hand, the opposite condition may be encountered when glycosuria occurs, although the blood-sugar never rises even to the normal maximum, 0.17 per cent. In this case some peculiar condition of the kidneys appears to be present, and the term leaky kidneys or renal glycosuria is employed. In the days which preceded blood-sugar examinations, such cases were regarded as diabetes and treated quite unnecessarily by restriction or deprivation of carbohydrate. Their innocence was identified clinically by astute observers, who expressed their opinion by employing the term diabetes innocens. It may be added that a combination of diabetes with renal glycosuria may occur but rarely.

The occurrence of glycosuria in cerebral tumours, epilepsy and nervous disturbances generally is very familiar. Such cases are the clinical representatives of glycosuria resulting from puncture of the floor of the fourth ventricle; the action is upon the sympathetic nervous system through the adrenals, and explains the temporary glycosuria which may result from excitement and other emotional disturbances.

Intermittent glycosuria is not infrequent in gouty subjects, and especially those addicted to alcoholic excess. It is sometimes (though not often) present in Graves' disease, presumably from antagonism of the thyroid and pancreas. For a similar reason glycosuria may occur in acromegaly.

The association with boils and sepsis is familiar. In children glycosuria sometimes occurs shortly after an attack of pertussis.

Apart from the question of blood-sugar estimations, glycosuria acquires special importance when associated with the presence of acetone, β -oxybutyric and diacetic acids in the urine, and particularly the last two, since acetone may occur in the urine in a large number of relatively innocent conditions. In diabetes the percentage of sugar bears no relation to the amount of diacetic acid excreted, but the presence of sugar encourages the test for β -oxybutyric acid

which, although it cannot in itself intrinsically produce coma, is an essential factor. It is not strictly true to say that one tests for β -oxybutyric acid, for direct identification of this acid is very difficult. But since it is always accompanied by diacetic acid, the test for the latter by the simple addition of ferric perchloride is sufficient. The only fallacy in this test is the close similarity afforded by a urine containing the decomposition products of salicylic acid, which will be present if one of the coal-tar products has been administered. The colour is rather different, but sufficiently like for confusion if the possibility is forgotten. Naturally, prolonged boiling in the case of diacetic acid, which is volatile, destroys the colour which persists in the other instance.

A POST-GRADUATE CLINICAL AND PATHOLOGICAL DEMONSTRATION.

Given at St. Mary's Hospital, October 7, 1928.

By ZACHARY COPE.

M.D., M.S.LOND., F.R.C.S.ENG.

LADIES AND GENTLEMEN,—I have endeavoured to bring together a series of cases and specimens as instructive as they are rare and interesting. All the patients before you have been operated upon, and some have only been asked to come in order that you may be assured of their present condition. From each case I hope we shall be able to draw one or more clinical lessons which may prove of value in future practice.

The first patient is a man aged 57, whom I first saw five years ago on account of a large hard swelling in the posterior part of the left frontal region of the skull. It was hard, painless and appeared one with the bony skull. It had been first noticed between ten and fifteen years previously, and epileptic fits had begun ten years before I saw him,

and become lately so frequent as every ten days. The Wassermann reaction was negative, and there was no focus of primary cancer anywhere else in the body. There was no sign of intracranial pressure apart from the fits. From these data it was very probable that we were dealing with a primary neoplasm invading the bone.

With a view to relieving the fits I exposed the tumour, but after burrowing into the bone for a depth of 2 in. without reaching dura, I had to desist on account of the patient's bad condition. Later, however, I again explored and removed a large part of the bony mass down to the superior longitudinal sinus so as to relieve pressure. The patient improved considerably for a time, but the fits began to recur and he is now an inmate of the epileptic colony at Edmonton. Microscopic examination showed the mass to be a growth invading the bone.

There are several lessons to be learnt from this case as regards pathology, diagnosis, treatment and prognosis.

The pathology of the condition is that of a slow-growing malignant tumour arising from the meninges and invading the overlying bone, causing a large amount of new bone formation in its progress. It probably arises from the arachnoid, but on superficial examination appears to come from the dura. It is commonly referred to as an endothelioma, or more generally as a meningioma, and must be classified with the sarcomata. The very curious distinction from other forms of bone-sarcoma lies in the slow growth and rarity of metastases, and in the enormous amount of new bone which may be formed in process of extension of the tumour.

Diagnosis is not difficult when once there is a prominence on the exterior of the skull, for after excluding gumma, and the possibility of metastatic growth, there is nothing else which causes a chronic, slowly-growing hard painless tumour of the skull vault.

When such a tumour grows inward it

causes localizing symptoms early enough to enable operation to be undertaken with a good prospect of success, but when the bone is invaded the swelling on the exterior of the skull may be painless and unaccompanied by any symptom causing the patient any anxiety. Hence may arise delay in seeking advice and possibly delay on the doctor's part in advising any surgical treatment. When the tumour is small removal is not so difficult but may need to be done in several stages. It is better to remove the bone around the tumour rather than to attack the swelling itself. After removing the bone round about, the tumour mass may better be enucleated.

The question of prognosis is sufficiently commented upon by recounting the facts that the swelling was noticed first about twenty years ago, that fits started fifteen years ago, and that, in spite of the failure of the operations to remove more than a part of the tumour, I am able to show you the patient this morning.

I next show you a pathological specimen from the museum. You see it consists of a plaque of bone, shelving towards the edges, and with a round hole in the centre. It is, in fact, a sequestrum of the parietal bone, and its history is as follows: A lady, aged 33, suffering from lupus erythematosus of the scalp, was in 1925 given treatment by the X-rays. It was done at some place in the country, and either by mistake or ignorance the rays were applied for much too long a time. The lady said she was exposed to the rays for five hours continuously, which, even allowing for exaggeration, seems rather terrible. Anyway, the result was that she was scalped, and the whole of the top of the head became a vast scar. I saw her first in 1924, and at that time there was an ulcer the size of a penny, with raised edges, in the middle of a large bald, scarred area on the top of the scalp. I advised removal of what was evidently an epithelioma. This was carried out, but recurrence took place within a few months

at the site of operation, and a fresh epithelioma appeared in another part of the bare area of the scalp. Excision of both these areas was performed and the parts healed up. Eighteen months ago, however, the original site was again affected by a recurrence. This time I excised the growth by the diathermic cautery. To my surprise and anxiety I found the bone had been infiltrated deeply, and was in one place perforated. As the result of the application of the diathermic cautery, severe meningeal irritation occurred, and in the process of several weeks there separated this large sequestrum. A granulating area as large as the palm of the hand was left, but healed up without the need of skin grafting. Since then the lady has remained well, and, I believe, is soundly cured.

The following comments suggest themselves. The danger of exposure to X-rays for more than an ascertained safe medical limit is emphasized by the destruction of the scalp in the effort to cure the initial condition. The later development of epithelioma (which was verified microscopically), after only one exposure to the X-rays, is, I believe, almost unprecedented. One knows, of course, that cancer is prone to develop in scars, but it is also recognized that radiation upsets the balance of the tissues so that cancer can develop later. The occurrence of two separate growths rather supports this view. The infiltration of the bone by the growth of the scalp is also remarkable. Finally, the cure of the penetrating growth by the diathermic cautery, whose influence extends deeper than the point of application, was a happy, though at the time an alarming, accident.

The next two cases which I wish to demonstrate are living commentaries on the natural history of cancer, and lively warnings as to the possible errors in prognosis in that disease. The first case is a woman: Miss A. B., who was operated on at the Bolingbroke Hospital in 1920 for cancer of the right breast. Local recurrence

soon took place, and within two or three years widespread nodules occurred all over the chest and shoulder area. Some also appeared on the scalp, and were at times removed by energetic house-surgeons, who thought they were dealing with sebaceous cysts, until the microscope revealed cancer. Dr. Ulysses Williams treated her by X-rays, and some improvement took place and most of the nodules disappeared. But the left breast became large, hard, and nodular—an obvious cancer the size of one's fist. I was thinking of removing the left breast, but she had a very severe cough, and X-ray examination revealed the fact that the chest was full of small patches like secondary deposits of the growth. Since that time, i.e., eighteen months ago, no treatment has been carried out, but the patient's condition has improved. Her shortness of breath is not inconveniencing her, the left breast is about a third of the size it was, though at the present time it is hard, nodular, and attached to the skin at two points, and there are two or three small nodules in the skin covering the thorax and neck. The X ray does not show much in the chest, but there appears to be a nodule in the liver.

We have here an example of the natural resistance to cancer. Everyone has seen examples of this in the course of the ordinary atrophic scirrhus, but it is very uncommon to see many nodules completely disappear and large tumours rapidly retrogress. I have often thought that by a study of the serum of such a patient one might obtain some light upon the bodily resistance to cancer. A noteworthy point in this case was and is the slight indication, apart from X-rays, of the implication of the lungs. It is quite common for the lungs to be involved without any very definite physical signs being present, and vague pains and possibly shortness of breath alone may suggest the pulmonary involvement. It should be a rule always to X ray the chest of every case of cancer of the breast before operation. By this means also one can detect metastases

in the spinal column which may be latent. I recently saw a patient with a small movable hard lump, the size of a filbert, in the breast, and adherent to the skin over the breast. There were no glands in the axilla and it seemed an early case. She had some pain in the back and I had the chest X-rayed, only to find extensive deposits in the upper dorsal spine which precluded operation.

The second case exhibiting a problem in cancer is that of this man E.H., who, as you see, does not look particularly ill. Eight years ago this patient was sent into the Bolingbroke Hospital under my care with all the symptoms of acute intestinal obstruction. He was very distended, and immediate operation showed the abdominal cavity full of ascitic fluid; there was enormous hypertrophy and distension of the small gut above an annular stricture of the bowel low down in the ileum. I short-circuited the stricture, but rejected any thought of later excision, since the whole right side of the pelvis was filled with an irregular mass of friable material which I could not but conclude was neoplastic material secondary to a primary growth of the intestine. His convalescence was uninterrupted, and I sent him home thinking he could not live more than two months. At the same time I advised the administration of selenium intravenously as a last resort. To my astonishment he improved rapidly and put on stones in weight. I showed him at the Medical Society of London in 1921, as a case which had improved after selenium treatment. I lost sight of him for some years, but six months ago I was asked to see him at St. James' Hospital on account of a swelling of the right testicle. I found a hard mass in the region of the epididymis of the right testicle, and thought that it agreed more with the characteristics of tuberculosis than with anything else. The query occurred to me—Was the condition of eight years ago really tubercle of the intestine and peritoneum, and does that account for the great improvement after operation? I

advised and carried out removal of the testicle, and took the opportunity at the operation to make a small opening into the peritoneal cavity and feel the pelvis. To my surprise there was still a large mass in the pelvis, and the peritoneum higher up was infiltrated with what might have been tubercle or growth. I removed a bit of peritoneum for microscopy, and took it and the testicle to the pathologist. When I met Dr. Newcomb a few days later he informed me that the swelling in the testicle was due to a deposit of enteric carcinoma—a condition that he had never seen before in the testicle—and that the peritoneal deposit was also carcinomatous. You see before you the patient who is certainly very much better in general health than he was eight years ago.

Comment on such a case as this is almost better left to each one of you, but I cannot forbear drawing two morals.

First, be careful in giving a prognosis in cases of carcinoma, or at any rate guard yourself very carefully when you give a bad prognosis. A doctor does not gain in reputation when he predicts the speedy death of a patient who contrives to live for many years. Secondly, do not be too ready to put down to the remedy what is really due to the kind offices of the bodily resistance to disease. For seven years this patient did well without any treatment. Another point worth noting is the comparative benignity of cancer of the small and large intestine.

Next, I wish to show you a specimen of an hour-glass gall-bladder which I removed from a patient two years ago, and which has been very beautifully mounted by Dr. Newcomb for the museum. I have operated on three such cases. You note that the gall-bladder is large, thick and fibrous, and almost completely divided in an hour-glass fashion by a thick septum. I cannot here go into the pathology of the condition, but would lay emphasis on the practical point that the performance of a simple

cholecystostomy would not completely relieve the patient, for there were gall-stones in both parts, and the communication between the two sacs would hardly admit a pin-point.

I show you also a specimen of a gall-bladder showing a very tight fibrous stricture of the cystic duct without any other lesion—no gall-stones, no inflammation of the gall-bladder. The patient had very severe attacks of biliary colic which were mistaken for a time for duodenal ulcer, since he had pain two hours after food and suffered constantly from hunger-pain. In this case the cystic duct was so constricted that inspissated bile would have had the greatest difficulty in getting out of the gall-bladder, though thin fresh bile may have gone into the viscus easily. Now the function of the gall-bladder is to store and inspissate the bile, and one can understand the pain coming on two hours after meals by supposing that inspissated bile was trying to get out of the gall-bladder. Hunger pain is by no means pathognomonic of duodenal ulcer. After removal of the gall-bladder he was completely well and sent to me on the anniversary of the operation to say how well he had kept.

Next I would ask you to look at this large specimen which was removed several years ago from the patient you see before you. It is a large intussusception—the largest I have ever seen—and consists of small intestine only. The bowel is very hypertrophied but the most important thing to notice is that on the exposed mucosa are numerous pedunculated papillomata. Whenever you get an intussusception occurring in an adult, or even a child over about 4 years of age, always suspect the presence of either a simple or malignant polyp.

The young man before you has had six operations. Eight years ago he used to suffer from attacks of violent abdominal pain. His appendix was removed in some hospital but he was no better. In 1921 he entered St. James' Hospital, Balham, where

he was seen by Dr. Lakin, who detected visible peristalsis in the abdomen during one of the attacks. At Dr. Lakin's suggestion I explored the abdomen and found many coils of intestine adherent to the appendicular incision and apparently causing obstruction. I freed these adhesions and closed the abdomen. Six days later he was seized with acute paroxysmal abdominal pain and vomiting, and became pale and collapsed. A lump was felt in the left iliac fossa. Immediate abdominal section showed an enormous intussusception filling the whole pelvis and the left iliac fossa. Many feet of invaginated gut were reduced till all was clear. Some soft masses in the bowel were thought to be inspissated content of the bowel.

On the thirteenth day after this operation an almost exact repetition of this attack took place and again the abdomen was opened and a similar intussusception found and reduced—this time with much more difficulty and with a few tears of the peritoneal coat of the bowel. The same soft lumps in the bowel were felt and one was removed by incising the bowel. It proved to be a papilloma with a pedicle. No more was done at this operation but six days later the abdomen was reopened and all the papillomata which could be felt were removed by incising the bowel.

All went well for a year when another very acute attack occurred and when I again reopened the abdomen the pelvis was again filled by the intussusception which you see here. It was quite impossible to reduce it owing to intestinal adhesions and I was compelled to resect and perform end-to-end anastomosis with some difficulty. He never gave me a moment's anxiety after any of the operations and has been able to carry on his work ever since—that is for six years.

Multiple papillomata of the intestine occur more commonly in the large than in the small intestine. I always regard them as a precancerous condition. In this specimen

it is very interesting to see the variety in sizes of the papillomata. Apparently we must have been successful in removing all the affected portion of gut.

The last patient whom I have brought to see you is a young man who caused me more anxiety than I care to think of, but whose case is I should think almost without parallel. Briefly he was a case of acute perforative appendicitis followed by acute ascending paralysis of the small intestine, necessitating three successive enterostomies and three short circuits of the bowel before he recovered; followed a year later by symptoms of obstruction requiring another short circuit; and to cap the lot finishing early this year by rapid wasting and acute development of pernicious anæmia which has been treated as you see successfully by the new liver treatment.

The details are as follows: He was taken ill with acute abdominal symptoms in March, 1924. I operated and removed an acutely inflamed and perforated appendix situated on the right wall of the pelvis and surrounded by protective omentum. The omentum seemed very septic, so I removed it—to my after-sorrow. All went well for three days, but then he began to vomit copious amounts of material, which rapidly became fæculent though there was no pain. His cheeks became sunken, and he rapidly presented a cholera-like facies though the pulse remained 88. At once I operated and found the last coil of the ileum obstructed and adherent to the wall of the pelvis where it had been left bare. It was difficult to clear, so I performed enterostomy and short-circuited the base of the loop. Two pints of saline were given intravenously. For thirty-six hours he was much better, but then collapse and fæculent vomiting occurred though with no pain, whilst the enterostomy stopped acting. Again he was opened and the lower part of the small intestine found very thickened and œdematous and clearly paralysed. No peritonitis. A second enterostomy was performed higher

up the bowel, and to prevent loss of fluid the two enterostomies were connected outside the abdomen by a rubber tube in accordance with Wilkie's suggestion. For three days he progressed satisfactorily, but then, again, the upper enterostomy ceased to act, and the patient vomited pints of bile, and appeared moribund. When I reopened the abdomen I found the thick œdematous condition of the small bowel had spread up to the upper jejunum which looked very swollen alongside of the quite normal transverse colon. I closed the upper enterostomy and performed another at the top of the jejunum. To make drainage of the bowel more complete I anastomosed the upper jejunum to the transverse colon, which was quite healthy. The stomach was also washed out.

Improvement from this time was uninterrupted, though convalescence was prolonged owing to the necessity of closing the openings of the bowel. A very important point in the case was the absence of abdominal pain with such acute obstruction.

After he had returned home he rapidly got stronger, but it was noticed that he had attacks of diarrhœa, and had an enormous appetite which could hardly be satisfied. A year later he had attacks of abdominal pain and visible peristalsis which caused me to reopen, when I found an obstruction of the terminal ileum which was corrected by another lateral anastomosis. The abdomen was found very free from adhesion at this latest operation. After this he was much better in every way for two and a half years, but less than a year ago he began to get thinner and weaker, and his medical attendant, Dr. C. M. Young, had the blood examined and found a red count of just over one million with a comparatively high hæmoglobin percentage. Clearly pernicious anæmia. As you are all aware, this formerly deadly disease is now amenable to treatment by the exhibition of raw or even cooked liver in sufficient daily quantity. You will be interested to hear that this patient did

not tolerate raw liver, but has made a very rapid recovery under treatment by one of the more recent liver extracts.

I should like to discuss, if time would permit, whether the pernicious anæmia was in any way due to the serious strain on the young man's constitution three years previously, whether the toxins of obstructed intestine combined with the repeated anæsthetics could possibly damage the patient's liver so that its blood-forming function might be inhibited, or whether the short-circuit between the large bowel and the upper end of the small bowel could be in any way responsible for the late complication. I must be content to suggest these for your own consideration.

It would be unfair to give a description of this case without saying that recent discoveries would probably have rendered the treatment more easy and might have avoided the enterostomies. The administration of antigas-gangrene serum has been shown to have a wonderful effect in some of these cases of ileus, and equally good results have followed the treatment of some cases with human or ox-bile administered *per rectum*.

AMENTIA IN RELATION TO CEREBRAL DISEASE AND ABNORMALITY.

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(Continued from p. 13.)

THERE are a few other cerebral conditions which may give rise to residual cortical damage after the active mischief has subsided, and may thus be associated with amentia. In the first place, I would say a few words about *trauma*, because many cases will be brought to you in which

this is the alleged cause. You will probably be told that the trouble in a large proportion of those that are brought to you dated from, or was attributed to, the child falling on its head, or being dropped by a nurse. Excluding birth trauma and perhaps injuries in the first weeks of life, I believe that trauma must be so rare a cause of amentia that you may for practical purposes exclude it. The more opportunity one has of investigating these cases, the more one finds that the symptoms can be much more easily explained in other ways, and that an accurate history of the child's development—milestones, &c.—show that the amentia preceded the trauma. Moreover, the cases of cerebral trauma which I have seen, with obvious concussion or evidence of fractured base, have scarcely ever been followed by any permanent amentia. As a point of practical policy, you will often do well to have an X-ray examination of the skull in a case in which an injury is supposed to have occurred. Personally, I believe that a cranial injury in a child which is not fatal and does not produce physical signs almost always passes on to complete recovery when the initial irritation has subsided, and that in the rare cases where the cortex is involved in blood-clot you may get fits without amentia, but scarcely ever amentia without fits.

An alleged cause which I think you may dismiss completely is *rickets*. I mention it chiefly because a publication appeared recently on the Continent giving an elaborate description of so-called rachitic dementia, and I have heard it suggested as a cause from time to time. Rickets is very commonly found in feeble-minded children, because many of them are the offspring of psychopathic parents, and are consequently exposed to environmental influences which favour the development of rickets. But I do not believe that there is a grain of positive evidence in support of the idea that rickets is a causative factor in amentia.

A much more difficult question is provided by *sypilis*. There is no doubt whatever