publish the results as soon as possible. (The coloured glasses must, of course, be of a certain standard quality.)

We may by this means be enabled to form a standard as simple and as useful as Snellen's standard for form vision. With the average normal central colour vision (C. V.) reduced to $\frac{1}{2}$ for red and green, rejection of the examinee is advisable; with C. V. reduced to $\frac{1}{4}$ it becomes an absolute necessity.

To secure accuracy each eye should be examined separately, and, though for practical purposes it would be quite sufficient if one eye only satisfied the colour test, still it would be of great importance to know that such and such an individual was suffering from a defect of colour perception in one eye.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, March 17th, 1900.

REMARKS ON CHRONIC ENLARGEMENT OF THE PANCREAS IN ASSOCIATION WITH OR PRODUCING [ATTACKS SIMULATING BILIARY COLIC.*

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DISEASES of the pancreas are not yet as well understood, or as thoroughly worked out, as diseases of the other abdominal viscera. Two reasons appear to me to explain this in the main: first, the pancreas is not easily examined in the living subject, owing to its depth and the protection given it by the liver and stomach; and secondly, the examination of the organ at necropsies is often most perfunctory. Evidence of the truth of the latter statement seems to me to be afforded by the condition of acute infective pancreatitis. This disease has only of recent years received recognition, but it is very unlikely to have originated as a new disease in the last few years, and yet if the organ had been thoroughly examined in past times, the striking picture presented by it could hardly have been overlooked.

The purpose of this communication is to present 4 cases of enlargement of the pancreas which I have found accidentally when operating on the gall bladder or ducts. Two of these were distinct errors in diagnosis, for gall stones were not found, although it was believed that they were responsible for the symptoms.

CASE I.

History.—The first case occurred in 1897 in the practice of Dr. N. H. Turner, with whom I saw the patient, a gentleman aged 44, in what appeared to be a characteristic attack of gall stone colic. There was pain in and to the right of the epigastric region, going through to the back, vomiting and distinct jaundice; tenderness also existed over the lower margin of the liver in the right semilunar line. There had been several similar attacks at intervals of weeks or months, some of them associated with shivering.

Operation.—I operated for gall stones in April, 1897, but none existed, and the only condition found which might explain the attacks was a considerable mass in the head of the pancreas, firm but not very hard, somewhat lobulated on the surface, and occupying such a position that it might easily compress the common bile duct. A guarded prognosis was given, the friends being told by me that whilst such formations did at times disappear after operation, yet this one was likely to be a malignant growth.

After-History.—A good recovery followed the operation, and for some months the patient considered himself relieved. Subsequently the attacks returned, and the patient at this date, three years and a half after his operation, still suffers from them; but he is otherwise well, and evidently his pancreatic enlargement was not due to malignant growth. Soon after the operation, although I knew exactly where to palpate for the tumour, I could never satisfy myself that I felt it, but the patient's muscles were most difficult to relax.

CASE II.

History.—The second case occurred in a stout woman, aged 51, who was admitted to the General Hospital April 4th, 1899, complaining of attacks of biliary colic. The first seizure was in November, 1898, the symptoms being severe pain in the epigastrium, radiating widely over the abdomen, and associated with vomiting. Several minor attacks followed, and a severe one at Christmas, after which four gall stones were discovered in the motions. On March 25th a severe attack occurred, and three small stones were passed.

Operation.—The operation was performed on April 7th, 1899, the gall bladder being only slightly distended with muco-purulent material, and three small gall stones lay near the orifice of the cystic duct. A mass the size of a good orange was felt in the position of the head of the pancreas—it was firm but not hard, rather lobulated, and fairly movable. Only a slightly bile-stained discharge took place from the gall bladder for more than a month, and then bile escaped copiously.

* Read at a meeting of the Birmingham and Midland Counties Branch of the British Medical Association.

After History.—The drainage tube was retained for a couple of months to ensure complete recovery from the cholecystitis which existed at the time of the operation, and it was six months later before the wound finally healed. The patient was anæmic and feeble at the time of the operation, and for some months afterwards, but she is now in excellent health. Here again I could not with certainty palpate the pancreatic enlargement, but the thickness of the abdominal walls was considerable. Warned by previous experience I looked upon this patient as suffering from an inflammatory enlargement of the pancreas and not from growth.

CASE III.

History.—The third patient, a man aged 29, of spare habit, was admitted to the General Hospital, July 29th, 1899, with a history of frequent attacks of abdominal pain during the preceding twelve months. The pain was described as of a sharp pulling character, commencing in the middle line, midway between the umbilicus and the xiphoid cartilage, and going through to the back. Occasionally the pain was to the right or left of the point above mentioned; rarely vomiting accompanied the pain, and only on three occasions had jaundice been noticed; gall stones had never been recognised in the evacuations. No tumour such as a distended gall bladder could with certainty be recognised, but the region below the liver was tender and the muscles rigid. There was tenderness on percussion over the edge of the right erector spinæ in the ilio-costal space.

Operation.—At the operation on July 31st the gall bladder was found distended, and over 800 stones were removed varying in size from a mustard seed to an orange pip. A firm, lobulated mass, nearly the size of one's fist, was felt behind the stomach, beneath the liver, above the transverse colon, and crossing the front of the vertebral column; this was regarded as a chronically inflamed pancreas.

After History.—I did not see the patient for some weeks after the operation, as I was leaving for my holiday, but he made a very good recovery, and was discharged healed on August 29th. He came to the hospital again in December, 1899, complaining of pain in the epigastrium; a mass could then be felt in the region of the pancreas, and examination from time to time showed that this was enlarging with some rapidity; the patient was therefore readmitted on January 22nd, 1900. At this time he

looked ill, was losing weight, complained of pain deep in the epigastrium and of constant nausea and inability to take food. The urine contained a haze of albumen, but was free from sugar; the stools were normal in colour, and did not appear to contain fat. A tumour existed which extended above to the xiphoid cartilage, and below nearly to the umbilicus, its long axis was transverse, and it extended somewhat beyond the semilunar line on both sides, being a little more extensive on the left than on the right side; a thrill could be obtained over it. Examination of the chest posteriorly failed to give any physical signs of the tumour. The diagram shows an outline of the cyst, which measured 9 1/2 inches transversely and 6 1/2 inches vertically.

Second Operation.—The abdomen was opened over the most prominent part of the cyst to the left of the middle line; the great omentum, which was not adherent, was pushed away, and 80 ozs. of dark, greenish fluid were removed with the aspirator; the cyst was then opened, and a further considerable quantity of fluid escaped into sponges. The cyst wall appeared to consist of two layers, an outer tough fibrous coat about the thickness of the external oblique aponeurosis, and an inner layer about a quarter of an inch thick, of pale pink, rather friable material. The opening in the cyst was stitched to the peritoneum, and two drains were placed in the cavity. The fluid was, unfortunately, not examined until the next day, so that changes may have occurred in it; the reaction was then alkaline, and it had neither diastatic nor peptonising power.

After History.—In the first twenty-four hours there was a profuse dis

large of yellowish, serous-looking fluid; this diminished rapidly in a few days, but it persisted for a long while, the cavity not closing entirely until four months afterwards, during which time the patient improved much in weight, and the haze of albumen in the urine disappeared. He has been at work as a gardener for five months, and remains in excellent health.

CASE IV.

History.—A male, aged 35, was admitted to the General Hospital on March 4th, 1899, complaining of abdominal pain and jaundice. Eleven months before, whilst reaching something, the patient was seized with sharp pain in the left hypochondrium, which continued for nine days. Some months later he was laid up for twelve weeks with sharp pain in his abdomen accompanied by vomiting. The attack for which he was admitted commenced on October 29th, when he noticed that his urine was very dark. On October 30th he had severe pain across the small of the back, of a sharp stabbing nature, running down the left hip and thigh, and associated with pain and shivering. He vomited on this and the following days, and his skin became yellow and his motions pale in colour. It was also elicited that there had been pain in the umbilical region, but it was not severe.

Condition on Admission.—He was rather deeply jaundiced, and the liver extended some 3 inches below the costal margin. A rounded hard mass could be felt beneath the right rectus muscle; it extended to the middle line and to $\frac{1}{2}$ inch below the umbilicus (see diagram, P). Resonance

existed over it, and bimanual palpation failed to detect any swelling in the right loin; the mass was slightly tender, and percussion over the edge of the right erector spinae caused pain. The diagnosis made was gall stones impacted in the common duct, and the mass felt below the liver was regarded as a distended and somewhat displaced gall bladder.

Operation.—The abdomen was opened by the usual vertical incision, and the gall bladder was found distended, but the mass palpated proved to be a greatly enlarged head of the pancreas; it was hard and had a lobulated surface. The gall bladder was opened, but it and the ducts were free from stone. Drainage of the gall bladder seems likely to be followed by a permanent biliary fistula, for it was uncertain whether the pancreatic enlargement were malignant or inflammatory, and, if the latter, whether it would subside and leave the common duct free. By means of a small Murphy button the gall bladder was anastomosed with the duodenum, and, as there had been slight soiling by intestinal contents, a drain was inserted down to the anastomosis, and the remainder of the wound closed.

After-History.—The jaundice rapidly disappeared. The button was passed on the thirteenth day, and an uneventful recovery took place. The patient soon returned to work, and has from time to time been examined. The pancreatic enlargement is still to be felt though it is less than it was, and the patient's general condition is good so that he is able to do laborious work. At the point where the drainage tube was inserted there is a small hernia, brought about mainly by a chronic cough from which the patient suffers. Quite recently I learnt in an accidental way that the patient suffered from a hard chancre three or four years ago; but he has had no syphilitic manifestations for a long time, and I do not associate his pancreatic enlargement with this disease.

The common features in these cases are enlargement of the head of the pancreas with attacks of colic and more or less complete blocking of the common bile duct. It is not necessary to recall the anatomy of the parts concerned further than to point out the close association between the terminal portion of the pa-

creatic duct and the common bile duct, both of which are closely embraced by the head of the pancreas and joining together have a common opening into the duodenum. Whatever blocks the outlet of these ducts into the duodenum blocks both the glands associated with them.

The obstacle may be within the duct, biliary or pancreatic calculus or inflammatory swelling of the lining; or it may be outside as from new growth or inflammatory enlargement of the head of the pancreas. In the cases under consideration no calculus could be detected in the conjoint duct or in either of its branches, but owing to the thickening of the head of the pancreas it would be impossible to say with certainty that pancreatic calculus did not exist. This is especially true in Case IV, where the painful attacks beforehand were quite atypical and where great swelling of pancreatic tissue existed. Pancreatic calculus appears to be a comparatively rare condition, and one which may be unsuspected until discovered in the post-mortem room, for, owing to the feeble muscular power of the duct of Wirsung colic is rare. It may, however, occur, and is then likely to be mistaken for biliary colic, from which it is chiefly distinguished by the position of the pain, which in pancreatic colic is either between the umbilicus and the xiphoid cartilage or along the left costal arch. My impression is however that calculus was not responsible for the pancreatic condition in three of my patients though it may have been in the fourth. The possibility of the enlargement in either case being due to malignant growth could not be absolutely dismissed at the time of operation, but the lapse of time and the present condition of the patients quite disposes of the question of malignant new formation.

We are therefore driven by exclusion to infer that the pancreatic enlargement was probably inflammatory in origin. Blocking of the common bile duct by inflammatory mischief spreading from the duodenum is a well-recognised cause of jaundice.

It is not unreasonable to infer that a similar block occurs in the pancreatic duct in view of its anatomical relations and swelling of the pancreas may be brought about by retained secretion beyond. Probably, however, the pancreatic duct and gland are invaded by organisms from the bowel which produce not merely a passive enlargement by blocking secretion, but an inflammatory swelling such as occurs in the salivary glands, which in its more intense forms may produce an abscess or the still more dangerous condition, acute infective pancreatitis. If the common bile duct is not already blocked by inflammatory mischief, it can hardly escape compression from without when the swelling in the head of the pancreas attains any considerable size, hence jaundice is likely to be one of the secondary results produced by pancreatic infection.

You will gather, then, that I regard the four patients as having suffered from chronic pancreatitis, which in two of them led to an ill-founded diagnosis of gall stones. In the other two, gall stones coexisted, and possibly by inflicting damage on the common duct in their passage, directly induced the pancreatic inflammation.

We have perhaps hardly sufficient information at present to enable a diagnosis to be made between certain affections of the biliary apparatus and chronic inflammations of the pancreas; further experience may provide what is now wanting. If operation seems to be required, fortunately the same steps have to be taken, whichever condition is present. If the abdomen has been opened by one of the usual incisions, it will speedily be determined whether gall stones exist, and how they should be removed. If they have been removed, or if none are present, what is required for the treatment of the pancreatic condition? My own cases are too few to enable me from personal experience to speak decisively upon this point, but whilst collecting these notes I have come across a reference to a paper recently published by Mr. Mayo Robson,¹ whose large experience of operations for gall stones has furnished him with as many as seventeen cases of chronic pancreatitis. If the symptoms call for operative interference, two methods of treatment offer themselves, either prolonged drainage of the gall bladder in the manner usually employed after cholecystotomy, or an anastomosis between the gall bladder and the duodenum. In my first case, being then ignorant of the condition I had to deal with, I did neither, and the patient still suffers as before the operation. In the

second patient prolonged drainage was employed to cure the cholecystitis, and incidentally appears to have acted beneficially on the pancreas. In the third case the gall bladder was drained, but only for a short time, and the pancreatic trouble subsequently increased until a large cyst formed. In the fourth patient, for the reasons mentioned in the notes of the case, I joined the gall bladder to the duodenum with resulting cure of the jaundice and the other symptoms complained of, but the pancreas still remains somewhat enlarged.

In the paper referred to Mr. Robson commends prolonged drainage of the gall bladder in preference to cholecystenterostomy and in his hands it has given very satisfactory results. His objection to cholecystenterostomy is chiefly the likelihood of the anastomotic opening closing without giving such prolonged drainage of the gall bladder as will suffice to cure the pancreatitis. A more important objection I think is offered by the greater risk implied in an anastomosis as compared with mere drainage of the gall bladder. Probably in the majority of cases the simpler method will be employed, anastomosis being reserved for those cases in which the nature of the pancreatic enlargement and its subsidence are doubtful, or in which prolonged drainage fails to cure.

The occurrence of thickening about the head of the pancreas with jaundice has in the past had a dire significance, it being constantly inferred that malignant growth was present. The possibility of a more hopeful explanation is offered by such cases as I have described and by those contained in Mr. Robson's paper, whilst the value of exploratory opening, when there is any room for doubt, is strongly emphasised.

REFERENCE.
Lancet, July 28th, 1900.

A CASE OF CONGENITAL HYPERTROPHY WITH STENOSIS OF THE PYLORUS.

BY

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A FULL term male infant, born of healthy parents, weighed at birth $8\frac{1}{2}$ lbs., and did not present any outward deformities or abnormalities. The mother's milk was not available, but the child's feeding was most carefully supervised. The first symptoms—vomiting and convulsions—arose when the infant was a fortnight old; diarrhoea and vomiting occurred a week later; temporary relief followed careful dieting, but after another week's interval profuse sickness set in, the vomited matters being highly acid, and apparently completely digested. Vomiting now continued on and off, the amount returned being sometimes in excess of that recently taken, constipation was troublesome, and the child lost weight. When six weeks' old death appeared imminent from continued convulsions. Probably these convulsions depended on the absorption of toxic material from the stomach, and may be considered as analogous to tetany in gastric dilatation. On rectal injections of saline solution containing albumin, rectal feeding by enules, and abstinence from any food by the mouth, the infant rallied, and even put on a little weight.

Five days before death the vomited matters contained blood, as shown by microscopic examination. Three days before death dilatation of the stomach was made out, this, though carefully sought for previously, had not been found. At no time could any tumour in the region of the pylorus be detected. It had been looked for, inasmuch as the condition found after death was suspected during life. Death was preceded by increasing asthenia and emaciation. The infant was 7 weeks and 5 days old. The infant was under the care of Dr. Crofton-Atkins, and was seen twelve days before death by Dr. Rolleston.

Necropsy.—A very limited examination only was possible. There was great hypertrophy, with almost complete occlusion of the lumen of the pylorus. A transverse section of the thickened pylorus showed a mere radiating fissure representing the canal of the pylorus, which barely

admitted the point of a pin. It is probable, as pointed out by Pritchard, that the degree of stenosis found after death cannot be regarded as an accurate gauge of that existing during life. The thickness of the wall of the pylorus was 8 mm., and was manifestly largely due to increase in the circular muscular coat, which was 4 mm. thick, the longitudinal coat being 2 mm., and the mucous and submucous coats 2 mm. thick. There was hypertrophy of the muscular coats in the antrum pylori and neighbouring part of the stomach, and intense injection of its mucous membrane.

Microscopic sections were taken through the pylorus in the situation of the accompanying photograph, and from the

Fig. 1.—Transverse section of the hypertrophied pylorus, actual size. The lumen of the pylorus is seen as a radiating fissure. (From a photograph by H. G. Drake-Brockman, M.R.C.S.)

middle of the stomach. At the pylorus the mucous membrane was well preserved and healthy; the submucosa was condensed, probably merely a mechanical effect of pressure; the circular muscular coat was greatly increased in thickness, and showed a few foci of small cells between some of the muscular bundles. The mucous membrane in the piece of the stomach wall examined showed catarrhal inflammation. It is probable that spasmodic closure of the pylorus prevented this catarrhal change from spreading into the pylorus. The condition of the oesophagus was not examined. There was, therefore, stenosis of the pylorus of extreme degree, and marked hypertrophy of the circular muscular coat. The gastritis was probably a late or terminal phenomenon, and showed itself clinically by blood in the vomit five days before death.

REMARKS.

In the BRITISH MEDICAL JOURNAL of April 28th, 1898, one of us (R.) published a case, in conjunction with Dr. L. B. Hayne, and referred to 22 previously recorded cases. Since then published reference has been made to 19 other cases: Meltzer (5),¹ Still (3), Cautley (2), Fletcher (1), Batten (1), Pritchard (1), Adler (1), Stern (1), Thomson (3), and Fisher (1); in addition, 2 cases referred to by Ashby in 1897 but omitted in the collection of 22 cases, must be included.

We have therefore references to 44 cases already published, though in some the bare statement of the observation only exist, making with the present case 45 in all.

It is noteworthy that the great majority (about three-fourths) of these cases have been recorded since 1897, when J. Thomson drew special attention to the subject. It is therefore probable, as pointed out by several writers, that the disease is less rare than might be thought. Further, it is a significant fact in the short history of this disease that not uncommonly an observer who has seen one case, and thus become familiar with the existence of the condition, is able to report others. [Hirschsprung, Henschel, Gran, Thomson, Soltan Fenwick, Schwyzer, Meltzer, Cautley, Still, Ashby]