

THE FORWARD MARCH OF SURGERY UP TO AND
THROUGH THE FIFTEENTH CENTURY

IV.

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Fifteenth Century

O U T L I N E

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CENTRAL IDEA

The history of anatomy and surgery from the early centuries of the Christian era onward shows little advancement.

- I. Surgery in a very restricted field and primitive form was practiced by ancient people.
 - A. The Egyptians.
 - B. The Greeks.
 1. Hippocrates.
 2. Heraphilus.
 3. Erasestratus.
 - C. The Jews.
 - D. The Hindus.
 - E. The Chinese.
- II. Galen was the first to establish a standard in anatomy.
 - A. His knowledge of anatomy.
 - B. His dissection and vivsections.
- III. The Arabians preserved intact the surgery of the ancient world.
 - A. No advancement made.
 - B. Passed on to Scots.

IV. Surgery and anatomy began to develop more as a science.

- A. Roger of Parma.
- B. Roland of Parma.
- C. Moddio.
- D. Guy de Chauliac (1300-1370)
- E. Paracelsus.
 - 1. His speech.
 - 2. His beliefs.
- F. Vesalius (1514-1564)
- G. Leonardo da Vinci.
- H. Servetus (1499-1553)
- I. Columbus.
- J. Harvey.
- K. Eustachius.
- L. Fallopius.
- M. Ambroise Pare (1510-1590)
- N. Thomas Vicary.

THE FORWARD MARCH OF SURGERY UP AND THROUGH THE FIFTEENTH CENTURY

Surgery in a very restricted field and primitive form was practiced by ancient peoples. The care of a wound, the result of accident or war, would necessitate the staunching of blood and the removal of foreign bodies. For example the extraction of arrow heads formed an important duty of the surgeon who followed the army.

In Egypt, 2500 years before Christ, simple surgical operations were depicted by engraving on stone. These were of the simplest character, as little was known of anatomy beneath the surface. Nevertheless, a favorable but unexplored field for surgery existed. In mummies there is evidence of mastoid disease, appendicitis, fractured bones, fatal sword cuts of the head, and ulcers of the skull due to carrying water jars on the head. Surgical procedures were, however, hardly encouraged. Among the Babylonians, if, as the result of an operation, a man lost his life or his eye, the surgeon had his hand cut off also.²

The oldest anatomical treatise, according to Macalister, is an Egyptian papyrus probably written sixteen centuries before our era. It shows that the heart, vessels, liver, spleen, kidneys, ureters, and bladder were recognized, and

1. Singer, C.J., History of Medicine, New York, 1928, p. 280.

2. Ibid, p.280.

3. Ibid, p.282.

that the blood-vessels were known.³ Other vessels are described, some carrying air, some mucous, while two to the right ear are said to carry the breath of life, and two to the left ear the breath of death.⁴

Hippocrates' (460 B.C.) knowledge of human anatomy was very defective, and for many centuries the observations of his successors were often inaccurate. The reason for this is found in the fact that the human body was seldom available for dissection. The Greek religion prevented interference with the dead; the Koran denounces as unclean a person who touches a corpse; and Islam forbade dissection.⁵ In fact everywhere in the ancient world, religious dogma was antagonistic to the study of human anatomy. Many fanciful statements are found in early manuscripts. Thus in the Talmud, embodying Jewish law and legend, the bone of Luz and the missing rib of Adam persisted until the sixteenth century, when Vesalius showed both to be myths.⁶

Human anatomy was studied enthusiastically in the school of Alexandria that was founded about 300 B.C. Herophilus (225-280 B.C.) and Erasistratus (280 B.C.) were alleged to have practiced vivisection. As a surgeon Herophilus appears

4. Wm. H.R. Rivers, Medicine, Magic and Religion, N.Y., 1924, p. 183.

5. R.O. Woon, Hippocrates, London, 1923, p. 530.

6. Thorndike, Science and Thought in the 15th century, N.Y. 1929, p. 430.

to have been a bold operator.⁷ He is said to have used the knife freely on such organs as the liver and the spleen accounting them of little importance in animal economy.

The Hindus, according to writings of the first and second centuries, were more advanced in surgery than others of that period. Operations for hernia, vesical stone, and cataract were performed. Amputations were done and boiling oil applied to the stump to arrest hemorrhage.

The Chinese were far behind in the practice of surgery and medicine. Their surgical procedures were very rudimentary, because of their religious respect for the dead and their reluctance to interfere with living structures by the drawing of blood -- their practice being to insert fine needles of silver or gold into painful parts.⁸ They specified 367 points where needles might be introduced without injury to nerves or blood-vessels. This implied some anatomical knowledge, but their notions of anatomy and physiology were fanciful in the extreme.⁹

Galen (130-200 A.D.) was the greatest anatomist of antiquity. His knowledge of anatomy was mainly derived from dissection and vivisection of the lower animals, chiefly the pig, ape, dog, and ox. From his assumption, however, that the anatomy of man was similar, in many respects, to that of the lower animals, his

7. Moon, op. cit. p. 532.

8. Rivers, op. cit. p. 191.

9. Ibid, p. 191 f.

conclusions were often inaccurate. He was no doubt influenced by the teaching of Aristotle. In spite of his shortcomings, Galen, as an anatomist, remained the supreme authority for fourteen centuries. Throughout the dark ages and in medieval times, it was considered rank heresy to challenge his authority. The heretic was subjected to persecution, exile, and even death.

While the knowledge of human anatomy was incomplete and often inaccurate, only a very elemental knowledge was necessary for the simple surgical procedures that were undertaken.

While the history of anatomy from the early centuries of the Christian era onward shows little advance until the sixteenth century, nevertheless the intervening period was by no means barren of development.

The Arabians preserved intact the surgery of the ancient world. Much of the medical lore of the time is recorded by them. In the Arabian Nights we have accounts of medical and surgical procedures as well as anatomical descriptions. No doubt Arabian literature of the time was tinctured by the doctrines of Greek and Roman authors whose writings have been translated into Arabic. The best known medical writer among the Arabs was Avicenna (980-1036). "The Canon of Medicine", a voluminous work, contains details of medical and surgical knowledge interwoven with much philosophical argument.⁹

Various surgical procedures are described. In trophining, the sutures must be left untouched because they "are believed to be the patients' destiny written by the hand of Allah"¹⁰.

10. Ibid, p. 233

There was much of mysticism revealed in his teaching.

No advance was made by the Arabs in anatomy because of the religious prejudice against dissecting the human body.

Avicenna were translated into Gaelic. The Scots kept well abreast of medical progress; even at the time of the Roman occupation of Britain we read of surgical procedures such as amputations and operations for hernia and cataract. 11.

When St. Columba established the monastery of Iona in Hebrides in 563, a "hospitium" was provided for guests and sick folk. Here various remedies were used to effect the cure of disease of injuries.12.

The school of Salerno founded in the seventh century was the first medical school to be established in Europe. In the early part of the thirteenth century Roger of Parma and Roland of Parma both attained eminence as surgeons in that school, where many wounded crusaders were treated.13.

At Bologna in the fourteenth century Mondino taught anatomy, but he copied Galen in many particulars. He also described certain surgical procedures. Thus in describing the anatomy of the peritoneum in his "Anatomia" he makes reference to the treatment of wounds in the small intestine.14. He says these wounds will not stand suturing, and on that account it is better

11. Robinson, Pathfinders in Medicine, N.Y. 1929, p. 133.

12. Ibid. p. 234.

13. Encyclopedia Americana, Vol. 15, first edition.

14. The Canadian Magazine, Vol. LXXX pp. 17-18.

that the lips of the wound should be held in contact by means of the heads of large ants in the following manner; the lips of the wound in the intestine should be brought together by the hands while large ants are caused to bite the conjoined lips of the wound in the intestine, then cut off the head forthwith; continue this until the lips are brought together; and then put back the intestine.¹⁵ In the light of our present day knowledge we might safely assume that the mortality in such operations was high!

The influence of increased interest in anatomy stimulated by Mondino and his pupils had its effect on surgical progress. Guy de Chauliac (1300-1370) who studied at Paris and Bologna is accounted as the greatest surgeon of the fourteenth century. The "Chirurgia" was published in 1363. He taught that cancer should be treated at an early stage by excision with the knife. He was a good anatomist, and he applied his knowledge to surgical problems.¹⁶

The authority of Galen and Avicenna remained supreme until the sixteenth century, when some bold spirits, discovering certain erroneous doctrines, ruthlessly overthrew the authority of these ancients. Occasionally the heretical spirit exhibited much impetience and controverted ancient authority with extreme vigor.

In June, 1527, in Basel, Switzerland, the day before the

15. Ibid, p. 18.

16. Ibid, p. 19.

Feast of St. John, which the students of the University were to celebrate by a large bonfire in the public square, the following notice in large letters appeared on the door of the city hall: "The famous Doctor Paracelsus, City Physician, will speak at High Noon tomorrow in the Town Square upon the New and Marvelous Light of Medicine. He will also touch upon the Ignorance, the Avarice and the strutting Vanity of the Doctors of Basel". Exactl at noon Paracellsus appeared. He was dressed in a sweeping black silk robe trimmed with red. His hat was black and gold. He wore a long sword and carried an ebony staff. Behind him walked a page carrying two large books bound in leather. For a moment he faced the crowd in silence, then strutted up and down the platform, sweeping the flagstones with his robe, showing off his staff, his sword, and his regal stride. Then he stopped, tore off his hat and threw it savagely into the audience, slammed his sword on the pavement, broke his staff over his knee, stripped off his robe, rolled it into a crumpled ball, and sent it after his hat. He advanced towards the crowd bareheaded, in a plain gray jacket, sleeves rolled up to the elbows. "Thus." he screamed, "should a doctor appear before his patient--to cure by knowledge, not by fine clothes; by science, not by gold rings and jewels." He motioned to the page who handed him one of the books. With a furious gesture, Paracelsus tore it in two and threw it in the furnace. It blazed up in a burst of yellow flame and black smoke. "That was Galen," he shouted.

The second book followed, and a second burst of flames rose up. "That was Avicenna," shrieked the heretic doctor. "Old bloodless words. Vain mountings of ignorance. Latin sounds meaning nothing. From these books your doctors get their Latin for diseases they know nothing about, and their Greek for diseases they never heard of. Grey-bearded frauds, old wormy moth-eaten sophists, lousy pretenders with their fine clothes, their long steps, their Latin to hide their ignorance. They cling to the rich like leeches and let the poor die like flies. They make a disease of nothing but a pain in the belly from eating too much. Their cures are worse than the illness. They burn the flesh with hot irons, give black draughts which tear at the bowels. Their plasters raise blisters as thick as a hand. Then they go back to their snug studies, thumb over Hippocrates, that old Greek; and Galen, that old Roman, and count the golden coins they've stolen from our pockets."

The universities do not teach all things, so a doctor must seek out old wives, gypsies, sorcerers, wandering tribes, old robbers, and such outlaws, and take lessons from them. He was appointed town physician at Basel and lecturer in medicine in the University; he also superintended the town apothecaries. He invited not only medical students, but barbers, bath-men and all the citizens to attend his lectures. He made many enemies and was threatened with assassination.¹⁷.

17. The Canadian Magazine, op. cit. p. 44.

Vesalius (1514-1564) was born in Brussels and pursued his studies in Paris and Vienna.¹⁸ At the age of twenty-two we find him demonstrating in Padua, where he held the chair of surgery and anatomy for five years. Subsequently he taught in Bologna and Pisa. He became imperial physician to the court of Charles V of Spain and afterwards to the son of that monarch, Philip II.

He was the first author of a comprehensive and systematic treatise on human anatomy. He, like Paracelsus, ruthlessly challenged the authority of Galen that had been held sacred for fourteen centuries, correcting many of Galen's errors. His old master Sylvius, who is described as a man of coarse language and manners, with varied learning and considerable eloquence, turned upon him and denounced him as "an impious madman who is poisoning the air of all Europe with his vapourings".²⁰ At one time Sylvius, when bound to admit that Vesalius had possibly discovered errors in Galen's teaching, remarked that if Vesalius were right the anatomy of man must have changed since Galen's time!²¹

Prior to the time of Vesalius there was little opportunity for the dissection of the human body, and when it did occur and was legalized the actual dissection was carried out with

18. Ibid, p. 44f.

19. Ibid, p. 46f.

20. Virchow, Recent Advances in Science & Their Bearing on Surgery, p. 360

an elaborate ceremonial. The subjects were executed criminals. Invitations were sent to the city officials and other prominent persons. The dissection was carried out by a servant while the physician stood aside and read Galen pointing with a wand to the various structures mentioned in the text. A concert, banquet, or theatrical performance followed, and the body was buried.²²

Leonardo da Vinci died at the age of sixty-seven, nine years after the birth of Vesalius.²³ His activities embraced painting, sculpture, architecture, engineering, and mechanics; also botany, mathematics, astronomy and anatomy. We are interested in him here because of his contribution to anatomy. He was influenced by ancient authority, accepting many of Galen's views. He probably learned these indirectly through the "Canon of Avicenna" that was a favorite text book in his day. His writings contain physiological as well as anatomical data. "As an artist he was interested in function...each organ was believed to be designed and created for a special purpose." Both Leonardo da Vinci and Michael Angelo, his contemporary, studied anatomy from dissection of the human body.

Servetus (1499-1553), a contemporary of Vesalius, described the blood as passing from one side of the heart to the other

21. Walsh, Medical Profession for 6,000 yrs.N.Y., p.523.

22. Garrison, Introduction to Medical History, Philadelphia, p. 156.

23. The Canadian Magazine, Primrose, op. cit. pp.48.

through the lungs.²⁴ This was remarkable observation at the time, in reality suggesting the circulation of the blood which was discovered by Harvey a century later. It was at variance with Galenic tradition and was considered heretical. Servetus was also a religious controversialist, and falling foul of Calvin he was imprisoned, condemned to death and burned at the stake; his writings were confiscated. Columbus in 1559 announced a similar discovery of the pulmonary circulation. Harvey acknowledges his indebtedness to him.²⁵

Eustachius and Fallopius, two famous anatomists of the time, are names well known to the medical student of today because they occur in anatomical nomenclature in "the fallopian tubes" and "the eustachian tube".

Ambroise Pare (1510-1590), a picturesque figure of the sixteenth century, began life as an apprentice to a barber-surgeon in Paris. He was also a pupil at the Hotel Dieu.²⁶ He studied anatomy under Sylvius and became this prosector, but his main claim for recognition is as an army surgeon. He published surgical treatise of various descriptions, but of special interest is his detailed account of clinical cases. A successful case history would end with the quaint recognition of the vis medicatrix naturae--"I dressed him, God healed him."²⁷ His book on monsters shows that he was not free from super-

24. Haggard, Vital Role of Med. in History of Civil N.Y. p.632.

25. Ibid., p. 633

26. Singer, From Magic to Science, N.Y. p. 445.

27. Ibid., p. 445.

stitution. Gunshot wounds were treated by simply bandaging, and the application of a ligature to stop hemorrhage. He believed in providing drainage for infected wounds.

Thomas Vicary wrote a treatise on anatomy in 1577.²⁸ It became popular and was entitled "The Englishmens' Treasure". In it he enumerates the qualities of a good surgeon: "All authors do agree that a good chirurgian should be chosen by his complexion and that his complexion be very temperate, and all his members well proportioned. For Rasis says 'Whose face is not seemly it is impossible for him to have good manners.' And principally it is necessary that he be a good liver and a keeper of the holy commandments of God, of whom cometh all cunning and grace...."²⁹ He further stipulates that he should be learned, expert, ingenicus, and well mannered. "Hhe must know the anatomie..." With these characteristics as a background surgery advanced up to its present position as an art in science and in anatomy.³⁰

28. Ibid., p. 462.

29. Osler, Evolution of Medicine, New Haven, p. 163.

30. Ibid., p. 168.

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OUTLINE

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2. Special divisions.

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C. Prevalence today.

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V. Conclusions.

Cancer Research

Thesis: I have endeavored to give a short history of cancer, ancient and modern methods of treatment, and the hope which we in the medical profession have for future control.

Cancer is a mysterious, terrifying word to the majority of so called educated people of the world. There is no reason why this should be so. Many do not even know a simple definition for cancer. A definition in itself is not very enlightening, but the possibilities for further knowledge that it opens up are unlimited. The definition in the American Pocket Medical Dictionary is, "A malignant tumor made up chiefly of epithelial cells." It then goes on to give "fractional" definitions. The words in the definition alone are enough to arouse your curiosity. What do malignant, epithelial, hepatic, encephaloid, scirrhous and many more words in the definition mean? If you really wish to know, and will look them up, also all the "see's", you will very soon have some knowledge of cancer. Not enough knowledge, perhaps, to speak at length, give advice about, or diagnose, but enough to put you at your ease and let you say an occasional word or so in any "cancerous" discussion. Also if you hear Mrs. So and So say, "Well, I know cancer is inherited and such and such a thing causes cancer, because I have a friend who has a friend whose three aunts, two uncles and grandfather and grandmother all died of cancer. It was caused by a similar injury in each case, etc., etc. Mrs. So and So has a constant pain in her side, but she refuses to go to the doctor because she knows it's cancer and he can not do anything for her," you can perhaps do a little good toward prevention by

explaining that it is not hereditary, not caused by injury, etc., as this information is found in the dictionary along with much more.

Cancer is divided into three main divisions, according to the type of tissue it attacks. Carcinomata are made up of connective tissue and glands. Sarcomata attack muscles, tendons, fibrous tissue and bones; epitheliomata are composed of skin or epithelial tissue. 1

Under these three main divisions come many minor or sub-divisions. These are classified, mostly, according to the organ or part of the body that they attack.

Teratoma, cancer of the Ovary, is believed to be made up of embryonic tissue whose growth was somehow retarded before birth. If growth continued, there would have been a twin, identical, to the recipient of the teratoma, in every respect. Encephaloma is a soft cancer of brain-like consistency which attacks almost any part of the body. The name is taken from cephalus, meaning head or brain. Hypernephrona, cancer of the kidney. Mellanoma, cancer coming from pigmented moles. Sometimes, instead of having an "Oma" name, it is simply called cancer of, for example, Cervix uteri. There is, as far as I know, no set rule for naming them.

Cancer has been known to man for many centuries. 2 We know from records that in Egypt 3000 years ago cancer was fairly prevalent, many dying from it each year. Little was known about the disease either as to cause or cure. Everything that was possible, at the time was done for the patients comfort, but to our knowledge nothing was done to ascertain the cause or cure.

1. Britannica, 14th edition. Vol. 4, p. 731.

2. Wood, F. C., Literary Digest, Sept., 16, 1933, p. 17.

Today cancer is one of our most prevalent and discouraging diseases. Statistics show that there is more cancer today than in 1913. In 1913 there were 35,845 deaths from cancer of stomach, skin, tongue and mouth while in 1927 there were almost 90,000 deaths from cancer. These four kinds, however, included over half of the total number.

This would seem to indicate an increase in the occurrence, but medical science is inclined to believe otherwise. Their contention is that with increased knowledge of diagnostics and improved methods of diagnosing, more diseases are brought to light, and also that people are no longer so much afraid of it as they were, and are reporting more cases. This argues well for the cause of cancer.

The occurrence of cancer can be roughly divided into four main headings.

Age is one of the most important factors in cancer. It is not a child's disease, as is thought by many. Although some children do have it, it is very rare. Before the age of thirty-five there is very little cancer, but between thirty-five and sixty-five most of the cases occur, and it is much more prevalent in women than in men. After sixty-five is reached the occurrence drops rapidly until seventy-five; from seventy-five to ninety almost none, after ninety there have been no reported cases. 2

When I say there is no cancer after ninety or very little between seventy-five and ninety, I do not mean that no people over ninety have cancer, but that none over ninety ever develop it after they reach that age. Similarly, few develop cancer between seventy-five and ninety.

1. Americana, Vol. 5, p. 490-3, 1928, U.S. Public Health Service pamphlet of Statistics.
2. Americana, Op. Cit., p. 490-3.

Sex also is an important factor. Men between the ages of thirty-five and forty-five have only one third as much cancer as women of the same ages; between fifty-five and sixty-five they have about sixty-five per cent as much as women of the same ages. In old age more men are afflicted with it than are women. In women the menopause has much, ^{it} is believed, to do with cancer. During this time, usually between forty and fifty years, most of the cancer of the breast and uterus appears, these being the most common cancers of women.

To say a word for the ~~women~~, men have much more cancer of the lip, tongue, and stomach than do women. In fact they are almost unknown in women, only about one per cent as many women have cancer of these organs as do the total number of men. These three cancers are the cause of almost seventy-five per cent of the deaths of men from cancer. 1

Just as an interesting sidelight, occupation has some effect on whether you do or do not have the disease. In England between 1890-92, sixty-seven out of every 1000 clergymen, and 265 per 1000 chimney-sweeps died of cancer. Perhaps God does protect those who live closest to him, who knows?

For some strange reason the Negro, Japanese, and Chinese are less afflicted with cancer than the white race; the North-European states less than the tropics or South America. For example in England out of every 100,000 women, 18.0% die of cancer of the breast, while in Japan only 1.8% of this number die of the same cause.

The organism attacked also has something to do with the death rate. In 1913, 30,205 died from cancer of the stomach; 3,007 from tongue and mouth; and 2,625 from cancer of skin.

1. Americana, Op. Cit. p. 490-3.

There are several things thought to be cause of cancer, but they all come more or less under two main theories. The least important of them is that of Dr. Cohenheim, 1880. 1

Cohenheim contends that cancer is due to embryological remnants included in the tissue, owing to some slight error in development. As yet there is not much to support this theory other than that of teratoma.

Dr. Virchow contends that cancer is due to chronic irritation, and there is much to support this belief. 2 We know of many precancerous conditions which are nothing more or less than chronic irritation. Pigmented moles often develop into ^{melanotic} ~~melantic~~ sarcoma, due to efforts to remove them. Senile keratosis which is harsh, dry skin of the elderly, often develops into cancer of the skin, because of the constant irritation of it peeling off and reforming.

Chronic ulcers and fissures of the skin due to old scars from burns, cuts, Roentgen burns, upon healing, cause ~~the~~ irritation. The always moist skin, from supperation or bleeding, will, eventually, become cancer.

Gallstones, another fairly common disease, if not removed or properly taken care of in time, may help to form cancer of the gall bladder as some adjacent organ because of the constant irritation caused by the rubbing and rolling around.

It has been estimated that, of all cases of cancer of the stomach, seventy-five per cent have had a history of stomach ulcers, and that in people over ^{forty} ~~eighty~~ who develop gastric ulcers it leads almost 100% of the time to cancer. 3

1. Britannica, Op. Cit., p. 731.

2. Ibid, p. 731.

3. American Medical Association, p. 20-23.

Two of the common contributing factors to cancer of the cervix uteri are erosions and lacerations from childbirth. The women either did not know they were injured, or neglected to have the injury repaired by a competent surgeon. Now, all lacerations and tears that can possibly be repaired at childbirth are attended to. However many do not show up until sometime after partuition has taken place; therefore, it is advisable for all women to be examined by their physician not later than six months after bearing a child.

Cancer of the mouth, lip or tongue is often preceeded by ill-fitting plates, jagged teeth, tobacco chewing or syphilis. Syphilis is one of the most irritating diseases to tissues that we know. These cancers are almost unknown to white women, but in the Phillippines and Ceylon where Betel-nut chewing is a popular pastime, cancer of the mouth frequently develops. The people often leave a piece of the nut in their cheeks for days at a time. The irritation along with the unhygienic mouth is almost sure to cause cancer.

Involution changes of a physiological nature, such as senile atrophy of male and female reproductive organs, have been known to preceed cancer of these same organs. In fact ten to twenty-five per cent of the cancer of breast and prostate glands have been definitely proved to have been preceeded by this. 1

The civil state of men and women, also, are predisposing to some extent. Irritations from intercourse and pregnancies with resulting lacerations and instrument injuries are decidedly a contributing factor in cancer of the uterus, married women having much more that unmarried. The abeyance of normal functions and

1. Ibid., p. 20-23.

the resulting occurrence of chronic mastitis supports the view of chronic irritation. More evidence to support this view is Dr. Bagg's experiment on mice. 1

Dr. Bagg is convinced that stagnation and decomposition of the breast secretions are the predisposing causes of breast cancer. His experiments have included the following. Mother mice which were prevented from suckling several litters developed cancer more ^{quickly} frequently than those who ^{were allowed to suckle alternating} did not suckle any; when ^{litters: they developed cancer more quickly than those who} he tied the breast on one side to prevent normal drainage, cancer developed quickly every time, while only one or two cases occurred in the untied side.

Human breast cancer, according to Dr. Adair of Cornell, is preceded in a large percentage of cases by abnormal activity due to various causes. It is not known definitely as yet to be a contributing factor, but is thought that excessive masturbation or over-indulgence in sexual intercourse may be a factor in causing cancer of the penis in the male. As this is a fairly rare occurrence, not much research on it has yet been done.

Blows and injuries are not the cause of cancer, although many lay people believe this. Thorough investigation shows that cancer was there before the injury occurred, but was lying dormant, and the injury only stimulated it to increased activity.

Chronic leg ulcers, no matter how irritating they are, seldom lead to cancer. Why, no one knows. As long as this is true it must not be the irritation alone that causes the cancer, but perhaps some peculiar personal quality must be present.

1. Science, Jan. 8, 1926, p. 12.

Exclusive diagnostic symptoms. What are they. No one knows as yet, but we do now some symptoms that occur frequently in cancer. Some of the, what we believe to be general symptoms, which, if they should occur to you, would warrant a medical examination by a competent physician are: Any lumps which occur in the body which do not disappear after a reasonable time, say three or four weeks; a discharge or bleeding from any body orifice which occurs frequently or steadily; a sore which does not heal quickly and cleanly and any change in warts or moles. 1

I do not mean that if these things happen to you that you have cancer, or that if they do not occur you have no cancer, but that they may be signs of cancer.

A few of what we believe to be more specific symptoms are: Breast cancer, retraction of the nipple, hard or soft irreducible lumps, blood tinged discharge and stabbing pains. Pain in any type of cancer usually comes after the cancer has progressed to a fairly advanced stage, and is due to pressure on exposed nerves.

Hemorrhage, alteration of feces, and mucosal discharge often are present in cancer of the rectum, while pain in the lower back, hemorrhage without, or between menstruation, and bloody foul smelling discharge often accompany cancer of the uterus or female organ. Cancer of the prostate, which is very common, is often heralded by difficult micturition and defecation, but seldom by hematuria.

Ancient peoples, as I have said before, had no cure for cancer. As usual, there were quacks who said they had cures, but they consisted of nothing more or less than rubbing ointment into the cancer, in cantation and propitiation.

No doubt these did much to relieve the mind but we have no evidence that they did anything else. This is just supposition,

but perhaps their ointments did contain some local anesthesia which they didn't understand. However, as long as it relieved the pain they were content to let it go at that.

These methods of treatment prevailed, so far as we know, with very little variation up until the discovery of the microscope by Antony Leeuonhoek. If the early Romans, Jews, or the Greeks had any method of treatment, succesful or unsuccesful, I have found no record of it.

Leeuenhoek's discovery did not immediately revolutionize the treatment of cancer. On the contrary, it was some time before much was done, but the microscope did enable them to view the tissue, to classify the different kinds and do some experimenting. By the time Lister and his antiseptic surgery came into being it was possible to operate without supperation and to do a fairly succesful job of removing cancerous tissue.

Although here too, cancer treatment received a set-back. The methods of diagnosing were so poor that cancer was not discovered until the advanced stages and then, as now, it was too late to do any successful surgery. So things were once again *at* a comparative standstill.

It was not until almost the beginning of the twentieth century that any more progress was made, and from then on until now we have progressed rapidly in cure, treatment and control.

1897. An auspicious year for cancer. Madame Curie discovered radium in that year. And today all the medical profession thank God sincerely that she did make this discovery. For radium is now one of our best methods of treatment and cure.

1. Hygeiea. Aug. 32. pp 700-702.

It is used both before and after operation. Before, to get the cancer in operable condition. Many cancers that were thought to be inoperable have been cured by Radium treatment followed by operation, and then more radium. The radiation of the radium actually kills the malignant cells. After as much radium as possible is used, without endangering the patients life, surgery is resorted to if possible.

Radium is used either directly or indirectly. When it is used directly it must be a cancer that is accessible to direct treatment. Radium is placed in or on the cancer and allowed to remain from one to twelve hours, then removed. This action is repeated as often as thought necessary until the cancer is cured or growth stopped.

Indirect use of radium involves placing the needles of radium, so many MGM per square inch, in a silver or rubber case and putting it as close to the afflicted spot as possible. This is left in place from one to twenty-four hours, depending on the type, seriousness, etc. of the cancer.

Radium after surgery is used to check metastases, if possible, and to insure that all the malignant cells are removed or killed. Radium radiation effects extend over a wide area, from actual destruction of the entire cancer, a cure, to merely retarding the growth. These cancer most susceptible to radium radiation are lymphomas, lympho-sarcoma, and giant celled sarcoma of bone.

Radium radiation is much more effective on superficial, non-metastasizing type of cancer than on internal metastasizing type.

Radiation gives relief from pains and comparative comfort even though cure is not possible.

X-Rays are also important in treatment of cancer. Unlike

radium they are as effective on internal as external cancers. But, however, unlike radium, the only cure is in an early stage. Usually, however, X-Rays only retard or prohibit growth. They are used in much the same way as radium. A series of treatment, not more than twelve, are given extending over a five or six months period. At the end of this time treatment is discontinued for ~~X-Rays~~ from twelve to eighteen months. If then, there are any signs of it recurring or increasing in size the treatments are continued.

X-Ray again like radium, prolongs life without pain and facilitates movement of the part afflicted.

The most effective and lasting curative device, however, is surgery. Surgery is effective if, and here the Law of Relativity steps in, the cancer is procured in its early stages.

When surgery is resorted to you have to remove the whole of the cancer or it will do no good. Even one or two tiny cancer cells left in the body will form a new one. This is why it should be operated on early if possible. The longer you let it go the bigger it gets. In time it will metastasize to some other organ. And, after all, even the most proficient surgeons cannot remove the major portions of your body and hope to keep you alive. Therefore, while it is still attacking only one organ and is small you must get it all out or surgery is ineffective.

On the other hand, even if the cancer is too far advanced to completely remove it by radical operation, the wise thing to do is operate anyhow and follow it up with X-rays or radium, or perhaps both. Your life will not only be prolonged, but will be much more comfortable and painless.

There is still another treatment and perhaps a cure for cancer. It has not ^{yet} been ~~yet~~ absolutely proven to be a cure. Professor Blair Bell of London is conducting some highly satisfactory experiments in the lead treatment, as it is called. ¹ It is really a fairly simple treatment consisting of a number of injections of collodial lead. After much experimenting a lead has been found that is not injurious to the healthy tissue. Since 1920, Prof. Bell has had some 227 apparently hopeless cases. From this number thirty have been cured. At least they have not been back with a recurrence; ten have had growth arrested; and nine have greatly improved. Prof. Bell does not hesitate to use X-Ray or Radium as an auxiliary treatment if it is necessary. From the above results it would seem to be highly satisfactory, but let us not put too much faith into it until time and more results have proven it to be a satisfactory cure. We can only hope for the best.

During 1933 there were two important and interesting discoveries made. The first, by Prof. Wm. Woglum, is that rats will produce a substance that will cure tumors grafted on them. If this can be isolated and tested it may lead to the production of some hormone in the animals which, if injected into humans will cure them.

The second is the production of two synthetic substances which rapidly produce cancer. This will be a great help in studying the growth of cancer in its early stages, and enable us to see the cells take on their malignant character. So far this has been an impossibility, both in humans and in animals.

1. Science, April 16, 1926. p. 10.

The control of cancer is much within our power. The main method of control is through education. Education of both lay people, and the members of the medical profession.

The main methods of education of the public lie in self-education. By self-education I mean interest in the subject. Every year there are many pamphlets printed, editorials and newspaper articles written about cancer. We no longer live in the dark ages. The body is no mysterious thing, never to be thought of, then why not read some of these articles? Why not go to some of the numerous lectures and discussions about cancer that are held so frequently? Go to your doctor and have him talk to you about it. At your next Ladies Aid meeting, have somebody deliver an paper on the subject of cancer. There are any number of ways in which you can learn if you so desire.

Medical men can learn in the same way. If they all read their Medical Journal, attend their State Med. Ass'. meetings give heed to the material sent them by the American Society for the Control of Cancer, as well as numerous other things, they would be more competent in diagnosing the disease. Many of our doctors are unable to diagnose cancer today, but they can, and will, send you to a specialist if they are unable to find out what is wrong with you. Every one knows the old adage: "An ounce of prevention is worth a pound of cure". In the case of cancer an ounce is worth several pounds.

Marion Castle, in Hygeiea for Aug. 1932, gives three things which, if followed to the letter, would, I am convinces, rid the world of cancer in a short time. They are: (1) "Stop whispering; (2) See your doctor for a thorough examination once a year; and (3) Avoid any miraculous and easy cures. Invest all your legacy

in Peruvian oil wells, if you like. Select your mate by means of matrimonial agencies. Consult an astrologer about your business deals. Trust your souls salvation to yogis, swamis, or what-nots. But go to a good doctor for your bodies sake."

The American Society for the control of Cancer has an endowment of \$1,126,959.03 in pledges and cash. This money is all in trust with the U.S. Mortgage and Trust company. This money is to be used as they see fit, for education, research, etc. Every ten years a committee is appointed to see if it is necessary to carry on the work. If at any time it is not necessary, the money will be turned over to other health projects.

They have a three-fold plan: To instruct the public; work with health departments; and to work with the organized medical profession.

The aim of the society is to improve the medical service available for prevention and cure; give to the public facts known about prevention, symptoms, and treatment, and to help establish clinics and consultation services in large hospitals which will be available both to the rich and the poor.

The society has a field organization which seeks to find new methods for public instruction. It has been found that the newspaper is the most valuable and the radio next, closely followed by pamphlets and handbooks. The representatives go to schools and business womens clubs, and mens clubs to give lectures. These lectures are open to the public and are fast becoming a popular means of education.

Every month "Campaign Motes", a small magazine is sent to all Doctors and fourth year medical students, and at the end of the year a bound volume called "Cancer Control" is published. This book has special sections devoted to gynecology, obstetrics, surgery, etc. Thus the society is doing every thing it can to live up to its three fold policy.

Once again, may I say that cancer is not a mysterious, uncurable disease as is thought by many, and that if people will only be educated much can be done about the cause, cure and prevention of cancer.

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