development of the race up to mankind, and I think we may in after life trace the progress of the individual through various ancestors more and more slowly as he advances in years. In infancy and childhood we frequently notice how rapidly the features change, and friends will say at one visit how like the child is to some member of his father's family, while a week or two after they will notice a resemblance to someone of his mother's family. If this Society can gather together notes as to whether an individual presenting an unwonted reaction to medicine happens to resemble at the time someone either of his father's or his mother's family who had a similar peculiarity, a great step might be made. This, however, is not all. We have next to try to trace why medicines act differently upon different families. It is just possible that this also is a case of reversion to a very far-off period; indeed, before mankind had even reached the level of the monkey. Some years ago it occurred to me that one might possibly gain some information regarding the peculiar differences in the action of drugs on gouty and other individuals by comparing the effects of certain poisons or remedies upon such animals as rabbits, which excrete their nitrogenous waste in the form of urea, and pigeons, which excrete it in the form of solid urates. Now Weir Mitchell had shown that pigeons had a singular power of resistance to the action of opium, and can take large quantities of it without presenting any symptoms of narcosis. Dr. Cash and I made some experiments upon the subject, and we found that opium in moderate doses appeared to have almost no action upon pigeons, yet on examining more closely we found that it had a very marked action, only it did not produce sopor, but caused the temperature to fall greatly. Instead of acting as a narcotic it acted as an antipyretic. We did not try the converse of this by giving antipyretics such as antipyrin to pigeons and seeing whether they acted as soporifics, but in patients we certainly do find that occasionally, as in acute inflammation, opium seems to have an antipyretic action, whereas antipyrin certainly acts at other times like a soporific. In order to track these actions further back still and find out what changes in the circulation, blood, nerve cells, and nerve fibres the action of these various drugs depends, a large amount of experimental work in laboratories is required.

Until lately there has been no opportunity for young men generally to do such work in this country, and those who wished to undertake it were obliged to go abroad. Now, however, owing to the wise action of the Colleges of Physicians and Surgeons, opportunities are being afforded for such investigations; but all such researches will give only one side of the subject, and will remain valueless unless clinical observation can be brought to bear at the same time on therapeutic studies. The members of this Society, by the fact that they have founded it, have shown their desire to forward the progress of medicine. I have to-night tried, in a very imperfect way indeed, to consider some of the methods by which I have thought their objects might be to some extent attained; and even if I should have failed to show you how to work, this evening may not have been uselessly spent if I have succeeded in directing your attention to the search after methods of attaining the objects which we all have at heart—that of securing health and ease to our patients with quickness and certainty.

AN INFECTIOUS DISEASE HOSPITAL FOR ST. ALBANS.—At a recent special meeting of the St. Albans City Council, it was announced that Mr. J. Blundell Maple, M.P., was willing to erect, on a site already selected, a hospital for infectious diseases, to be called the "Sisters' Hospital," at an expense of £6000, to be presented to the St. Albans Corporation on behalf of the city and neighbourhood. Mr. Maple has also promised to present a recreation ground and people's park to the city.

AYR COUNTY HOSPITAL.—The utility of this institution has been again exemplified by the extended area of the benefits it has bestowed during the past year. The hospital has been more taken advantage of than in any previous year of its existence, the marked feature being a greater number of cases from outlying districts. The total ordinary income and expenditure respectively during the year were £1728 1s. 8d. and £2169 4s. 4d., showing a deficiency of £441 2s. 8d. The endowment fund now amounts to £5922 13s. 7d.

Clinical Lectures

ON

STRICTURE OF THE ŒSOPHAGUS, WITH FOURTEEN ILLUSTRATIVE CASES, IN FOUR OF WHICH GASTROSTOMY WAS SUCCESSFULLY PERFORMED.¹

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LECTURE I.

GENTLEMEN,—Since the beginning of the present session you have had brought under your notice an unusually large number of cases illustrative of the class of disease which will occupy our attention in this and the succeeding two lectures. Diseases of the œsophagus leading to more or less complete stricture are not as a rule met with in considerable numbers even in our large hospitals, therefore it is the more remarkable that during the last three months you have seen so many cases in which the patients suffered from marked dysphagia as a consequence of disease of the gullet, or from pressure upon that canal. Most of these cases were sent to me by their medical attendants, while others came to the out-door department of their own accord, and simply complained of difficulty in swallowing, together with weakness, as a result of inability to take a proper amount of nourishment. In all the cases brought before you the most prominent symptom was difficulty or impossibility of swallowing food.

When we were studying the general symptomatology of diseases of the throat, your attention was directed to various conditions which may manifest themselves by difficulty or even impossibility in swallowing food. Hence various terms are employed to designate the character or degree of obstruction to the passage of food. When swallowing is painful, the patient is said to be suffering from odynphagia, as, for example, in inflammation of the œsophagus resulting from the action of corrosive agents. On the other hand, when the lesion is of a chronic character, such as cicatricial stricture or the pressure of tumours upon the gullet, the patient may suffer comparatively little pain, while the obstruction to swallowing is great. To this condition the term dysphagia is applied. Again, should the obstruction be complete, as in Cases 3, 4, and 7, the patient is said to be suffering from aphagia. Besides stricture of the gullet properly so called, the lesions which give rise to œsophageal dysphagia are numerous and varied; but as most of them will require to be referred to when we come to consider the question of diagnosis, I will simply enumerate them at present. Congenital malformations and the impaction of foreign bodies in the gullet very seldom give rise to much difficulty in diagnosis, but it is otherwise in those cases of aneurysm of the aorta, mediastinal tumour, enlarged lymphatic glands, exostosis or curvature of the spine, which, by pressure upon, or by causing distortion of, the œsophagus, may lead to serious difficulty in swallowing. The cases of aneurysm of the transverse arch of the aorta causing pressure on the gullet at the level of the bifurcation of the trachea are perhaps the most important.

Using the term "stricture of the œsophagus" in its proper sense, it may be divided into four varieties—viz., malignant stricture, obstruction by benign tumours, organic stricture, and spasmodic stricture. We will now consider these diseases in detail, and afterwards discuss the questions of prognosis and treatment. Two forms of malignant disease attack the œsophagus—the carcinomata, which are very common and usually occur as primary lesions, and the sarcomata, which are rarely met with in the gullet unless as secondary to sarcomatous formations in other parts. Carcinoma is by far the most important and also the most common new formation met with in the gullet; and it appears that any part of the tube may

¹ Selected from a course of lectures delivered during the winter session 1890-91 at the Royal Infirmary, Glasgow.

be attacked, although there are certain points which are more liable to the disease than others. Taking, for example, the seven cases of cancer of the oesophagus which have come under our notice this session, it was observed that in two the tumour occupied that portion of the oesophagus situated behind the larynx; in other two the stricture was found to be on a level with the bifurcation of the trachea, while in three the cancerous growth attacked the gullet at its lower extremity. There is considerable difference of opinion as to the most common situation of the primary disease. Some observers assert that the lower third is the most frequent seat,² while Mackenzie³ and others assign 44 per cent. of cases to the upper third, and say that only 22 per cent. occupy the lower third.

As far as my own experience goes, it appears that the most common spot to find the primary growth, at least as far as can be discovered during life, is immediately behind the cricoid cartilage, and that the next point most liable to attack is at the level of the bifurcation of the trachea. Statistics derived from the inspection of pathological reports do not afford very reliable data; because in such instances the disease is not observed at its onset, but after it has terminated the life of the individual and extended far beyond its primary focus. Even in cases examined during the early stage of the disease it is difficult to ascertain the precise limits of the lesion; all we can learn is the highest point of obstruction, unless in those rare cases in which the oesophagoscope may be employed. From a clinical point of view, the most important fact is that carcinoma of the oesophagus very frequently is situated, and may cause obstruction, at the level of the bifurcation of the trachea—namely, at a part where the gullet is likely to be pressed upon by a mediastinal tumour, or by an aneurysm of the arch of the aorta. As a matter of interest, I have contrasted a number of tables drawn up to prove the part most liable to attack; but the discrepancy between them is so remarkable that the value of individual tables is by no means high. For practical purposes we must, however, consider carcinomatous disease in reference to the situation of the tumour. When situated high up and of small size, the tumour possibly may be removed by oesophagectomy, or oesophagostomy may be performed, while if large in size the neoplasm may cause obstruction to respiration and demand tracheotomy. Again, when the tumour is situated at the bifurcation of the trachea, great care must be taken in the employment of bougies, on account of the danger of causing injury to the trachea or aorta, and at the same time, before adopting any line of treatment, the possibility of the obstruction being due to an aneurysm must be eliminated.

We now come to consider the etiology of carcinoma of the gullet. We know just as much and as little regarding the causation of tumours in this situation as in other parts of the body. The two important predisposing causes are sex and age; we will leave out of account the question of heredity. Some observers, however, attach considerable importance to heredity as a cause of malignant disease, but to my mind the influence of inheritance in the production of malignant disease has not been proved, as it has been, for example, in such diseases as hæmophilia, Daltonism, and diabetes insipidus.

Age is a most important factor. Of 510 recorded cases, the ages of which I have ascertained, 80 per cent. were between the ages of forty and seventy years, 12 per cent. were below forty, and 8 per cent. above seventy. Again, on examining more carefully into those between the ages of forty and seventy, nearly a half (or 40 per cent. of the 510 cases) were found to be between forty-five and fifty-five years of age. In considering the influence of age it must always be remembered that each decennial period does not contain the same number of individuals; so that, to be quite accurate in our calculation, it would be necessary to estimate the percentages with the fact in view that each decennium as it advances contains fewer individuals.

Another circumstance which must have attracted your attention is that out of the seven cases shown to you only one was a woman. One in seven is, however, a little below the general average. Of the 510 cases referred to already, 108 were women and 407 were men, and of all the cases which have come under my own observation only 10 per cent. were women. For practical purposes it may be said

that four-fifths of the cases of cancer of the oesophagus occur in males. In this particular epithelioma of the oesophagus resembles the same disease as it attacks the lip, the tongue, the larynx, and the rectum. But while these parts are more liable to be attacked by malignant disease in men, in women disease of the sexual organs is disproportionately frequent. No reasonable explanation has yet been offered for this peculiarity, and it remains as one of the many facts in regard to the etiology of cancer of which we know little.

Regarding the exciting causes of cancer of the oesophagus there is only one point worthy of attention—namely, that protracted slight irritation is likely to determine the site of the primary growth. This point has been well illustrated by cases shown, in which the points of selection were—(1) The upper part of the oesophagus, where the tube becomes suddenly narrowed behind the cricoid cartilage, and where during deglutition the bolus of food is moulded into form to pass down the gullet; (2) at the point where the oesophagus passes behind the bifurcation of the trachea; and (3) where it penetrates the diaphragm, in all of which situations there is more likely to be obstruction to the passage of large morsels of food. Again, it has been observed that epithelioma of the oesophagus may follow upon simple stenosis, or upon an old cicatrix, just as we may have malignant disease planted on an old syphilitic cicatrix on the tongue, or a burn of the skin.

In many of the cases which have come under my notice the patients have told me that for a considerable time, sometimes for years, before they experienced any difficulty in swallowing, they were troubled with "indigestion and acidity," and had been falling off in general health. In instances where these symptoms existed for only weeks or months, the possibility is that the malignant disease was present from the onset, but when symptoms of gastric and oesophageal irritation have been present for years previous to any definite obstruction to swallowing, one cannot but seek an etiological relationship between the chronic inflammatory lesion and the carcinomatous growth. Is it likely that the tumour in this case, as in the more acute cases, existed from the beginning of the illness?

Passing now to the consideration of the pathology of the carcinomata of the oesophagus, we have already seen that there are certain points of selection; but while this is so any part of the tube may be attacked. When the disease is, as is usually the case, a squamous-celled epithelioma, the histological structure and mode of growth closely resemble cancer of the lip or of the larynx. A small raised, warty, or nodular tumour appears. The proliferation of cells probably takes place, in the first instance, in the deeper layers of the mucous membrane, but very soon the basement membrane is perforated and the actively increasing epithelial elements infiltrate the underlying connective tissue. The tumour may remain isolated, but as a rule it assumes an annular appearance, and soon forms a distinct obstruction to swallowing. The disease may further extend into the muscular coat, and afterwards into the adjacent parts. The central or more prominent parts of the growth may now ulcerate, and, as a consequence, at this stage the impediment to swallowing may be somewhat relieved. If death occurs at this period a deep ulcerated ring will be seen to be overlapped by the elevated edges of the upper and lower portions of the tumour. In most instances the obstruction is not entirely due to the space occupied by the tumour proper, but is increased by inflammatory induration of the connective tissue. This inflammatory new formation, together with the granulation tissue of the ulcer, contracts as the disease advances; so that while the epithelioma is being destroyed by a destructive process the calibre of the gullet is soon after reduced by the contraction of cicatricial tissue. It is therefore commonly observed that, during a certain period in the course of the disease, marked improvement may occur in swallowing (as in Cases 4 and 7), while later on dysphagia becomes more marked than at any previous time.

When examined microscopically, the squamous-celled epithelioma is usually found to be of the infiltrating form. The epithelium is seen to infiltrate and destroy the sub-mucous connective tissue by sending long processes and laminated capsules into the underlying tissue. These capsules are very characteristic of this form of epithelioma. In the aggregated form the cells take, on section, the appearance of globes, but individually they are arranged in a concentric form, like the coats of an onion. The growth is usually softer, and the connective tissue more abundant,

² Coats' Pathology, p. 713, and Petri, Berlin, 1868.

³ Diseases of the Oesophagus, p. 88.

than is observed in epithelioma of the lip or of the skin. But while the squamous-celled carcinoma is the most common growth in the gullet, other varieties of cancer are met with.

CASE 1.—For example, three years ago a patient who was under my care died from starvation, with the most marked and complete obstruction at the lower end of the oesophagus, and at the post-mortem examination a tumour was found occupying the lower three inches. The new growth uniformly infiltrated the oesophageal wall, and both its lower and upper extremities were abrupt, and the parts below the cardiac orifice were free from disease, while the mucous membrane of the gullet above the tumour was the seat of only slight inflammatory changes. There was no ulceration at any part. On transverse section the tumour was seen to occupy the whole thickness of the wall, and measured from the mucous to the outermost limit about half an inch. The lumen of the tube was so reduced that even after death it would only admit a No. 3 urethral bougie. On microscopical examination the tumour was proved to be a cylindrical-celled epithelioma, or adeno-carcinoma, similar to what is usually met with in the rectum. It presented a distinctly glandular appearance in some parts; while in others, as a consequence of active cell multiplication, the adenoid structure was not strictly preserved, and the cylindrical form of the cells was lost, except perhaps in those forming the layer next the stroma. These aggregations of epithelial cells were of considerable size, and were separated from one another by a coarse alveolar stroma, partly composed of newly formed connective tissue and partly of dissected involuntary muscular fibres. This growth closely resembled in its structure and history the destructive adenoma of the stomach, large and small intestine, and rectum. These neoplasms start in the mucosa, but soon invade the deeper layers, and are accompanied by an inflammatory connective tissue proliferation, together with the development of a large number of neoplastic tubules. These first invade the submucosa, but very soon thereafter they extend, ultimately dissect their way between the muscular bundles, and may even extend to the serous covering of the alimentary canal. In the case now under consideration the patient was starved before the growth had time to extend into the neighbouring tissues or give rise to metastasis.

Mr. H. T. Butlin,⁴ in his admirable monograph on Sarcoma and Carcinoma, refers to three cases of hard cancer or scirrhus of the gullet. He says: "The hard cancers are said to have presented a well-marked alveolar structure, and in one of them the mucous glands were thought to be the point of departure of the disease. The duration of the third case is not known, for the patient was too weak to communicate the history of his illness during the two days he was an inmate of the hospital before his death; but the duration in each of the first two cases was much longer than in the most prolonged of the cases of epithelioma. Even at the end of two years the second case does not seem to have completed its course, for neither the glands nor any of the organs were the seat of secondary growths. And in the first case, although the disease was believed, on what appeared to be sufficient grounds, to have existed for upwards of three years, only a few small nodules were found in the lungs and one small tumour in the liver, while the condition of the glands is not recorded." Three years ago I saw the last of a case very similar to the one just quoted.

CASE 2.—This patient, a man aged fifty-nine, consulted me for the first time on Nov. 1st, 1886—that is to say, about two years previous to his death, and nearly three years after the onset of the first symptoms of stricture. In other words, without the aid of an operation, the patient lived for five years with a scirrhus cancer of the oesophagus. The first symptom was difficulty in swallowing, which was observed by the patient in January, 1884. At first the dysphagia was so slight and transitory that he thought little of it, and he did not consult a medical man till November of the same year. At that time a No. 11 bougie could be passed, after which the patient experienced some relief, and he did not complain of pain, nor at any time was blood observed in the vomited matter, or in the expectoration. He could swallow fluids and semi-fluid food with ease, but frequently he had difficulty in taking such articles of diet as bread, potatoes, and meat. In the interval between Nov., 1884, and January, 1886, so far as I could learn, the symptoms, although varying in degree slightly from time to time, remained practically the same at the latter as at the former

date. Indeed he felt himself, during the early months of 1886, that he was swallowing more easily; at the same time his strength and weight improved, and a No. 15 bougie could be passed with ease. This favourable condition continued till July, when gradually but steadily the stricture became more severe, and when, in November, 1886, he consulted me, I could with difficulty pass a No. 7 bougie, and the patient was considerably emaciated. The following table of weights in pounds is very interesting, and can be relied upon:—

	1883.	1884.	1885.	1886.	1887.	1888.
January ...	—	151	144	141	132	118
March ...	—	153	142	145	134	112
May ...	156	150	142	145	127	101
July ...	—	145	140	137	128	—
September.	158	143	142	136	125	—
November.	—	143	140	132	121	—

Taking the years from May, 1883, it will be seen that during the first he lost only 6 lb., the second 8 lb., the third gained 3 lb., the fourth lost 18 lb., and in the fifth year 26 lb.; in all the loss was 55 lb. This slow development of the stricture and very gradual loss in weight is in marked contrast to what is seen in other forms of cancer; and even although the case extended over such a long period, the patient did not die from starvation, but as a consequence of secondary formations in the lung. The tumour occupied the lower fourth of the oesophagus, was almost as hard as cartilage, and both in the bronchial glands and in the liver small hard secondary formations were discovered. The nodules at the root of the lung had caused constriction of the bronchi, and very extensive and marked passive pulmonary hyperemia. We have under observation at present a man (Case 6) whom I believe to be suffering from the disease under consideration.

Soft cancer or acute carcinoma is said to be very rarely seen in any part of the oesophagus, so that the following cases are of special interest. Only one case of acute carcinoma has come under my own notice. But to show you that acute carcinoma is met with in the gullet, I refer you to a case published in the *Glasgow Medical Journal* by Dr. John Fox.⁵ I will not occupy your time by referring to the clinical history of the case, but the following is the account of the post-mortem inspection. On examination after death there was found in the middle of the oesophagus a pretty firm mass, about an inch and a half long, and almost completely closing up the passage. The oesophagus, at the part occupied by the tumour, was firmly connected with the structures at the arch of the aorta, but no ulceration of these parts had occurred. The glands at the cardiac end of the lesser curvature of the stomach were enlarged and indurated. The stomach and other organs seemed free of disease. Microscopic examination of the tumour in this case was made by Dr. Joseph Coats, and he writes "that the structure of the tumour presents the characters of medullary cancer, and not of the epithelial form, which is much more usual in the oesophagus. The glands from the neighbourhood of the stomach also present similar microscopic characters." Dr. Joseph Coats informs me that in the Western Infirmary museum he has three specimens of acute carcinoma of the oesophagus, and the patient H. C.—(Case 9), to whom I shall refer hereafter, is also suffering from this disease.

Colloid cancer may attack the oesophagus, but as a rule degenerative changes are seldom observed in malignant growths in this situation. Death of the patient from starvation usually occurs so early after the onset of the disease that little time is permitted for such retrograde metamorphosis to take place. Dr. Bristowe,⁶ however, reports one case in which the characteristic appearance of colloid cancer was shown in an instance in which the tumour invaded the lower part of the gullet and the cardiac end of the stomach, as well as formed secondary formations in the lungs and lymphatic glands. The report of the Morbid Growths Committee shows that the tumour presented the "ordinary features of colloid disease, and under the microscope the characteristic alveolar structure was observed."

In considering the diagnosis of carcinomatous disease of the gullet three points require to be considered together—(1) Is there a carcinoma in the gullet? (2) What is its situation? (3) What is its nature? These questions cannot well be discussed separately, for not only do the symptoms depend upon the precise nature of the tumour, but perhaps

⁴ Pp. 178 and 187

⁵ Vol. iv., New Series, p. 402.

⁶ Trans. Path. Soc., London, vol. xix., pages 228 and 236

even more upon its situation. In respect to situation I will therefore divide the cases which have been brought before you into three classes—(1) those in which the tumour occupied the upper part of the œsophagus; (2) cases where the growth developed at the bifurcation of the trachea; and (3) those instances in which the neoplasm was situated at the lower end of the gullet. Each of these classes may show a different history, and may present special points for consideration.

CASE 3. *Epithelioma* (?) of œsophagus at the level of the lower edge of cricoid cartilage; history of steadily increasing dysphagia during two months, terminating in complete obstruction.⁷—W. F.—, aged fifty, a labourer, was admitted into the Glasgow Royal Infirmary on Nov. 3rd, 1890, complaining of complete inability to swallow any food. The only substance which he could take by the mouth was very small quantities of brandy-and-water. He stated that two months previous to admission he experienced a feeling of tightness in the throat on swallowing dry and solid food. This tightness he referred to the region of the larynx, and stated that it had remained always present, although it varied a little in degree from time to time. This constriction, however, increased, so that three weeks ago he was only able to take soft or fluid food. He did not complain of pain. There was no history of syphilis or of injury to the gullet, nor had the patient noticed at any time blood in his sputum. On passing a No. 13 bougie a distinct obstruction was found eight inches and a half from the teeth, and this stricture was so complete that no instrument could be passed through it. On palpating the neck a hard swelling, two inches in length from above downwards, was observed, situated behind the cricoid cartilage and the trachea, but there was no enlargement of lymphatic glands or obstruction to respiration. Physical examination of the chest revealed nothing abnormal.

CASE 4. *Epithelioma of the œsophagus behind the cricoid cartilage; rapid development of dysphagia and dyspnoea, requiring gastrostomy and tracheotomy: good result.*—Mrs. C.—, aged forty-three, was admitted into the Infirmary on Dec. 23rd, 1890, complaining of an obstruction to swallowing and slight pain in the throat, which sometimes extended to the ears. On inquiring into the history of the case it appears that she has always enjoyed good health, with the exception of trivial ailments, until the beginning of November, when she complained of pain and dryness at the back of her throat. On examination her medical attendant discovered the pharynx to be deeply congested, and a small ulcer was seen a little to the left of the middle line. Under treatment the condition of the throat improved, the ulcer healed up, and she felt much easier. A few days after this recovery she again consulted her doctor on account of difficulty in swallowing. He passed a probang into the œsophagus and “felt an obstruction on withdrawing it,” and he noticed that the bougie was stained with blood. Slight hæmorrhage continued for some hours. Her attendant, Dr. Drysdale, suspected malignant disease; but, owing to the sudden onset of the symptoms, and the almost complete absence of pain, he felt reluctant in expressing an opinion regarding the nature of the disease, and advised the patient to consult me. When I saw her for the first time on Dec. 11th, 1890, she was weak, anæmic, and much emaciated, and stated that for the last three weeks she had been unable to take any solid food, but was still able to take fluid and semi-fluid diet with ease. She told me that since the middle of November the symptoms had steadily become worse, and that during the last six weeks she had lost considerably in weight, and, although she could not give me exact figures, she believed that she had lost about 28 lb. On examination, I discovered a hard, firm swelling immediately behind the cricoid cartilage, and extending from the level of the vocal cords downwards for a distance of about an inch and a half. It was found impossible even to pass a small-sized bougie, but on examination with the laryngoscope no encroachment on the lumen of the air passage was observed, either by pressure from behind or by invasion of the wall of the larynx. The voice was perfect, and the movements of the cords complete. On palpation externally, not only was the tumour described above apparent, but there were

also several small firm swellings, the largest of which was about the size of an almond, and was situated to the right of the thyroid cartilage, where it was firmly adherent and embedded in the surrounding structures. Considering all the circumstances of the case, I advised the patient to come to Glasgow and have treatment in the Royal Infirmary, where I successfully performed gastrostomy on Jan. 29th.⁸ When dismissed, although the lumen of the larynx was encroached upon, there was still sufficient air space to allow of the patient breathing freely. The right vocal cord was fixed in the position of complete adduction; voice good.

In those two cases the stricture was situated high up, and in both the onset of the symptoms and the development of the dysphagia were extremely rapid, so rapid, indeed, in the second case, as to raise a doubt whether the disease was malignant or inflammatory in its nature. This sudden difficulty in swallowing is probably the result of two circumstances. First, the disease involves the narrowest and least distensible part of the œsophagus; and, second, the action of the muscles of deglutition are directly interfered with by the tumour, consequently the food does not pass far enough into the gullet to allow the action of its circular fibres to come into play, hence the greater tendency of food to regurgitate into the mouth or larynx when the tumour is situated high up. In these cases there is still another danger, namely, obstruction to the entrance of air, either by pressure of the growth, leading to diminution in the lumen of the air passages by interfering with the circulation and producing œdema, or by the invasion of the larynx by the new formation.

In Case 4 tracheotomy required to be performed on March 28th—that is to say, eight weeks after the gastrostomy, on account of sudden œdema of the larynx.

(To be concluded.)

THE BEARING OF RECENT BIOLOGICAL RESEARCHES ON THE PRACTICE OF MEDICINE AND SURGERY.

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It has long been known that inert particles of various kinds, when mixed with blood just drawn from the vessels or injected into the circulation of the newt, are rapidly taken up by the colourless corpuscles, where they are enveloped in the motile protoplasm. Particles of vermilion introduced in this way are taken into the amœboid mass of the leucocyte, and in it are passed on from point to point in the channels in which leucocytes are usually found. The number of particles taken up by leucocytes which still retain their power of independent motion is sometimes very great indeed, and it has also been noticed that after a time these particles may be ejected, as though all that could possibly be utilised had been made use of by the cell. In the dust diseases of the lung the proliferating cells derived from the lining epithelium of the air-vesicles have a similar power of ingesting particles of various kinds.¹ These proliferating cells, with their contents, are apparently carried into the lymphatics of the lung tissue; here the pigment may be disgorged, when it is almost immediately taken up by leucocytes or by the stimulated connective tissue cells, or—and this appears to happen very frequently—the wandering cell with its contents is taken bodily into the larger actively stimulated connective tissue or fixed cells, where all that can be digested is converted to the use of the larger cell, and all inorganic matter and effete material is thrown out, to be again taken up, and carried from point to point, until eventually some, at any rate, may be actually excreted from the body or may become enclosed in a fibrous capsule

⁸ Patient was dismissed on March 21st, but on account of sudden onset of œdematous laryngitis she was readmitted on the 28th, when tracheotomy was performed, and she returned home much improved on April 25th, and is reported improving in strength on June 22nd, 1891.

¹ It has recently been maintained that these cells containing the foreign particles are derived not from the epithelium, but that they are lymphoid cells or leucocytes which have made their way from the blood-vessels and lymphatics into the air-vesicles. It seems to me that we have direct evidence that this is not the case; the partially detached catarrhal cells that contain pigment or other foreign particles being usually well made out in well-prepared sections.

⁷ In this case gastrostomy was performed on Nov. 6th, 1890, and the patient lived for exactly one year thereafter. At the post-mortem examination a scirrhus cancer was found at the level of the lower edge of the cricoid cartilage; no secondary formations; old tuberculosis and gangrene of lung.