavit, a quo tandem incurvata, convulsa et retracta ad fauces lingua, miserrime delictum, poenitenter confessus ad strictissimum Judicem suorum famulorum vindicem acerrimum, commigravit. (*Medicina Septentriolana Collatitia*, 1685, vol. i, p. 302. The case is headed 'Tumor Linguae Miraculosus.')

Tobacco, as is well known, was brought from Cuba by the Spaniards in 1497, and under the name of Petum was introduced into Europe on account of its medicinal properties. Inhalation of the smoke was also learnt from the Indians, but it was not until 1586 that Ralph Lane brought the implements and materials for smoking into England, although a few persons had acquired the habit as early as 1573. It quickly took root amongst the Elizabethan courtiers, the pipes being short and made at first of silver and afterwards of clay, as is known from the pipes and pipe-cases belonging to Sir Walter Raleigh, which are still preserved in the Wallace Collection at Hertford House.

The poor at this time were content with a walnut-shell and a straw. One pipe often sufficed them for a smoking party, the pipe being handed round the table at threepence a pipeful. It is hardly surprising that sore tongues increased rapidly in number. Syphilis at the same time was rife, and the older treatment by mercury was beginning to give place to guaiacum and other less reliable remedies. Syphilis of the tongue, both as a primary lesion and as a late glossitis, soon became well-known to the medical profession.

The practice of smoking was at first essentially English, but it quickly spread to the north of Europe, being probably introduced by our sailors. King James I tried to stop the habit, and in 1604 issued his *Counterblaste to Tobacco*, in which he says that smoking is "A Custome loathsome to the Eye, hatefull to the Nose, harmefull to the braine, dangerous to the lungs, and in the black-stinking fume thereof neerer resembling the horrible Stigian smoke of the pit that is bottomlesse." The *Counterblaste* was useless; but although the custom was well established in London, it took a long time to spread through the country, and as late as 1665 it was noted as something unusual that 'such an one was a smoker of tobacco.'

Alcohol.—It is often said that alcohol in the form of spirits plays some part in the production of cancer of the tongue, but history does not appear to show any close interrelation between spirit drinking and lingual carcinoma. During the seventeenth century social habits remained very much as they had always been. In London, breakfast was not usually eaten, but a piece of bread with a draught of wine or a cup of beer was taken at a tavern some time in the morning. Dinner was the chief meal of the day, and taverns were used for that purpose nearly as often as we now go to restaurants. The fare was simple but ample, and although men were often "scandalously overserved with liquor," it was usually with wine or beer. Spirits, in the form of Scotch whiskey or French aqua vitæ, were esteemed as early as the sixteenth century, but they were not much drunk until the reign of Elizabeth, nor was any excise duty imposed until 1684, and in that year it was only levied upon a little more than half a million gallons.

Habits changed quickly after the introduction of coffee. Men became interested in learning the news, and frequented the coffee-houses. Coffee-houses in turn gave place to social clubs, where, in place of coffee, a bottle of wine or a bowl of punch became the popular beverage, and the use of spirits thus increased so enormously that during the years 1721-91 the consumption of British spirits alone reached an average of 0.62 gallon per head of the population, an amount which did not include foreign and colonial spirits. The eighteenth century was a jovial, sociable, hard-living age, when men drank spirits freely, kept extraordinarily late hours, and yet were obliged to take much physical exercise owing to the poor facilities for travelling both in town and country. Cancer of the tongue increased in frequency during this period, but not out of proportion, so far as can be ascertained. It seems probable, therefore, that spirit drinking is not an important factor in its causation. During the whole of this period syphilis continued unabated, but it was treated so severely by salivation and diet that many died of the cure.

II. ZOOLOGICAL DISTRIBUTION.

Cancer, as is well known, occurs in many vertebrate animals, from mammals to fish. Its zoological distribution has been the subject of more than one interesting contribution to the reports of the scientific investigations of the Imperial Cancer Research Fund. The types of carcinoma do not differ materially in human beings and in animals, when similar organs are affected.

I have made enquiries of my friend Sir John M'Fadyean, the Principal of the Royal Veterinary College, and of Dr. J. A. Murray, Director of the Imperial Cancer Research Fund, as to the frequency with which cancer of the tongue occurs in animals. Sir John M'Fadyean has had especial facilities for gaining knowledge of this nature, because he asked in 1890 that veterinary surgeons, stockowners, and others would send him all tumours excised by them in order that he might collect information regarding the occurrence of cancer in domesticated animals. The appeal brought him a considerable number of specimens, and he writes to me in 1918, twenty-eight years after this appeal was issued: "In 1890 I published in the *Journal of Comparative Pathology* an account of a case of cancer of the tongue in a cat. It was the first case I had seen in any animal, and since then I have only seen one other case, and that was in the tongue of a horse. The tumour in the horse had been diagnosed during life as one of actinomyces, but the appearance of the tongue after death was different from actinomyces as seen in the tongue of cattle, and microscopical examination showed that the case was one of quite typical epithelioma."

The details of Sir John M'Fadyean's first case are as follows: "*Carcinoma of a Cat's Tongue*.—The tumour grew on the tongue of a cat, and was handed to me by Professor Walley. The cat was a male, and aged twelve years. It had been ill for about two months prior to the date at which it was killed, the symptoms observed being discharge of saliva with occasional streaks of blood, difficulty of mastication and deglutition, and progressive emaciation. Microscopical examination showed that the tumour was composed essentially of masses of epithelium burrowing along the lymphatic spaces of the tongue. The epithelium resembled pretty closely that of the deepest layer of the buccal mucous membrane. Each cell had a large nucleus and a deeply staining (carminic) nucleolus. The central cells in the larger masses of epithelium had undergone a colloid degeneration, probably in consequence of defective nutritive supply."*

In like manner, Dr. Murray writes: "I can only recollect two cases of squamous-celled carcinoma linguae in animals in our material, both in cats."

In 1902 Dr. Anton Sticker published a very elaborate paper 'Ueber den Krebs der Thiere,'† in which he analyzed the occurrence of cancer in 215,037 horses, 5795 cattle, 91,273 dogs, 1732 cats, and many pigs. In this vast collection, cancer of the tongue only occurred in one old dog.

The net result, therefore, is that one horse, three aged cats, and one old dog are known to have died of cancer of the tongue, and in each case it was a squamous-celled carcinoma. Nothing is known of the previous history of these animals.

These figures show that cancer of the tongue occurs in domesticated animals, but so rarely that it is negligible, and that when it occurs it is of the squamous-celled variety, just as it is in the human. It seems fair to assume that cancer of the tongue in domesticated animals at the present time has not increased in frequency, but remains the same as it has always been; and, as I have already said, history appears to show that until the seventeenth century cancer of the tongue was as infrequent in men as it now is in animals.

III. STATISTICAL.

Leaving now the historical and scientific sides of the question, and turning to the statistical aspect, Dr. T. H. C. Stevenson, superintendent of statistics at the Central Register Office, Somerset House, tells me that cancer of the tongue had already attracted the attention of the Registrar-General as early as 1909, when he wrote, "The increase amongst males from cancer of the jaw and especially of the tongue is remarkable, and can scarcely be explained by improved diagnosis. Although cancer of the tongue in its later stages presents little difficulty in diagnosis, the recorded mortality has increased amongst

* *Journal of Comparative Pathology and Therapeutics*, 1890, vol. iii, p. 41; with an illustration of the microscopic appearances.

† *Arch. f. klin. Chir. von Langenbeck*, Bd. 56, 1902, pp. 616, 1023, and 1067.

males by no less than 228 per cent in 41 years. The increase, moreover, is entirely confined to the male sex.* This remarkable statement is based upon the following figures, which show the annual death-rate per million living, 35 years of age and upwards :—

	1868	1888	1909
Males	46.49	77.49	152.54
Females	17.45	12.46	14.97

The increase in the death-rate from cancer of the tongue continued to increase, until in 1915 it had more than trebled since 1868. There was still no material increase for women, and amongst men the increase was chiefly at the higher ages, that is to say, from 65 years upwards. Thus, the mortality between the ages of 65 and 75 was 283 in 1901, and 432 in 1916; between 75 and 85 it was 284 in 1901, and 420 in 1916; whilst in persons over 85 it was 166 in 1901, and no less than 516 in 1916.

It is a pity that statistics of death from cancer of the tongue are not available before 1868, but Dr. Charles Singer has done something to remedy the omission. He states† that “the death registers referring to the Chelsea Hospital for old soldiers have been examined from the years 1837 to 1910, and among 4,719 deaths of pensioners of the age of 55 and upwards, at least 62 were certified as due to oral cancer. Of these 62, at least 28 were carcinomata of the tongue and floor of the mouth, giving the proportion of deaths due to the last two causes as 6 per 1000.”

An examination of the blue-books issued by the General Registrar shows that of the deaths of males over 55 years of age registered in England and Wales during the years 1901–1909, only 3.5 per 1000 deaths were due to cancer of the tongue. Thus, even with the imperfect certification and greater statistical rarity of carcinoma in earlier years, cancer of the tongue appears to have been twice as common among this group of old soldiers as among the general population of comparable age in Britain to-day.

It should be remembered that the pensioners in this series were long-service men, and that, in the earlier years at least, many of them must have been serving in 1817, at a time when Thomas Rose,‡ surgeon to the Coldstream Guards, had nearly persuaded the Army that syphilis could be cured without mercury, a heresy which was supported by Guthrie,§ but was not shared by the soldiers themselves, many of whom bought Liq. Hyd. Perchlor. privately, and thereby made the fortune of a druggist living near their barracks.

Some additional facts can be gleaned from the reports of the Registrar-General. || Here is a table showing the ages at which death occurred from cancer of the tongue during the years 1901–1909 in 6257 men and 782 women :—

AGE AT DEATH	MALES	FEMALES
Under 5 years ..	0	1
“ 10 “ ..	1	0
“ 15 “ ..	1	0
“ 20 “ ..	2	3
“ 25 “ ..	33	53
“ 35 “ ..	427	85
“ 45 “ ..	1626	128
“ 55 “ ..	2143	167
“ 65 “ ..	1485	209
“ 75 “ ..	498	121
85 and upwards ..	41	15
Totals ..	6257	782

* Seventy-second Annual Report, p. xciii.

† *The Quarterly Journal of Medicine*, 1911, vol. v, p. 20.

‡ *Medico-Chir. Trans.*, vol. viii, p. 346.

§ *Ibid.*, p. 545.

|| Seventy-second Annual Report, pp. lxxxii–lxxxv.

This table shows that the true proportion of males to females affected with cancer of the tongue is 8 to 1. Our hospital statistics give a proportion of 18 to 1; Sir Henry Butlin thought it was 6 to 1. The table also shows that at that time the optimum, or shall I not rather say the pessimum, age for cancer of the tongue is 55-65 in males, and 65-75 in females. The table, to be strictly accurate, should be headed 'Cases of Malignant Disease of the Tongue,' because the two or three cases occurring in very young persons are almost certainly sarcomata and not carcinomata.

The difference in the death-rates of males and females has already been noticed by Dr. Charles Singer, who plotted it out in curves on the accompanying chart (*Chart 1*) which he has kindly allowed me to reproduce from his article, 'A Study of some Factors in the *Ætiology* of Oral Carcinoma.*' He says, "The death-rate presented by cancer of

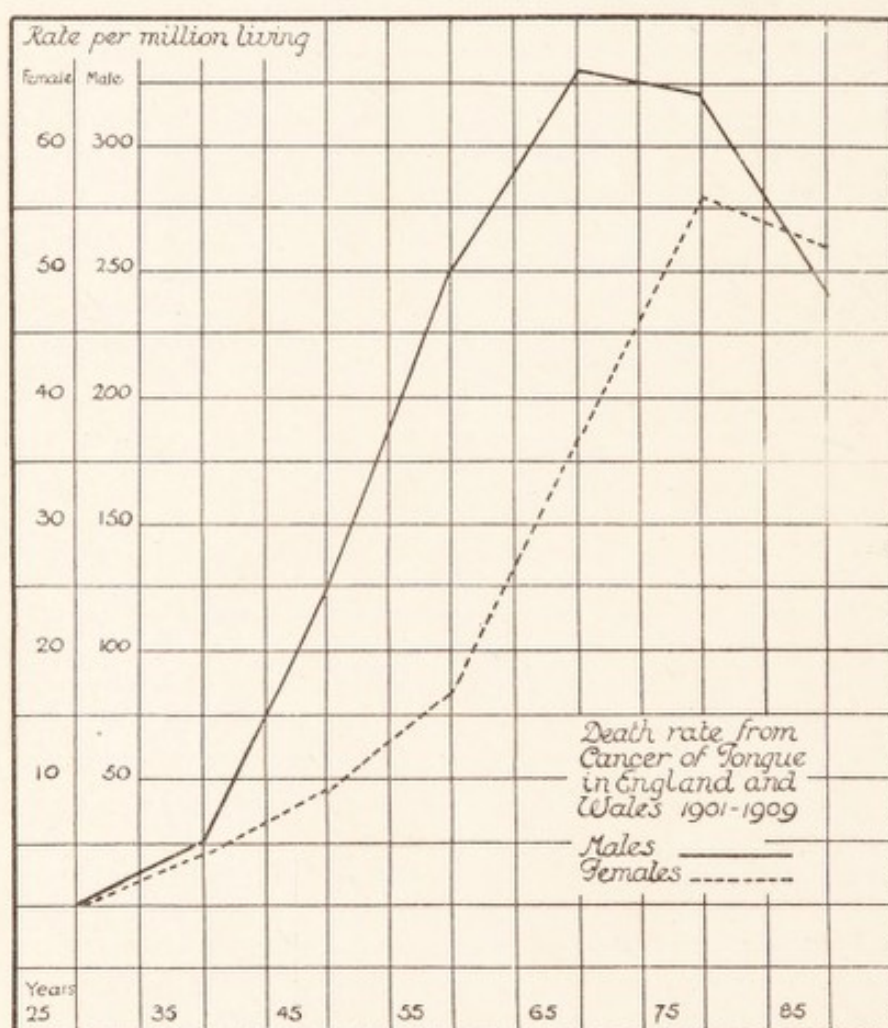


CHART 1.

the tongue has certain peculiarities which are not shared by that of cancer of other parts of the body. It differs, in the first place, from the death-rate from malignant disease of those other parts of the body in which a liability is shared by both sexes, in the marked differences in character of the age incidence of males and of females (*Chart 1*). The death-rate from cancer of the tongue in males rises steadily until about the sixty-fifth year, when the rate remains almost uniform for two decades, to fall again in extreme old age. In the female cases the death-rate rises slowly at first, and by no means parallel to the male; then, becoming accelerated about the sixtieth year, it rises rapidly to a maximum at or about the eightieth year, and again falls slightly (though less than the male curve) at the extreme limit of life.

* *The Quarterly Journal of Medicine*, 1911, vol. v, p. 22.

"The chart illustrating the death-rate from lingual cancer thus presents the following characteristic features: (a) The dissimilarity of the male and female curves; (b) The approximately equal rates for males in the decades 65-75 and 75-85; (c) The drop in extreme old age in both sexes. As regards the general form of the curves presented by this group of cases, it may be said that, while the male curve is a type of its own, the female curve accords fairly well with those for cancer of several other parts of the body, and is, for example, closely similar to the curve for cancer of the rectum in either sex ('Chart 2')."

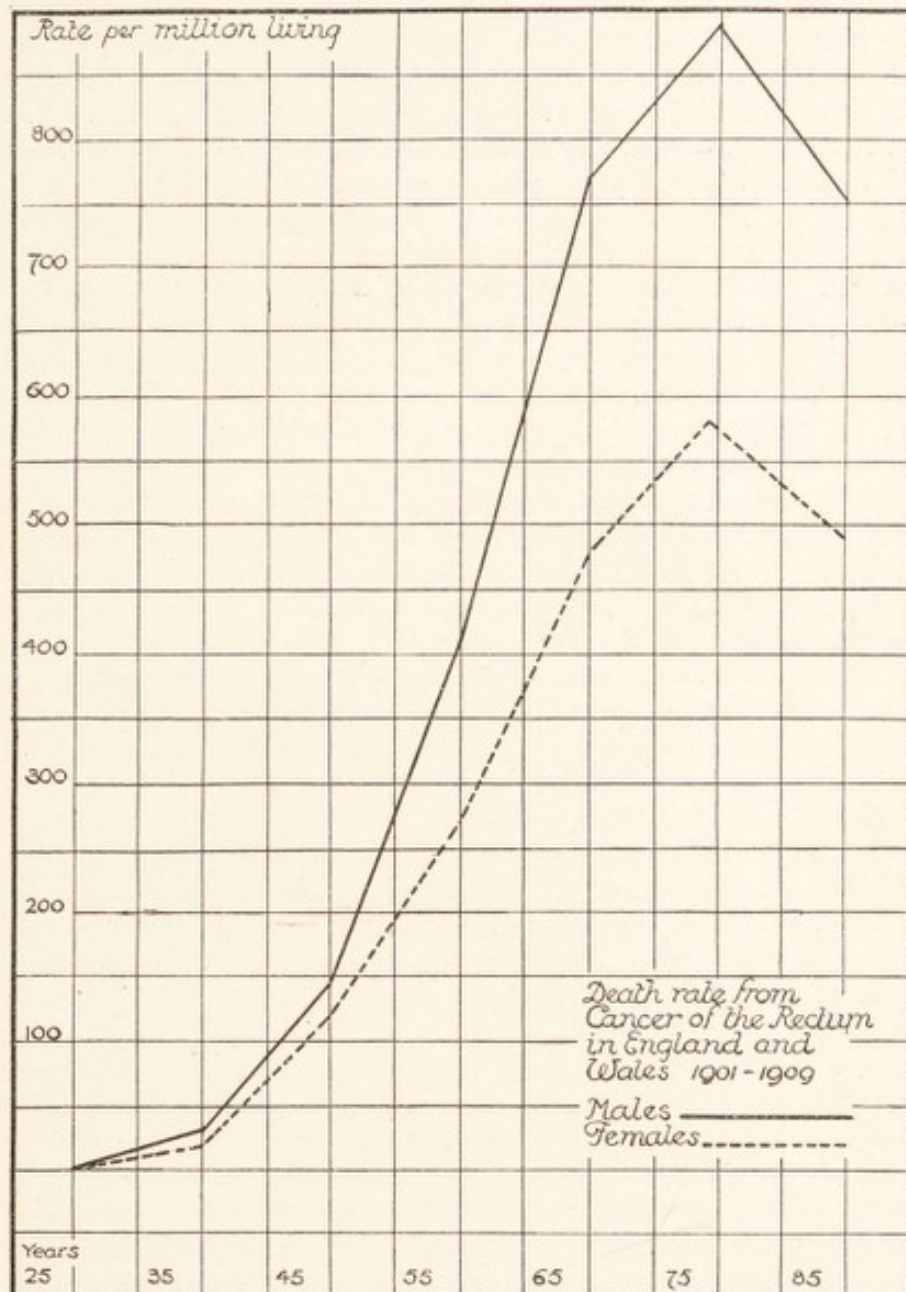


CHART 2.

IV. POSSIBLE FACTORS CAUSING THE INCREASE IN CANCER OF THE TONGUE.

It is clear from the historical and statistical evidence that cancer of the tongue is increasing in frequency, and at the present time it is increasing more rapidly in men than in women. It is of interest, therefore, to try and discover some of the factors which have caused this increase. Irritation is thought to be an important factor in the causation of cancer, and I have therefore been at some pains to ascertain whether the state of the teeth has altered materially since cancer of the tongue became rife, because many patients state that injury to the tongue by a tooth was the origin of the cancer.

a. Pyorrhœa Alveolaris vel Periodontitis.—Pyorrhœa is widely distributed throughout the human race, and is often met with in animals under domestication, as well as in wild animals kept in captivity. The animals which have been most carefully observed in regard to pyorrhœa are the horse, the cat, and the dog—the three animals in which cancer of the tongue has occasionally occurred.

Amongst 600 horses working in London, it was found that approximately one-third presented some degree of periodontal disease, mainly of local origin and the result of injury to the mucoperiosteum by foreign bodies in the diet.

Periodontal disease is also extremely prevalent in domestic cats and dogs. It is most frequent in highly-bred cats, because they are fed on soft food, whilst the ordinary domestic cat, which has to get its own living and feeds upon a meat diet, is comparatively free. The same holds true for dogs. Pyorrhœa is seen most commonly in lapdogs and dogs with short muzzles, and especially in the functionless incisor teeth of bulldogs. Dogs living on a good flesh diet which gives plenty of exercise to the jaws are invariably free from the disease. It is clear, therefore, that whilst pyorrhœa may act as a source of irritation to the tongue, it is only of minor importance in producing cancer, as otherwise cats and dogs should be affected much more often than is actually the case.

b. Caries.—Caries of the teeth, in like manner, seems to be only of slight importance as a factor in causing cancer of the tongue, although it is often put forward prominently as an exciting cause.

Dental surgeons have done much good work in determining the existence of caries in the teeth of different races from prehistoric times to our day. The late Mr. Mummery examined over 3000 skulls to determine the prevalence of dental caries, and tabulated the results of 1658 cases. Caries occurs from the earliest times, varying in frequency in different districts. Among 68 skulls obtained from Wiltshire barrows, there was only a single case of decay; whilst in 44 skulls from similar long barrows in the more northern parts of England, there were 9 cases of caries.

During the bronze age caries was more frequent, for there were 7 instances in 32 skulls, whilst in the Yorkshiresmen of this period there were no less than 26 cases of caries in the 60 skulls examined.

During the Roman period the teeth were often diseased, and in 143 Roman skulls 41 were thus affected, the amount of caries in some individuals being very great; thus, in one woman, aged about thirty, every molar and every bicuspid was diseased. If such a large proportion of Romans in Britain suffered from caries, there is no reason to suppose that the Romans at home were exempt; and if dental caries and stumps were an important cause of cancer of the tongue, it must certainly have attracted the attention of the classical writers on surgery. Yet Celsus, in speaking of ulcers of the tongue, contents himself with following the statement in the *Prorrhœticon* of Hippocrates, saying, "Those on the side of the tongue last a very long time, and it should be noticed whether there is a sharp tooth, for this often prevents healing and must be filed." *

In Anglo-Saxon times the proportion of teeth affected with caries was certainly less than in Roman times, and Mr. Mummery states that he only met with it in 12 out of 76 Anglo-Saxon skulls. We have no knowledge of the incidence of dental caries in England from the time of the Conquest until the beginning of the seventeenth century. Mr. J. F. Colyer has now taken up the investigation, and has been examining skulls obtained from the Clare Market district in the immediate neighbourhood of this college. Large numbers of Londoners were buried in the graveyard which occupied this site between the years 1600 and 1800. He tells me that 3443 teeth were present in the skulls which he examined, and 319 of these were carious, the percentage of carious teeth being therefore 9.2 per cent, as against 28 per cent in the Romano-British period. In the skulls and mandibles examined by Mr. Colyer, 669 teeth had been lost from

* *Linguae ulcera . . . quæ in latera ejus nascuntur diutissime durant. Videndumque est num contra dens aliquis acutior sit, qui sanescere sæpe ulcus in eo loco non sinit; ideoque limandus est.* CELSUS, *Medicinæ*, Lib. vi, cap. xii.

disease. If these specimens are examined more in detail, "we find in the complete dentures 1683 teeth were present, of which 68 were carious, or just over 4 per cent, while in the incomplete dentures there were 1760 teeth present, of which 251 were carious, that is 14·2 per cent. In the latter group 669 teeth were missing, and of these it would be a generous estimate to assume that half were lost from caries, and the other half from periodontal disease. If the estimated carious teeth be added to the known carious teeth, the figures would indicate about one-third carious."

It seems, therefore, as though the proportion of carious teeth amongst modern Londoners is about the same as in Romano-British times. A fallacy lies in the smallness of the numbers under consideration; but if it be assumed for the sake of argument that they are substantially correct, the conclusion must be drawn that, whilst the number of cases of caries has not increased, there has been a very rapid increase in cases of cancer of the tongue. Caries, therefore, is not an important factor in causing lingual carcinoma.

c. Syphilis and Tobacco.—None of the factors so far enumerated exercises a preponderating influence upon the increase of cancer of the tongue. It remains, therefore, to consider in somewhat greater detail the two factors pointed out by the history of the disease—syphilis and tobacco.

I have recently examined the records of patients admitted into St. Bartholomew's Hospital suffering from cancer of the tongue during the years 1909–1916. During that period 169 persons entered the Hospital with this disease. Most of them submitted to operation, a few were inoperable, and some discharged themselves after a preliminary examination. The diagnosis of 'squamous-celled carcinoma' was verified in every case operated upon, by an independent microscopical examination carried out in the Pathological Institute attached to the Hospital.

Women.—Of the patients, 9 were women, and 160 men. The proportion of women to men, therefore, was nearly one to eighteen, which, as I have already said, is much smaller than the true proportion as shown—by the returns of the Registrar-General—viz., one woman to eight men.

Seven of the nine women were married, one was unmarried, and the social state of the other is not given. Of the seven married women, one gave a history of syphilis; two had healed syphilitic scars on the body; one was a widow who had only one child alive out of a family of five—the note adds "she looks as if she drank;" one had suffered from leucoplakia of the tongue from the age of 17, and stated that her father had suffered from "an abscess of the brain," of which he was cured by medicine—this was probably a gummatous meningitis, the patient herself being the subject of inherited syphilis; there was no history of syphilis, either acquired or inherited, in the other two married women. The unmarried woman, a nurse aged 42, said that her father died of aneurysm, and that one sister had cancer of the breast. The patient herself, during the same month in which she first noticed the ulcer on her tongue, found that her right eye was fixed in such a manner that she could not turn it outwards—abducent paralysis. This affection of the eye was cured by medicine, and was probably syphilitic in origin.

All the women had bad teeth, and attributed the cancer of the tongue to irritation caused either by the teeth or by a badly-fitting or broken denture. None of them smoked. In none of these cases was a Wassermann test done.

The duration of the disease had varied greatly in these women. In one, a woman of 52, the cancer grew so rapidly that the tongue was removed three weeks after the first occurrence of symptoms; whilst in another patient the tongue had been painful for eleven years before an operation was considered necessary.

There was also an interesting case which may be mentioned here, though it does not belong to the series, as it was under the care of Sir Henry Butlin. The patient was a married woman, age 24, with pyorrhœa. She was admitted to the hospital with a cancer of the tongue dating, as she said, from the irritation of a carious tooth in May, 1898. Sir Henry Butlin removed her tongue on Dec. 9, 1898. She was discharged from the hospital on Jan. 7, 1899, and returned on Jan. 23 of the same year—i.e., only sixteen

days later—with such extensive recurrence that no farther operation could be undertaken. This woman had suffered repeatedly from small ulcers of the tongue before the cancerous ulcer was observed. These ulcers had appeared in crops three or four at a time, but were curable. The case is remarkable, both on account of the youth of the patient and the rapidity of recurrence after removal of the tongue by a surgeon who was especially careful not to do things by halves.

Men.—The men admitted with cancer of the tongue presented some additional and noteworthy points. Their teeth were nearly always bad, but not worse than is usual in the class to which they belong. Many were edentulous, some from age, some because they had their teeth removed after the appearance of the ulcer for which they sought advice. Of the 160 patients, 93, that is to say 58·5 per cent, were syphilitic. Of the 93, 62 gave a history of syphilis, and the remaining 31 showed signs of syphilis in the form of chronic glossitis, aortic disease, scars of healed ulcers, tabes, etc. The syphilis was invariably of long standing and, taking a few cases in the series without selection, the primary infection was said to have been 26 years, 30 years, 29 years, 40 years, 28 years, 23 years, and 43 years previously. Twenty-six of the patients stated definitely that they had never contracted syphilis, but of these one had suffered from gonorrhœa, and two had a positive Wassermann test. Many of the patients had drunk beer to excess, but did not as a rule acknowledge that they had taken spirits freely. There is no doubt, however, that many were, or had been, alcoholic. For instance, one was a farmer who stated that he took thirty glasses of strong beer daily and smoked continuously; he had cancer of the tongue which was removed at the age of 74. Another man, who said that he smoked eighty cigarettes a day, was usually drunk six days a week, and had contracted syphilis twenty years previously, suffered from a richly deserved cancer of the tongue at the age of 42. On the other hand, a teetotaler and non-smoker, who denied that he had ever suffered from syphilis, had his tongue removed for carcinoma at the age of 51.

A Wassermann test was performed 26 times, with the result that in 12 cases it was negative, in 6 positive, in 5 it was doubtfully negative, and in 3 doubtfully positive. These results may be compared with those obtained by Captain Arnold Renshaw, Demonstrator of Pathology at the Manchester University Medical School (who wrote to me at the kind request of Dr. C. H. Browning, Director of the Bland-Sutton Institute of Pathology, Middlesex Hospital), and by Captain Archibald Leitch, Pathologist to the Cancer Hospital, Brompton. Captain Renshaw writes: "Seventeen cases of squamous-celled carcinoma of the tongue were examined, and only two cases showed a positive Wassermann reaction. Two of the negative cases gave negative reactions before and after (twenty-four hours before and forty-eight hours after) an intravenous injection of neosalvarsan, this being repeated in each case after a second injection had been given. In one of these cases there was a definite history of syphilis twenty-five years previously." Captain Leitch writes: "I regret that I cannot give you any definite figures. All I can say is that the majority of cases I tested gave a positive reaction. The numbers tested were comparatively few, merely sufficient to establish in my own mind the fact that the result of a Wassermann reaction was of no service whatever in assisting a diagnosis between syphilis of the tongue and carcinoma of the tongue. Of that I am certain. Strangely enough, I did a few reactions in advanced lingual syphilis, and some of these were quite negative." Carl Bruck* says that he obtained ten positive Wassermann tests in twelve cases of leucoplakia of the tongue.

The Wassermann results are interesting, but too much importance must not be attached to them as signs of active syphilis, because, as Lieutenant-Colonel L. W. Harrison wisely says,† "Although the Wassermann test looks deeper into the patient's condition than the naked eye, it is not an absolute guide to a decision regarding the absence of syphilis."

* *Die Serodiagnose der Syphilis*, Berlin, 1909, p. 70.

† *The Diagnosis and Treatment of Venereal Diseases in General Practice*. The Oxford Medical Publications, 1918, p. 280.

As regards the influence of syphilis upon cancer of the tongue, the number of cases under review is too small to generalize upon, and is only useful to point out the direction in which future work is advisable. There is, moreover, a possible fallacy. It is a matter of common belief that syphilis is in some way associated with cancer of the tongue. Every patient, therefore, is asked as a matter of routine whether or not he has previously suffered from syphilis. This is not done in other surgical diseases, and there is consequently no means of determining what proportion of patients admitted into hospital would acknowledge previous syphilitic infection.

It is not uncommon in a family for two or more members of the same generation to suffer from lingual carcinoma, but it is very rare for a father and son to die of the disease. There is one case in the records at St. Bartholomew's Hospital, but I can find no other. This may mean that the son, born whilst the father has active syphilis, is thereby protected if he does not happen to have leucoplakia; or it may imply that the tissue changes in the tongue which are sufficient predisposing causes in the first generation are compensated in the second generation. The first assumption is the less likely, because inherited syphilis, as has been shown, is actually a factor in cancer of the tongue. The point is in need of further investigation, first as to whether it is a fact, and secondly as to the explanation. Another point for investigation is to determine whether cancer of the tongue occurs more frequently in syphilized members of families predisposed to cancer than in those with no such history. Personally I do not believe that it does.

The evidence seems to point at present to a close association between syphilis and cancer of the tongue. The syphilis may be active; it is more often quiescent or even extinct. It may be inherited; it is more often acquired. In every case the syphilitic infection has preceded the appearance of cancer by very many years, and the preliminary syphilitic changes therefore are slow and prolonged. Of these preliminary changes I know nothing. I have examined many sections of cancerous tongues, but there are no constant histological changes in the deeper tissues which are attributable to the effects of spirochætal infection. Tongues which were leucoplakic at the time of removal show a thickening and fibrosis of the walls of the arterioles, but in others there was no manifest change either in the blood-vessels, the lymphatics, or the connective tissue. An examination for such changes needs more care, a larger amount of material, and much more prolonged study than I have been able to give in the limited time at my disposal. All that can be said at present is that syphilis in some way alters the resisting power of the epithelium of the tongue, and allows the squamous cells to run riot; in other words, that lingual carcinoma is born on the bed prepared by syphilis. A similar relationship has long been known to exist between syphilis and tubercle, but in tuberculosis there is a definite infective agent; as yet there is no proof of any such exciting cause in cancer.

When mercury fell into temporary disrepute in the treatment of syphilis at the end of the sixteenth century, and again in the Army at the beginning of the nineteenth century, it seems that cancer of the tongue increased in frequency. It would be interesting to determine whether the present increase can be associated with the very imperfect treatment of syphilis which was in vogue during the mid-Victorian period. The sound teaching of John Pearson (1758-1826), surgeon to the Lock Hospital, that mercury in sufficient doses was the proper treatment for syphilis,* regulated the practice of most surgeons during the earlier decades of the last century. The introduction of potassium iodide, and its obvious utility in the later stages of syphilis, led to the very imperfect mercurial treatment which continued until our own day. Several of the patients who were treated for syphilis at St. Bartholomew's Hospital, and were admitted for cancer of the tongue forty and fifty years afterwards, stated that they had been given mercury for a fortnight or three weeks only. As late as 1880 the old dread of salivation still lingered, and it was quite usual in the out-patient room to hear a patient protest that he would not take mercury on any account. The treatment at that time was merely a treatment of

* *Observations on the Effect of Various Articles of the Materia Medica in the Cure of Lues Venerea.* London, 1800.

symptoms, and minute doses of the red and green iodides of mercury were frequently prescribed. Is the present great increase in cancer of the tongue amongst old syphilitic patients the aftermath of this treatment?

But if syphilis is a predisposing cause of cancer of the tongue, the exciting cause must be looked for elsewhere, and it ought to be some form of long-continued local irritation. The provocative irritation is sometimes, but not so often as might be expected, syphilitic—the fissures and abrasions of chronic glossitis or the soreness of leucoplakia. Pyorrhœa and carious teeth, as I have shown, are very frequently associated with cancer of the tongue; but had there been no previous syphilis, lingual carcinoma should not have occurred in men and women more often than in the domesticated animals, whose teeth are equally affected by disease. Pyorrhœa and caries are at least as frequent in women as in men, and it is probable that syphilis is just as common, yet cancer of the tongue in women has not yet increased in the same ratio as in men.

It remains, therefore, to inquire whether any change has taken place in the habits of men within the last fifty years which has not affected women to the same extent.

Before 1868, anyone who looks at the pictures in *Punch* will see that snuff-taking was on the wane, and that whilst cigars might be smoked openly in the streets, pipes were taboo in public, and cigarettes were unknown except to foreigners, and travellers who had learnt to smoke them on the Continent or in America. Smoking after dinner was not usual amongst gentlemen who still drank a glass or two of port wine, and in the various Senior Common Rooms to which I was hospitably invited at Oxford during the years 1874–80, the Fellows of the older school only smoked after going to their own rooms. On the other hand, long clay or churchwarden pipes, with a mug of home-brewed beer, solaced the leisure of many country parsons and doctors at the bowling greens and quoit grounds in summer, and round the hearth in winter. The labourer smoked a short clay or cutty as a matter of course. On the whole the upper classes smoked a great deal less than they do at present, whilst the lower classes smoked about the same, but in a more irritating manner so far as the tongue was concerned. From 1877 onwards the smoking of cigarettes has become an ever increasing habit, until now it is well-nigh universal amongst men, women, and boys.

Amongst the patients suffering from cancer of the tongue admitted into St. Bartholomew's Hospital whose cases I analyzed, 37 men stated they had been great smokers, whilst only 2 were non-smokers. It seems possible, therefore, that smoking acts as the exciting cause of cancer in a tongue which has been sufficiently prepared by previous syphilitic infection of the tissues. Smoking acts as an irritant in two ways. My friends have kindly experimented for me, as I do not myself smoke, and they tell me that it causes a definite rise of temperature in the mouth, registerable by the thermometer; and there is also the irritant action of the nicotine itself. Smoking may thus bear the same relation to the production of lingual carcinoma as the brazier does to Kangri cancer.

To sum up, then, I think the following conclusions can be safely arrived at from the evidence I have obtained. Cancer of the tongue has always existed both in men and in animals, the actual cause being as yet unknown. Its rapid increase in men within historical times is the result of two causes: the first predisposing, the second the exciting.

The predisposing cause is the degenerative change taking place as a result of spirochætal infection, the change being accentuated by lapse of years and by indulgence in alcohol. The form in which the alcohol is taken does not seem to be important; beer, spirits, and wine are equally harmful. It is the amount consumed, not the quality, which matters.

The exciting cause is local irritation. The most effective local irritant is tobacco, although pyorrhœa and carious teeth often act as minor exciting causes. The exciting causes may act for long periods of time, but will not produce cancer, except in the rarest instances, without the long-continued action of the predisposing cause—syphilis. The occasional occurrence of cancer of the tongue in animals and in non-syphilitized people shows that, as in cancer generally, there is a *tertium quid* as yet undiscovered, which is

called for convenience the predisposition to cancer. This predisposition manifests itself in the varying resistance to cancer shown by different persons. Sometimes the course of the disease is rapid, and an accidental injury to the tongue is quickly followed by a carcinomatous ulcer; at other times, when every factor seems to be present and the individual ought to have cancer of the tongue, he lives to a good old age, and dies of some wholly different disease.

It is this *tertium quid* which we should seek, by correlating, as I have tried to do this afternoon, historical, clinical, and pathological results; for it is only by a wide survey on all sides that it is possible to discover where experimental research is likely to be most useful. Years ago* I carried out a series of experiments to ascertain whether irritation by itself had any influence in producing cancer in animals; but the results were uniformly negative, and some other factor was clearly necessary to make the epithelial cells change their natural method of growth.

CONCLUSION AND FORECAST.

In conclusion, some points of great practical importance are obtainable from what has been stated.

In the first place, it ought to be possible to reduce cancer of the tongue to the subordinate position which it occupied before the seventeenth century in men, and which it still holds amongst the domesticated animals.

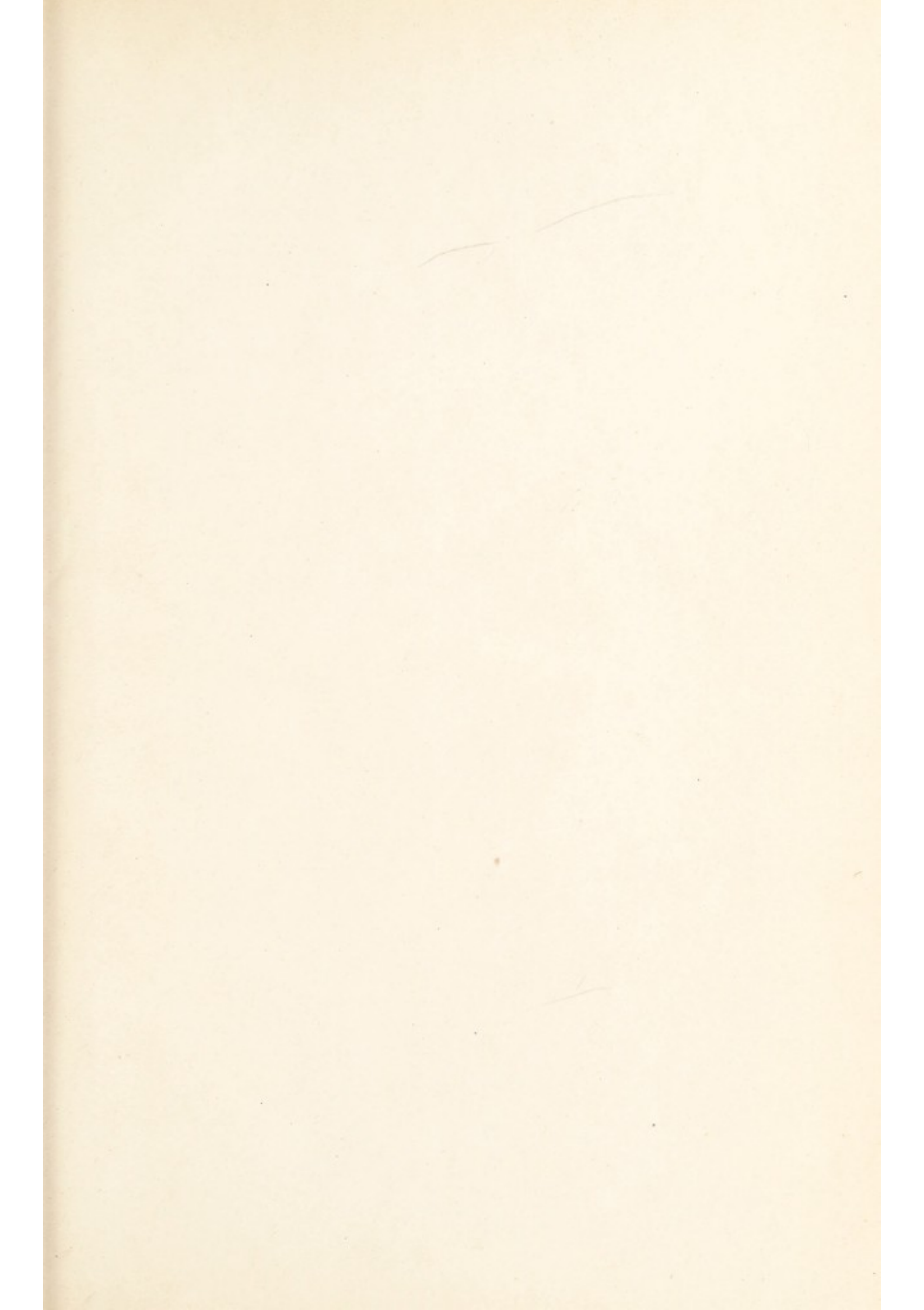
At the present time syphilis is more prevalent than it has been for many years, and the consumption of tobacco has risen from seven and a half million pounds in 1914 to eight and a half million pounds in 1915. Much of this tobacco is smoked in the form of cigarettes, and women now smoke on a much larger scale than they used to do. It follows, therefore, that if matters are allowed to continue as they are doing, there will be a huge increase in the number of patients suffering from cancer of the tongue. The increase should begin about 1950, and it should affect women as well as men.

Such an increase can be prevented by a thorough and systematic treatment of syphilis in its initial stages; for, as has been shown, cancer of the tongue has always increased in frequency some years after syphilis has been treated inadequately. Persons who are being treated for syphilis, therefore, should be told never to smoke, not to drink to excess, and to pay regular visits to a dentist in order that their teeth may be kept in the best possible state, and that any dentures they may have to wear should be maintained well-fitting and free from rough edges.

Such advice should be given whilst the patient is actually under treatment for syphilis. It is useless to defer it until the tongue has become sore, because it is then too late in a large number of instances. Many patients, of course, will say that they would rather run the risk of having cancer of the tongue than put up with such a restriction as is involved in renouncing tobacco. It may be so; but at any rate it is our duty to put the matter plainly before them, and to point out the risk they run, in the hope that a few will take advice and be saved from a painful disease and a miserable death.



* *The Journal of Pathology and Bacteriology*, 1898, vol. iv, p. 69.



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