concluded, bile pigment could be formed in the spleen apart from the liver, his results rather lent support to the doctrine of a hæmatogenous jaundice, for the very essence of that view was that bile pigment could be formed from hæmoglobin apart from action of liver cells.

Dr. AULD, in reply, said that in regard to the question put by Dr. Hunter, it seemed to him that the hæmatogenous jaundice he had described corresponds to the jaundice brought about by the absorption of the decomposition products of a large extravasation of blood. This was of admittedly frequent occurrence, and the excreted hæmatoidin gave the reaction for bilirubin. The destruction of blood he had described in the spleen gave rise to the same pigmentary products as in the case of extravasation.

ON THE OCCURRENCE OF A CANCEROUS DEVELOPMENT IN SIMPLE ULCER OF THE STOMACH.*

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In a former article¹ I have briefly referred to some few points in the morbid anatomy of gastric ulcer which seem to have a direct clinical bearing on such cases. In the present communication I wish to draw attention solely to one event, which, although rare, is undoubtedly of importance to both physician and surgeon, namely, the cancerous development of a "simple" or so-called "round" ulcer of the stomach.

EARLY REFERENCES.

The earliest writers to clearly draw attention to such a condition appear to have been Dittrich and Rokitsky.²

Brinton³ in 1856 wrote: "as respects the combination of gastric ulcer with cancer of the stomach they seem to be chiefly limited to a cancerous degeneration or deposit that involves the hard brawny mass which we have already noticed as generally present in variable quantity in the base or periphery of an ulcer of long standing. The most frequent form of such a combination appears to be that in which a fungus (generally a bleeding one) shoots up from the basis of a gastric ulcer, the characters of which are in all other respects those usually seen in the ordinary lesion."

Lebert⁴ also appears to have observed the direct transition from ulcer to cancer.

Waldeyer,⁵ according to Leube, seemed to believe that a process which at first is simply ulcerative may in time be converted into a cancerous one.

Hauser,⁶ too, according to Leith, had met with the evolution of cancer from the site of an old ulcer.

FREQUENCY OF OCCURRENCE.

The occurrence of cancerous development in the floor or edge of a simple gastric ulcer is undoubtedly extremely rare. So exceptional is the association that many authors, and amongst them Trousseau,⁷ Fox,⁸ and Fenwick,⁹ practically deny that it is ever met with.

Even Ewald¹⁰ lays no stress on the association, although he admits that "chronic ulcer of the stomach is one of the factors which favour the formation of cancer."

Strümpell,¹¹ however, ventures the exceptional opinion that "it is probably not a very rare event that cancer eventually develops in the floor of the old ulcer."

Eppinger¹² goes further, and volunteers the surprising statement that in 11.4 per cent. of cancers of the stomach development from an ulcer occurred. This is manifestly the outcome of fallacious statistics.

Welch¹³ states that "it may be considered established that cancer sometimes develops in a simple ulcer of the stomach." He also adds, "It is most likely to develop in large and deep ulcers with thickened edges, where complete closure by cicatrization is very difficult or impossible."

Fagge¹⁴ long since at Guy's Hospital noticed "more than one case in which the stomach presented part of the circum-

ference of what was apparently a simple ulcer, of which the remainder had been replaced by a malignant growth."

Dr. Norman Moore,¹⁵ in his analysis of cases of ulcer of the stomach occurring at St. Bartholomew's between the years 1867-1880, mentions no example of this association.

RECORDED CASES.

Exceedingly rare though this connection may be, some few cases have, however, been published. Brinton¹⁶ in 1857 recorded a case occurring in a woman, aged 41, in whom he considered "the gastric ulcer had undergone a cancerous infiltration or deposit." He also states that one or two similar specimens may be seen in the pathological museums of London. Meyer¹⁷ also describes a case where cancer developed in the immediate neighbourhood of an ulcer. Rosenheim¹⁸ believes that he has met with the combination in several instances. Leith¹⁹ records an undoubted example occurring in a man of about 48. Flatow²⁰ has met with cancer in a young man, aged 26, with a history of ulcer beyond doubt. Cases have also been placed on record by Lebert,²¹ Hauser,²² Heitler.²³

It is well to bear in mind that not infrequently cases of ulcer with firm cicatricial tissue, and which occasionally give rise to a distinct tumour, may very closely simulate cancer, as has been shown by Dr. Dreschfeld²⁴ and Professor Ewald. In the considerable number of cases of gastric and duodenal ulcers and carcinomata of the stomach which have come under my notice in the Pathological Department of the Manchester Royal Infirmary I have only met with the one case, recorded below, where the association of ulcer and cancer could be considered as undoubted. The following is also, I believe, the youngest case on record, except, perhaps, the instance mentioned by Flatow.

CASE.

*Clinical History.*²⁵—W. M., aged 27, member of a military band, was admitted to the Manchester Royal Infirmary on February 13th, 1894, under Professor Leech, to whose kind courtesy I am indebted for permission to here record this case. Patient had been abroad in the army for six years, spending the chief part of this time in Malta and Egypt. Four years ago, while serving as a bandsman at Malta, he commenced to be troubled with pain in the stomach, especially severe some time after meals. The pains gradually became worse, and were associated with pain in the inter-scapular region. Sour eructations and occasional attacks of vomiting occurred. Vomiting usually greatly relieved the pain. These gastric attacks had lasted for at least four years, but he had intervals, some shorter, some longer, when he was fairly well. Eighteen months ago he had a long interval of freedom from pain and vomiting for three months. He was considered to be the subject of a chronic simple ulcer of the stomach. Six weeks before admission to hospital the vomit was noticed to be dark and coffee-coloured. The pain and vomiting rapidly became much worse, and a distinct swelling in the region of the stomach was noticed. On admission a distinct tumour-like bulging was detected in the epigastrium and left hypochondrium clearly connected with the stomach. There was frequent vomiting, and on several occasions blood was brought up. Sarcinae were often found in the vomit. On many occasions washings from the stomach were examined for the presence of HCl, testing with congo-red and phloro-glucin-vanillin. It was usually present, but two or three times appeared to be absent. Special methods of feeding were employed, but the patient's condition did not improve. Surgical interference was deemed inadvisable. After becoming extremely emaciated death occurred on April 24th.

I made a *post-mortem* examination the following day. The following is an abstract of the report:

*Necropsy.*²⁶—Body that of extremely emaciated young adult male. On opening the abdominal cavity a few nodules of growth were found projecting from the serous coat lining the abdominal wall. No peritonitis. On lifting up the liver a mass of firm cicatricial-like tissue found to involve pyloric end of stomach. The stomach was small and contracted, and lying in greater part under cover of the liver. A tumour-like mass felt to be involving greater curvature and anterior wall near pylorus. Stomach closely adherent to under surface of left lobe of liver, and also attached across the longitudinal fissure to the left edge of the right lobe. On opening stomach along greater curvature, large ulcer exposed, situated immediately to the left of the pyloric orifice, involving smaller curvature and extending on to anterior and posterior walls. Size $3\frac{1}{2}$ by $1\frac{1}{2}$ inches. The edges were rounded, thick, indurated, and in parts undermined. The base of the ulcer was part formed by pancreas and peri-pancreatic tissue, but where it involved anterior wall of stomach its base was formed by the lower surface of the left lobe of liver, to which stomach was closely adherent. The base was very much thickened, chiefly by chronic inflammatory tissue, but in places there were nodules of growth. Immediately around the ulcer and involving its edges there were distinct nodules of malignant growth. The growth appeared to be extending from the edges and infiltrating the adjoining mucosa. The extent of ulceration was very considerable, while the amount of actual malignant tissue was relatively small. The pylorus was so close to the ulcer that it was considerably compressed, and its lumen much narrowed.²⁷ The liver was apparently uninvolved by any secondary deposits although closely adherent to the ulcer. The external coat of the gall bladder was slightly invaded by malignant growth, evidently from direct extension. The thoracic organs and remainder of abdominal viscera, except for marked wasting and anaemia, presented no gross lesions.

* Substance of a communication to the Section of Pathology at the Annual Meeting of the British Medical Association held in London, July-August, 1895.

Microscopical Examination.—This showed the new growth to be of a characteristic carcinomatous nature.

REMARKS.

The above case may, I venture to think, be considered as undoubtedly one in which carcinoma supervened upon a simple gastric ulcer. The following points tend to establish this view:

1. The duration and character of the illness; gastric symptoms had been present for at least four years, and for the greater part of the time were quite characteristic of simple ulcer.

2. Absence of any cachexia or considerable wasting until the last few months of life.

3. Limitation of the growth to the ulcer and its immediate neighbourhood.

4. The distribution and characters of the malignant tissue, indicating a recent and rapidly-progressing growth.

5. An actual tumour was only noticed a few months before death.

6. Absence of secondary deposits.

7. The presence of hydrochloric acid almost to the last is a fact of some clinical interest.

8. The early age of the patient is also a point of some importance, but I have met with carcinoma so frequently in young subjects that I lay no very great stress upon it.

The present case very strikingly suggests some distinct etiological connection between the two pathological conditions of simple ulcer and cancer. In these days of resection and excision of abdominal viscera the present case may also suggest possibilities from surgical interference. Certainly our experience would seem to enforce the desirability of bearing in mind the possibility of a simple ulcer taking on malignant characters.

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THE PATHOLOGY OF SUBDURAL MEMBRANE FORMATION (WITH MICROSCOPIC DEMONSTRATION).

DR. W. F. ROBERTSON read this paper. He gave the conclusions to which he has been led by the study especially of superficial horizontal sections of the dura mater. By means of these it can be shown that the insane are specially prone to the occurrence of certain morbid changes in the tissues of the dura which predispose to hæmorrhage from its vessels. These consist mainly in proliferation and degeneration of the endothelial cells of the perivascular canals, occurring in association with similar changes in the endothelium of the inner surface. They lead to obstruction and rupture of the dural capillaries, which are themselves weakened by the morbid processes at work. These capillary hæmorrhages, which may be very numerous, take place mainly

at the inner surface, as in that situation there is a very rich capillary network, while other parts of the dura are only scantily supplied with capillaries. Hæmorrhages are specially liable to occur a few days or a few hours before death when fatty and other molecular changes have further weakened the capillary walls. This explains the fact that the great majority of the false membranes which occur in the subdural space are of quite recent development, as can be proved from their microscopic characters. Subdural membranes consist primarily of blood-clot. This rapidly becomes vascularised, so that an organised false membrane is soon formed. The hyaline vessels so frequently to be observed at the inner surface of the dura are obliterated, new capillaries that had penetrated a very thin layer of bloodclot. While the above morbid process constitutes the true subdural membrane formation of the insane, there is a certain proportion of cases in which false membranes are due to the occurrence of a simple hæmorrhage into the subdural space (independently of any morbid change in the dura), as is maintained for all cases by the advocates of the primary hæmorrhagic theory. The inflammatory theory, the author holds, is disproved by the appearances presented by superficial horizontal sections. The cellular aggregations are almost entirely endothelial in character. The primary morbid change associated with the true subdural membrane formation of the insane is practically the same as that which occurs with equal frequency on the opposite side of the subdural space, leading to milkiness, opacity, and thickening of the pia-arachnoid, appearances which are due to proliferation and degeneration of the endothelial cells lining the arachnoid spaces, and to a slow connective tissue hyperplasia. The microscopic specimens, in addition to demonstrating these morbid changes, are intended to show certain associated degenerative changes which occur in the dura, especially those leading to the development of concentric bodies. At the same time it is desired to draw attention to the value of superficial horizontal sections, and to recommend their employment for the study of pathological changes occurring at other smooth surfaces.

CONGENITAL DEFECTS OF THE CEREBELLUM.

DR. RISIEN RUSSELL read a paper on this subject. A careful microscopic examination of the central nervous system had been made by him in a young cat and in a puppy, both of which presented, during life, symptoms which we are in the habit of associating with some defect of the cerebellum. The animals presented many interesting features when considered individually; but still more important were the facts which became evident on comparing the results obtained in the two. The defect in the cat was chiefly unilateral, for, although the whole cerebellum was smaller than normal, the right lateral lobe was one-third the size of the left. The portion of cerebellar cortex which existed on the right side was, however, of normal structure, the proportion of the various layers to each other being preserved, and the cells of Purkinje were arranged in normal order. The corpus dentatum was almost absent on the right side, a few scattered cells in the region of this body alone representing it, whereas the left corpus dentatum appeared to be perfectly intact. In the case of the puppy, on the other hand, the condition of things was very different; here the cerebellum was about two-thirds or three-quarters the natural size, but one lateral half was not smaller than the other. Instead of the cerebellar cortex being of normal structure, as in the case of the cat, there were evidences of derangement of structure of a most marked character. The most notable departure from the normal was the great scarcity of the cells of Purkinje; these cells were entirely absent in large parts of the cerebellar cortex, especially of the lateral lobes. In parts where they were present they were to be found more or less regularly arranged in line in some places, but at irregular and much greater distances from each other than in the normal. At other parts, again, they were arranged in irregular clusters many rows deep, instead of being in a single line. Then, again, the cells of Purkinje that were present showed all degrees of variation in shape and size, and differed greatly in the way in which they reacted to various stains, some staining well, others badly. In many, besides the altered shape and size, the contents of the cells appeared to be more granular than normal. In addition to these abnormalities in connection with the cells of

Purkinje, the various layers of the cerebellar cortex presented considerable variations in thickness at different parts; in one place a layer would be twice the thickness it ought to be as regards the proportion between itself and its fellows, while in another part it would be half the thickness, or even less. In certain places the same layer was about three or four times the thickness at one point as compared with another point at no great distance from it; sometimes the change in thickness was gradual, at other times abrupt. Unlike the cat, in which the corpus dentatum was practically absent on one side, this structure was well preserved on both sides, and presented no abnormal appearances that could be detected. The cat was of interest because, with a chiefly unilateral defect of the cerebellum, it presented certain unilateral symptoms during life; and the puppy was of interest as showing how symptoms pointing to cerebellar defect may be present during life where the abnormal conditions met with in the cerebellum are limited to its cortex, without any evidence of defect of the corpus dentatum on one either side. But the cases had been brought before the Pathological Section because, taken together, they served to illustrate certain relations of one side of the cerebellum with the opposite inferior olive. In the case of the cat in whom the defect of the cerebellum was chiefly on the right side, the left inferior olive was extremely rudimentary, while the right was well developed. In the dog, on the other hand, both olives were, as far as could be ascertained, absolutely intact, in spite of the profound changes of structure that were met with in the cortex of the cerebellum. A consideration of these two cases tended to emphasise how intimate the relationship is between the corpus dentatum of one side and the inferior olive of the opposite side, and that if connections exist between the cortex of the cerebellum and the olive, they must be unimportant as compared with the connection between the corpus dentatum and the inferior olive. In this relation the author alluded to the fact that certain observers had described a considerable band of degenerated fibres as passing to the opposite inferior olive after ablation of one-half of the cerebellum. His own experimental observations did not confirm this, as only a few degenerated fibres were traced to the olives, and the majority of these appeared to be destined for the olive of the same side, after unilateral ablation of the cerebellum. He thought it probable that future observation would show that what has been described as degeneration is in reality a secondary atrophy, and that the chief tract will be found to degenerate from the olive to the cerebellum, not from the cerebellum to the olive. The case of the puppy was carefully examined, with a view to determine whether any of the structures, other than the olives, which have been shown to be connected with the cerebellum, for example, the red nucleus, optic thalamus, etc., presented any evidence of defect without any such being found; so that although important structural changes exist in the cortex of the cerebellum, no associated defect in any other part of the central nervous system could be detected.

A CASE OF EXOPHTHALMIC GOÏTRE.

Dr. ARTHUR FOXWELL (Birmingham) related the following case: The patient, a spinster of 41, in comfortable circumstances, was admitted to the Queen's Hospital, Birmingham, complaining of weakness, anorexia, and rapid wasting. For six months she had suffered from weakness and dyspnoea, for three months from nausea, for two months from exophthalmos and enlargement of the thyroid, and for one month from vomiting and rapid wasting. On admission, she presented the three cardinal symptoms of Graves's disease in moderate degree; but, in addition, she was the subject of extreme physical restlessness, there was a peculiar difficulty in swallowing, and she showed evidence of gastric catarrh. A marked enlargement of the thymus was diagnosed as well as an inflammatory involvement of the vagus. A week later she died, death being due to uncontrollable vomiting, which was sometimes without nausea or retching. On *post-mortem* examination the vermiform process of the cerebellum had undergone fibrous change, the adjacent surfaces of the optic thalami were in parts softened and in parts sclerosed; especially was there marked sclerosis of the floor of the fourth ventricle. Sections of the medulla showed that this sclerosis

extended somewhat deeply, involving the gracilis column and nucleus on each side, and also the nuclei of the cuneate bodies and of the tenth pair of nerves. There was also excessive vascularity of the surface of the brain, of the internal capsule, of the cerebellum, and of the medulla; which in the medulla at any rate led to occasional hæmorrhages.

THE LARYNX FROM A CASE OF TYPHOID FEVER.

Dr. ALFRED R. PARSONS (Dublin) related the following case: A. B., aged 22, a labourer, admitted to City of Dublin Hospital about the twelfth day of illness. The disease ran a most satisfactory course, and lysis had apparently been almost ended when, on the thirty-second day, the patient complained of a little pain on swallowing. Examination of the throat showed slight enlargement of left tonsil. On the following day temperature rapidly ran up to 105° F. On awakening after a short sleep about 4.30 P.M., the respiration suddenly became embarrassed and stertorous. External applications gave very little relief, and having been meanwhile summoned to the hospital, and finding by a hasty and imperfect laryngoscopic examination great swelling and redness of the epiglottis, I sent for the surgeon on duty, who at once performed tracheotomy. Extensive subcutaneous emphysema ensued, and death took place about fourteen hours afterwards. The rarity of such a severe laryngeal complication in typhoid fever, and the occurrence of extensive emphysema after a tracheotomy, are thought worthy of interest. The larynx and a portion of the intestines, with ulcers transverse rather than longitudinal, were exhibited.

FORMIC ALDEHYDE IN OPHTHALMIC PRACTICE.

By JAMES MACKENZIE DAVIDSON, M.B., C.M.,

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THE results I have obtained with this substance in the treatment of some diseases of the eye have been so notable that I am induced to publish this short article upon its use. The preparation I am using is Schering's formalin (which consists of 40 per cent. formic aldehyde in water forming a stable solution if kept in a well-corked bottle). One part of formalin in 2,000 or 3,000 of water is the strength of the solution which I find most serviceable. When I tried it first in hypopyon ulcers it was dropped into the affected eye three or four times daily, and it seemed to be of very little use, but on applying it freely every hour I have never seen anything act so effectually in these cases.

Everyone engaged in ophthalmic work in a manufacturing town knows how numerous and troublesome, and indeed often disastrous, are the cases of septic abrasions of the cornea ending in hypopyon ulcers. The granite and engineering works in Aberdeen give us ample experience in these kind of cases.

The usual antiseptic applications so often fail to benefit such injuries that recourse has to be had to the electric cautery, and if this is to be thoroughly effectual the focus must be burned out completely, and consequently more or less of sound corneal tissue is destroyed as well, and, while the scar left is frequently wonderfully slight, still no one can doubt that if the process can be at once arrested by local antiseptic applications the results are even better.

My experience warrants me in claiming that in a solution of formalin, 1 in 2,000 or 1 in 3,000, applied every hour freely we have such a substance, and it would be of interest to know if others come to the same conclusion. Used in the same way or less frequently as experience may dictate, it acts admirably in abrasions of the cornea which have become septic and infiltrated, and might or might not go on to suppuration. Another great advantage is that the severe pain so characteristic of hypopyon ulcer is speedily relieved by the formalin solution, which, further, is non-poisonous and produces no irritation in the strength recommended. The directions I give to the patient are to lie down, and then with a dropper, or failing that a teaspoon, the formalin solution is poured gradually into his eye, while the eyelids are kept winking, so that its surface will be freely bathed; this being done hourly