forms of the rare affection known as "plastic bronchitis." The plugs are quite soluble in lime-water (Wilson Fox). According to the old theory of Beau¹¹ asthma is a bronchial catarrh "with a highly viscid sputum the dislodgment of which into the larger tubes terminates the attack"; in other words, it is probably in some instances a paramucous condition dependent upon trophic or irritative changes occurring in the pulmonary vagus or its centre. As an example of the hypomucous variety may be mentioned dry bronchitis of the gouty diathesis (?). Naso-pharyngeal conditions of hypomyxia are seen in atrophic rhinitis and pharyngitis sicca. I have just referred to hypermyxia naso-pharyngea. Paramucous conditions do not appear to occur. The affection of the stomach represented by the term "desiccation of mucous membranes"¹² corresponds to hypomyxia gastrica. It might also be termed "myxanadenia," "myxatrophia," or "myxasthenia gastrica." Such a condition is the forerunner of gastric pain and dyspepsia, erosions, and ulceration. Some varieties of irritative gastritis, witness that associated with pertussis, and some forms of chronic gastritis, may be pure examples of hypermyxia gastrica. The problematical occurrence of membranous gastritis serves to illustrate the term "paramyxia gastrica." With regard to the large bowel conditions of metamyxia in the direction of excess occur as already stated in the disease called "mucous disease of the bowel." Under this terminology it would be classified as "hypermyxia colica."³ The converse condition is seen in many obstinate cases of constipation, due without doubt to a diminished production of mucin and probably to a myxatrophic condition of the lining membrane of the colon. I could name it "hypomyxia colica." The disease known as "glairy enteritis," "membranous enteritis," or "catarrhal enteritis," in which the membranes consist of inspissated mucus, of nuclealbumin, or even of fat, is obviously a paramucous condition—namely, "paramyxia colica." Trophic or irritative degenerations of the vagus may play a part in its origin.

Relations to gout, diabetes, and cholelithiasis.—Abnormal dryness of mucous membranes may occasionally be an accompaniment of the gouty and diabetic diatheses. The entire pathology of gout is not exhausted in the idea of uric acid, nor is that of diabetes altogether embodied in that of sugar, since we know that these two substances are merely the outward manifestations of a profound disturbance of metabolic activity the elucidation of which is still reserved. The presence of mucin in abundance within the synovial fluid where uric acid deposits most frequently occur, the existence of a carbohydrate moiety in the mucin molecule, and the diminution of saliva and desiccated tongue of diabetic patients are suggestive facts which may lead to the discovery of interesting relationships.

Clacton-on-Sea.

CARCINOMA MAMMÆ: ON THE NECESSITY FOR TAKING STEPS DURING THE OPERATION FOR REMOVAL TO OBVIATE THE RISK OF SUBSEQUENT DISSEMINATION.

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IN this paper I wish to call attention to a subject which I believe to be important—viz., the necessity of occluding as far as possible the emergent lymphatics and veins of the breast when operating for cancer of that organ. During the last few years new operations, of which I need only mention Halsted's, have been devised whereby we remove in a much more thorough and systematic manner than formerly any structures which we think may possibly be invaded by

the growth. In spite, however, of the advances which have been made three facts remain. In the first place, it must be admitted that, no matter how careful the surgeon may be, the mere fact of his operating in the neighbourhood of a malignant growth renders infection of some part of the wound at least possible; secondly, that though the surgeon may be morally certain that he has removed wide of the disease he cannot be absolutely so. In the third place, during the operation innumerable lymphatics and small veins are cut across. Without in any way meaning to imply that infection of the wound is a usual occurrence or that some part of the growth is invariably left behind, I do maintain that the possible risk of dissemination which may result from either of these contingencies taking place should always be borne in mind and as far as possible provided against at the time of the first operation. I believe that the chance of subsequent dissemination taking place may be much lessened, if not entirely prevented, by occluding the mouths of those lymphatics and veins which drain the mamma and which have necessarily been cut through during removal of the organ. I need only mention two cases to show that after operations for removal of the breast extensive dissemination may occur.

CASE 1.—A woman, aged 42 years, was admitted into the Cancer Hospital, Brompton, S.W. Three years previously she had noticed a lump in her left breast. This had grown and had eventually reached "the size of a child's head." The breast was removed in the country. The wound healed but always looked like "a scald." Two and a half years after the operation the whole of the left side began to get hard and the hardening process spread to the other breast which eventually completely disappeared. Small lumps of the size of a hempseed now began to appear on the skin on the right side and in the lower part of the abdomen. The patient lost the sight of her left eye and small lumps in the scalp now made their appearance. On admission the condition was as follows: the skin over the operation wound on the left side and that over the site of the right breast was tense, shiny, and hide-bound. There were seven little nodules over her right and three over the left temple, three in the middle line of the scalp, two in the right posterior triangle of the neck, two in the skin over the right supra-spinous fossa, two in a similar position on the left, three over the lower ribs on the right side, and one over the acromial end of the spine of the left scapula. 22 nodules were counted scattered over the abdomen. The inguinal glands on both sides were enlarged. In all, nearly 60 of these little nodules were present. There was atrophy of the left optic disc and ptosis, sometimes more sometimes less marked, of the left eyelid. Originally there were numerous nodules situated in the skin over the left scapula, but these had become replaced by the brawny hardness. The diagnosis I made of the condition was cancer en cuirasse, associated with multiple carcinomatosis of the skin and possibly of internal organs as well. The point, however, which I wish to bring out is this: that here we have a case of dissemination coming on after an operation. I look upon this case as one of infection by the blood-stream and I think infection took place at the time of operation.

The next case is a remarkable one and has been recorded by Dr. J. Ritchie and Dr. J. Purves Stewart.¹

CASE 2.—A breast which was affected with scirrhus was removed with some of the axillary lymphatic glands from a woman, aged 47 years. Five years and eight months afterwards she had a severe attack of pain in the back and limbs. Nine years and three months after the operation she died from secondary carcinoma of the bones. This was proved microscopically. As Dr. Ritchie and Dr. Stewart state, the case is remarkable for the great length of time which elapsed between the operation and the first evidence of bone infection—namely, five years and eight months.

These and many other similar cases which might be quoted show conclusively that after operations general dissemination, occurring either early or late, is by no means of rare occurrence. This is not to be wondered at when, in view of the two contingencies mentioned above actually occurring, it is remembered that no steps whatever are taken to prevent it during the operation. Before, however, discussing the means which I would advocate it may be well to indicate in the briefest manner possible the most important routes taken by the lymphatic vessels and veins which run from and drain the mamma. 1. The

¹¹ Auld: The Pathology of Bronchial Affections, p. 86.

¹² Stuart-Low: loc. cit.

¹³ The frequent occurrence of mucous degenerations of the bowel in the insane (asylum dysentery) where extensive trophic and degenerative lesions in the nerves and nerve-centres co-exist, is worthy of note (Dr. T. Claye Shaw, Brit. Med. Jour., Oct. 26th, 1901). The croupiform fibrinous exudations and deposits which occur in tropical dysentery do not concern us, since they are obviously due to severe inflammatory processes involving both mucosa and submucosa.

¹ Transactions of the Edinburgh Medico-Chirurgical Society.

lymphatics from the inner side of the breast accompany the perforating veins of the internal mammary; the emerging trunks run in the submammary and pectoral fascia, perforate the pectoralis major, and terminate in the sternal glands, the largest and most important of which are situated in the first, second, and third interspaces. In cases of carcinoma involving the inner portion of the breast these glands may be found affected. The gland in the second space may become so large that it may press upon and actually ulcerate into the left vena innominata or into the junction of the right and left vena innominata. 2. The greater number of lymphatics from the breast pass into a group of glands situated in the axillary fascia, thence the emerging trunks pass to a few small glands under the pectoralis minor muscle, and then make their way to a few glands situated immediately below the clavicle, whence they join glands in the subclavian triangle. The lymphatic vessels and glands in the axilla are imbedded in the axillary fascia and in a process of fascia, sometimes called the "suspensory ligament," which is part of a system known as the "clavipectoral fascia." The lymphatics in 1 and 2 are the most important and drain the greater part of the mamma. 3. The lymphatic glands underneath the pectoralis minor and a few small glands under the clavicle probably receive mammary lymphatics which pass through the substance of

by a Halsted's operation. Two or three differently curved pedicle needles should be handy. After the incisions round the breast have been made the skin is separated upwards and downwards. When the submammary and pectoral fasciæ are exposed pedicle needles armed with stoutish silk are passed through them, keeping as near as possible to the thoracic wall. On drawing each ligature tight the portion of mamma immediately lying over the strangled portion of fascia may be detached. The breast should not be removed until the fascia lying underneath has been ligatured. It is especially necessary to put ligatures at the upper and inner part of the submammary fascia, for in this way the majority of lymphatics and veins passing to the first, second, and third intercostal spaces will be occluded. As an additional precaution, especially if the case is a more advanced one, it is advisable to put two ligatures through the substance of the pectoralis major, one above the other and about one inch apart, at right angles to the course of these same lymphatics. In this way they, together with the veins passing from the breast to the anterior mediastinum, are occluded. When dealing with the axilla the axillary fascia should be well exposed and before it is cut away it should be ligatured, especially at the following places: (1) just to the inner side of the axillary vein; (2) as high up underneath the pectoralis minor as possible; and (3) where it becomes con-

the pectoralis major. 4. The lymphatics which lie over the serratus magnus follow the course of the intercostal veins. They are not, strictly speaking, lymphatics of the mamma, but in cases where the axilla is much involved by the growth extension may take place along this route, or if the axilla is cleared out infection may take place at this spot. 5. In a certain number of cases of carcinoma mammæ it is found that the liver is the seat of secondary deposits. The exact path taken under these circumstances has not been accurately determined. When a breast is amputated and the axilla, we will say, cleared out innumerable lymphatics and vessels are cut across. What is the result? Here are these lymphatics ready with their open mouths to convey any malignant cells which may have been left behind or with which they may have been infected up to the superior mediastinum, *via* the neck, or to the anterior and posterior mediastinum by the sternal or intercostal route. Not only this, but the veins being cut across at the same time an easier and certainly more rapid route is at once opened up. No circumstances more favourable to general dissemination than this double route can well be imagined.

It has already been pointed out that the sternal lymphatics run in the sub-mammary and pectoral fascia before perforating the pectoralis major. The axillary lymphatics run in the axillary fascia and suspensory ligament. Roughly speaking, the lymphatics may be said to accompany the veins. Now, from their size and number it would obviously be impossible to occlude either the small veins or lymphatics separately. My suggestion is to effect their occlusion by strangling by a series of ligatures the fascia in which they run. This is done in the following way. A case of carcinoma has to be operated on where the growth has not yet, let us imagine, involved the pectoralis major but where the axillary glands are felt to be slightly enlarged—the patient is not strong enough to be able to stand the shock, such as is produced

tinuous with the fascia covering the serratus magnus. By ligaturing the fascia in the latter place we occlude those vessels which, running with the lateral cutaneous branches of the intercostal veins, pass on to the posterior mediastinum. In the figure, where the sternal, axillary, and intercostal lymphatics only are represented, and that in a purely diagrammatic manner, we will imagine that the breast has been removed through the incision I I' (the dotted line in the diagram); that a nodule of growth N has been left behind, or that the wound has been infected at this spot. If no steps have been taken to occlude the lymphatic vessels it is clear that this nodule will be quite free to extend itself in the direction of the sternal glands; if, on the other hand, these vessels have been occluded by passing two ligatures through the pectoralis major higher up (L'L'L' in diagram) at right angles to their course (and this can usually be done by pulling the skin to its most upward limit without the necessity of making a fresh incision) it is clear that extension in this dangerous direction would be prevented. Similarly if a nodule N' in the diagram is left in the axilla, or the wound in the axilla is infected at this point, extension up the neck is prevented by ligatures placed at right angles to that portion of the suspensory ligament running upwards underneath the pectoralis minor L' L' in the diagram. In the same way, by referring to the diagram, it will be seen that if the intercostal lymphatics are ligatured in the same manner the nodule cannot extend into the thorax laterally. This method of occluding lymphatics and veins can also be carried out in the more extensive operations such as Halsted's, but in these cases, of course, they will be occluded at places nearer to where they join the vessels of the neck and thorax. In considering the advisability of performing such extensive operations as Halsted's quite apart from the question of shock, to which a great deal of attention should be given, it must be remembered that the

larger the wound made in the operation the greater the surface over which infection may take place. If, however, the method here advocated is followed I do not believe that the last objection should be such a serious one. I have now used this method of occluding lymphatics and veins with a view of reducing to a minimum the subsequent dissemination in six cases. In five of these the presence of the ligatures in no way interfered with the healing of the wound or gave rise to any increased pain; in the sixth case, however, I must admit that I think that they were the cause of some supuration and sloughing which were noticed in the wound on the seventh day; but even here, where the operation was an extensive one, the suppuration only lasted two days and I do not think the healing of the wound was retarded. One possible objection to their employment is that the operation is made a trifle longer. I sometimes use as many as from 10 to 15 ligatures. From what I have seen of the after-effects of vaginal hysterectomy for carcinoma of the cervix I believe general dissemination to be infinitely more rare in such cases than it is after breast operations. I cannot help thinking that the chief reason for this is that when hysterectomy is performed, prior to the actual cutting away of the uterus the broad ligaments are clamped and tied on either side, thus effectually occluding the chief lymphatics and veins coming from this organ and in this way minimising the risk of dissemination.

In conclusion I would state my belief that a "recurrent" nodule found in the neighbourhood of a scar after operation is not a very important thing in itself, but it is a most serious thing if the avenues along which it may extend have not previously been occluded, and I would again urge the importance of taking steps at the time of the first operation to prevent subsequent dissemination. Even if the method here suggested should not commend itself to those who may read this article I hope that the principle on which it is based may become more widely recognised and its importance more generally admitted.

Wimpole-street, W.

A CASE OF LEAD-POISONING CAUSING INSANITY.

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SIR W. GOWERS'S address on the Metallic Poisons has opened up a subject to which more attention might be paid—i.e., the nervous phenomena accompanying certain toxic conditions—and in giving the following history of a case of lead-poisoning in which certain nervous symptoms were marked it is in the hope that it may be of interest and prove a help in the diagnosis of such cases, which too often are mistaken for other conditions. The case was one of peculiar interest, because the onset of the symptoms was so sudden that the disease was at first regarded as one of the acute specific fevers and for a time remained undiagnosed.

The patient, a plumber, aged 30 years, was admitted into the Surrey County Asylum on August 17th, 1901. For the history of the case previously to admission I am indebted to the patient's wife and I cannot be certain of its complete accuracy, but it is to the effect that on April 12th, 1901, the patient returned from work feeling chilly and having "pains all over him." By night time he was delirious and a medical man was called in on the following day who regarded the case as one of influenza and treated it accordingly. As the patient got worse a few days later another medical opinion was procured and this led to the disease being certified as typhoid fever and he was removed to an isolation hospital. After three weeks of isolation it was recognised that he was not suffering from typhoid fever and he was sent home, remaining there until his admission to the asylum. From the outset the mental symptoms were marked and the certificate on which he was admitted to the asylum stated that he suffered from delusions of persecution with hallucinations of sight and hearing. During all this period he had been wasting in a marked degree, and his condition on admission to the asylum was as follows. He was suffering from acute mania, being restless, noisy, and excited, and utterly incoherent. His mental state, in fact, very much simulated alcoholic mania. He was very emaciated, certain muscles and groups of muscles being

picked out. There was marked paralysis of his extensor muscles of the forearms and wrist-drop was very pronounced. He was unable to stand, and when held in the upright position his legs gave way under him and he tended to drop in a sitting posture. There was very evident tremor and this was most noticeable when he attempted any movement. There was no very marked increase in the knee-jerks and ankle clonus was absent. Anæmia was very pronounced and the face was wrinkled. On the gums there was an exceedingly well-defined blue line. The pulse was very slow and the arteries were rigid. No examination of the eyes could be made at this time as the patient was so restless, but later it was ascertained that there was a certain amount of optic atrophy.

Treatment was at once commenced, large doses of the bromide and iodide of potassium being given. As he refused everything in the way of food and drugs he had to be fed, and after a certain time there was evidence of gastric irritation, and raw beef-extract in small quantities was given every hour instead of the larger quantity of milk and beef-tea with which he was fed less frequently. The immediate result of the bromide was a slight abatement in the delirium, but the sleeplessness continued and the patient was getting much weaker. On the 23rd—that is, six days after admission—stimulants were resorted to as there were symptoms of collapse and the bromide was discontinued. On the morning of the 25th the patient was nearly comatose and I was just on the point of giving him some strychnine hypodermically when, to my surprise, he had a well-marked epileptiform seizure and throughout the course of the day he had two others. That night he slept and in the morning he was decidedly better. From this time onward improvement was uninterrupted, perhaps the most remarkable feature being the extraordinary rapidity of the improvement in his mental condition. There were no more epileptiform seizures, and I ascertained that there was no previous history of epilepsy. He remained in the asylum until Oct. 11th, on which day he was discharged. His condition then was as follows. He had greatly increased in weight and the atrophic and paralytic condition in the muscles was fast disappearing and he could write fairly legibly. Mentally he was well, but there was a certain amount of deafness. The vision was somewhat impaired. There was also evidently a certain degree of cirrhotic change in the kidney, as there was an excessive amount of pale-coloured urine of a low specific gravity passed daily.

The history derived from the patient himself after his recovery did not add much to that gained from his wife. Colic had never been marked, although at various times previously to the onset of his illness he had had abdominal pains of the nature of cramp. He had been an abstainer and had never had syphilis. His memory was a complete blank from the time that he became ill until the day after he had the epileptic fits.

That this was a case of lead-poisoning there can be no doubt, and the only deviation from an ordinary case of lead encephalopathy with epilepsy was the suddenness and acute mode of the onset. Had there been any history of alcoholism the symptoms would in all probability have been attributed to that habit and the real cause perhaps overlooked. That the acute onset was the manifestation of another malady and that during the course of this malady the symptoms of lead-poisoning became apparent are quite possible; but is it not reasonable to think that with such evident symptoms of lead toxæmia in the later stages of the illness the initial symptoms were the result of the lead also?

Brookwood.

INFORMALITY IN A DEATH CERTIFICATE.—In the November number of the *Maryland Medical Journal* it is stated that not long ago, while the United States ship of war *Chicago* was lying off Netley, near Southampton, England, a sailor died from an accident and a funeral at Southampton Cemetery was planned with full naval honours. The registrar, however, refused to issue a permit on the American surgeon's death certificate on the ground that the latter, not being a registered medical practitioner, was not qualified to certify the death. Application was then made to the coroner, who could not hold an inquest unless the body was landed. The funeral on shore had to be abandoned and the body was a few hours later committed to the sea beyond the three-mile limit.