edges and press lightly with soft paper to express any ink that may have run under the edges of the slab. Now pour on Löffler's methylene blue, diluted with an equal volume of distilled water, and tilt the slide well until the ink is discharged from the agar, and it turns violet. Before this end is attained it may be necessary to pour off the first portion of blue and to put on a second. Then wash in a small stream of water directed from a wash bottle to carry away any deposit of altered methylene blue that may be formed on the surface of the agar. Decolourise in spirit until the colour ceases to come out in a visible cloud; finish dehydration in aniline oil, pass into xylol, and mount in Canada balsam.

It will be found that the organisms are stained a deep purple and the agar medium a very pale green. With a 1/12th oil immersion lens the individual organisms can be perfectly seen, while the colonies of those bacteria and yeasts that send off streamers and chains through the medium are very beautiful. Each individual organism is as plainly visible as in an ordinary stained film preparation, but it is a distinct advantage to be able to see the organisms in their exact relative positions; those organisms that are dichotomous, for instance, form interesting subjects of study when stained in this manner. In some of the fermentative organisms isolated from milk there is shown to be at first a proliferation of oval yeast-like cells, but when—either through exhaustion of the food-supply or the poisoning of the medium with the products of metabolism—the environment becomes unsuitable, then long rod-shaped cells are formed which radiate from the colony (Figs. 2 and 3). A number varying from 8 to 20 of the yeast-like cells bud off from the end of the rod and then another of the long cells is pushed through the medium. Although this organism in liquid cultures gives both forms of cell, yet it was not until a preparation of a deep colony in agar plate was stained that I was able to understand the use in the life economy of the fungus of the two types of cell produced. I give this illustration as a possible use in research work of the staining method described.

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A CASE OF THROMBOSIS OF THE INFERIOR MESENTERIC VEIN.

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THE patient, a man aged 48 years, was admitted to the Sussex County Hospital on the morning of April 1st, at about 1 o'clock, complaining of great pain in the lower part of the abdomen and in the scrotum.

History.—The patient had been quite well until about 9 o'clock in the evening, when he began to feel pain in the lower part of the abdomen, chiefly on the left side. At the same time, or soon after, he noticed that the left half of his scrotum had begun to swell; but as he had had for several years a left inguinal hernia producing no inconvenience, and always reducible without difficulty, he did not trouble himself about it. The pain did not come on after any sudden effort, but was of gradual onset. As it became rapidly worse he was brought to the hospital. He was a labourer, and had never worked in lead; his bowels had always been regular, and had been opened that morning; he had never had any illness of any kind all his life.

Condition on admission.—At 1 o'clock, about four hours after the onset of the attack, the patient was writhing with pain which was of a most intense griping character, referred to the lower part of the abdomen, more on the left than on the right side, and also in the scrotum. The inguinal canal and scrotum were filled with a huge hernial swelling, the scrotum itself being swollen to the size of a cocoa-nut, and extremely tense; the penis was obliterated by the swelling. This swelling gave some slight impulse on coughing and was in places resonant. The abdomen appeared somewhat distended, but not markedly so, and there was a definite fluid thrill to be made out; no rigidity of the abdominal walls was present, nor was there any area of tenderness or of hyperæsthesia. With the exception of the hernia there was no localised tumour, and no definite signs of obstruction were present; there was no vomiting, fæcal or otherwise. The pulse was 96, but of good tension; the temperature was 96·6° F., and the skin was cold, clammy, and sweating freely. There were no signs of disease of any sort in the heart or lungs.

The patient was prepared for operation immediately, but was unable to pass urine. Immediately before going to the theatre he passed a pint and a half of bright blood per rectum, whilst on the table he vomited a considerable quantity of food in an undigested state.

Operation.—Anæsthesia was induced with chloroform, and as soon as the patient was unconscious the greater part of the scrotal swelling disappeared, but as blood in great quantity had been passed per rectum it was decided that the hernial tumour should be explored. A catheter was passed but only a few ounces of normal urine were drawn off. A vertical incision was made over the swelling; the hernial sac was freed from the surrounding structures and then opened. Blood-stained fluid escaped in some quantity, and a knuckle of gut was found presenting at the neck of the sac, slightly purple and congested, but not to all appearances past recovery. This was drawn down to expose the gut beyond it in each direction, but this, instead of becoming less congested, was the reverse, and presented patches of dark purple and even black discolouration where the damage done was very extensive. Nearly three feet were drawn down, but as the same conditions were found to prevail beyond this limit, and since a very extensive resection of gangrenous gut was obviously necessary it was decided to open the abdomen in order to complete the operation.

The abdomen was then opened through the sheath of the left rectus muscle, the incision being about five inches in length and reaching from the level of the umbilicus nearly to the pubes. On opening the peritoneal cavity a large quantity of blood-stained fluid escaped, the whole cavity being filled with it. The portion of gangrenous gut presenting through the hernia opening was drawn back into the abdomen and out through the new incision. The extent of the affected gut was found to comprise about five feet extending upwards from a point some six inches above the ileo-cæcal junction, whilst definite congestion and even ecchymoses of some size were present in the mesentery attached to the affected gut, so that a resection of the whole extent of affected gut and mesentery was necessitated. This was begun a few inches above the upper limit, between two pairs of intestinal clamps, a purse-string suture being first inserted immediately above the upper clamp and tightened; the gut was then cut across below the upper clamp, the peritoneal cavity being protected by a gauze packing. A second purse-string was then inserted through the intestinal wall, half an inch above the first, the clamp removed, and the blind end intussuscepted into the gut above it. A third suture was then inserted in the same way to prevent any chance of leakage. The mesentery was then resected between a clamp below and successive stout silk ligatures above, in the same way as a broad ligament, until the base of the mesenteric attachment was reached. The same procedure was then taken with the lower end, and in this way two blind ends of small intestine were left lying in the abdomen requiring an anastomosis.

The ascending colon was found to have a very short mesocolon and could not be drawn out of the wound, so that the transverse colon was brought outside and the small intestine above the blind end was placed in contact with it. The two portions of gut were then clamped and a lateral anastomosis formed between them, the opening made being about two and a half inches in length. The anastomosis was completed in the ordinary way, an extra row of sero-serous stitches being inserted for safety, and tension stitches put in at each end.

The abdomen was mopped free of fluid as far as possible, and the abdominal incision was closed by through-and-through silkworm gut sutures. The hernial opening was closed except for a space left for a drainage tube, which was passed into the abdominal cavity through the remains of the hernial sac, after the latter had been for the most part closed. A pint and a half of saline was given intravenously during the operation, and strychnine hypodermically, while after return to bed a pint of saline was introduced under each breast, and digitalin was given hypodermically four-hourly.

The resected gut was reported as non-viable in its whole extent, while the mesentery for about three inches from the edge of the gut was purple and deeply congested, with several definite ecchymoses scattered throughout its substance, some of the patches being nearly two inches in diameter. Thus in the absence of all signs of a volvulus the lesion must have been a thrombosis or embolism of one of the larger mesenteric vessels, although on examination after the operation no definite thrombosis could be found.

Subsequent progress.—The patient slept a little after the operation, and was fairly comfortable during the day. He was given hourly feeds of milk and water and of albumin water, which he kept down without difficulty. In the evening he was given a turpentine enema, after which he passed flatus. To relieve pain in the evening morphia (¼ grain) was ordered. On April 2nd the patient had had a fair night and his strength was well maintained. An enema of soap and water was given in the morning with a fair result. Calomel (¼ grain) was given four-hourly through the day. At night the pulse was not so strong, and saline was given under the breast—one pint with half an ounce of brandy and three drachms of adrenalin solution (1–1000) on each side; the effect of this was good. On the 3rd the patient had two fluid fæcal motions and the feeds were increased in consequence. Benger's food and plasmon with jellies and beaten egg were given. The pulse again became weaker at night and saline with brandy and adrenalin was given as before (a pint into each flank). On the 4th the pulse was much improved after a fairly comfortable night's rest. The abdominal wound was red and somewhat swollen, so one of the stitches was removed, allowing some turbid serum to escape; some of this was collected and found to contain bacillus coli. A culture was made and a vaccine produced, 5,000,000 dead bacilli being injected into the arm. The patient had two loose actions in the morning and two in the afternoon, so a mixture of bismuth and opium was given by the mouth to check the tendency to diarrhœa. On the 5th the diarrhœa continued to be troublesome, though the motions were quite free from blood and mucus. An enema of starch and opium was given, and a mixture of catechu, chalk, bismuth, and opium was exhibited with but little benefit. The pulse became more rapid, rising to 120, and the patient was exhausted by the frequent actions. There were no abdominal distension and no rise of temperature to suggest a peritonitis. The diarrhœa persisted through the night and the patient obtained but little rest. On the 6th the diarrhœa continued and lead and opium was given in addition to the mixture but with little effect, the condition becoming more grave in consequence. About 6 o'clock the patient became very restless and the pulse-rate increased with onset of dyspnœa. A little later a very definite air-hunger supervened with pain in the chest; he became rapidly weaker and died at 9 o'clock.

Post-mortem examination.—On opening the abdomen it was found that the anastomosis had held well and that there was no leakage around it. Both blind ends were quite healed without leakage, and the stump of the mesentery was in a satisfactory state. The vessels of the mesentery were carefully examined but no definite thrombus was found in any vein or artery. There were, however, old dense adhesions all over the peritoneum with well-marked fibrous perihepatitis and perisplenitis, evidently of considerable standing. There was no recent peritonitis. In the thorax the heart was quite normal, and the aorta showed no signs of atheroma. The lungs on section showed numerous small embolisms, apparently quite recent; and as the area of congestion around each was still quite small and a bright red in colour these probably occurred almost immediately before death, and would account for the pain in the chest and air hunger felt by the patient during his last few hours.

Although no thrombosis was actually found in the vessels of the mesentery there can be little doubt but that the original lesion was one of thrombosis of the inferior mesenteric vein, especially in view of the normal condition of the heart and aorta found post mortem.

Remarks.—The chief points of interest in this case appear to rest in the question of diagnosis, especially in view of the rarity of the causative lesion. The predominant symptom was pain referred to the lower part of the abdomen, of a gradual onset, but culminating within the comparatively short space of two hours in an agony of the most intense acuteness, associated with a tumour in the left inguinal and scrotal region, which had grown since the onset of the pain to the size of a small cocoanut.

The history of the case was of interest especially on account of its extraordinary negativeness. The entire absence of any previous illness or even malaise, of indigestion, of vomiting, of melæna, and of pain was of great help in limiting the diagnosis, as rendering unlikely such acute lesions as perforation of an ulcer of the alimentary tract, whether gastric, duodenal, or typhoid in character. In face of the alleged freedom from urinary troubles, from jaundice, and from venereal affections, such conditions as renal and biliary colic and the gastric crises of tabes appeared equally improbable; whilst the muscular development of the patient rendered a Deitl's crisis of nephroptosis very unlikely. Thus one was left, before making any examination of the patient, with the following as the most probable lesions: acute fulminating appendicitis, strangulated hernia (external or internal), intussusception, acute pancreatitis, volvulus, and mesenteric thrombosis or embolism.

Of these lesions intussusception in adults is almost invariably the secondary result of an intestinal neoplasm, malignant or benign, and such growths in almost every case give rise to symptoms on their own account before producing those of an intussusception; and here the absence of melæna, of diarrhœa, of constipation, of straining, and of the passage of mucus was apparently definite.

On examination of the patient two points were at once striking—the presence of a very large and tense left inguinal hernia, and the presence of free fluid in the peritoneal cavity. At first sight the hernia, if strangulated, presented an obvious explanation of the pain and swelling, but did not account for the free fluid, unless the latter had previously been present but unnoticed, and this seemed unlikely. The situation of the pain in the lower part of the abdomen was not like an acute pancreatitis, where the pain is most often referred about or a little above the umbilicus, though such a lesion might give rise to the free fluid. The absence of tenderness and rigidity over the right iliac fossa practically negatived an appendicular affection, especially in the absence of any fever. The negative history of rheumatic and venereal disease, and absence of all physical signs of cardiac or arterial lesion, rendered the likelihood of mesenteric thrombosis or embolism very small. Volvulus could not, however, be eliminated in this way, and remained a probability with strangulated hernia, internal or external.

The next question was whether the fluid in the peritoneal cavity was due to the presence of the hernia, whether it was itself the cause of the hernia, or whether the two phenomena bore no relation to one another at all. On closer examination of the hernia it was found to be resonant in places, which was against strangulation, and further than this there was the definite statement by the patient that the pain started *before* the appearance of the hernial swelling. These two very important facts, then, made it seem more than probable that the hernia might be merely a secondary effect of some grave intra-abdominal lesion, which was capable of producing in a short space of time a very large outpouring of fluid into the peritoneal cavity. Such might be the result of a very large internal strangulation by bands, &c., of a volvulus, or of a mesenteric vascular lesion, though the latter was unlikely in view of the previous health of the patient and of his excellent cardiac and vascular condition. Thus until the operation was performed it was practically impossible to arrive at any exact diagnosis of the condition, though the passage of the large quantity of fresh blood immediately before reaching the theatre rendered certain the presence of some acute intestinal lesion.

With regard to the operation, the tangible presence of the hernia led to the first incision being made over the swelling with a view to its exploration. Had the blood not been passed per rectum just previously the self-reduction of the greater portion of the hernia under the anæsthetic might have led to the condition being left without further interference, but under the circumstances operation became inevitable. The lateral form of anastomosis was preferred to the end-to-end form because of the impossibility of gauging the exact extent of the damaged gut, and because with the lateral junction no special strain was inflicted upon the doubtful portion. In the after-treatment the great difficulty to contend against was the diarrhœa that so often occurs in cases of intestinal resection, and it was this that so greatly reduced the vitality of the patient. Indirectly the enormous

drain upon the body fluids very probably aided a tendency towards further thrombosis, which gave rise to the final and fatal pulmonary embolisms.

The recorded mortality after operation for arterial thrombosis is 92—95 per cent.; whilst in venous thrombosis it falls to 81—88 per cent. Without operation, of course, no recoveries are reported. The fact that this patient lived for six days is probably due to the absence of the heart lesion which is usually present in such cases.

Reviews and Notices of Books.

Protozoology. By GARY N. CALKINS, Ph.D., Professor of Protozoology in Columbia University, New York. Illustrated. London: Baillière, Tindall, and Cox. 1910. Pp. 349. Price 15*s.* net, or $3.25.

A CERTAIN fascination surrounds the amœba. as we watch its movements upon the stage of the microscope, in the idea that this collection of protoplasm has been living since life first appeared in our world and possesses the potentiality of immortality. Professor Calkins refers to this, but he says that the same sensations might be experienced upon gazing at our fellow beings or at any other living thing. He thinks that the difference is not so great after all, because protozoa, like metazoa, may die from old age. Certainly they *may*, but none of the ancestors of the particular amœba we see can have done so, and while the living metazoan body is destined to disintegration in a comparatively short time the amœba has in its whole body the potentiality of immortality.

Had Professor Calkins called his book "Parasitic Protozoa," or used some name for it that indicated that parasitic protozoa, perhaps particularly the tropical forms, were dealt with in detail, while the free-living forms were treated of only in such a manner as to serve but barely as an adequate introduction to their more dependent relatives, our part would have been easy, for we should have little to do but praise. This misnomer, for no other term can be applied to the title of the book, is the more surprising and disappointing because of the hope very naturally raised by Professor Calkins's earlier work on Protozoa published in the Columbia University Series. There he dealt with this difficult subject in a new and very satisfactory manner, and we had hoped that the present volume would prove to be an adequate amplification of the valuable introduction he had already provided.

Unfortunately there are many circumstances which militate against the proper treatment of the protozoa by any single author. A man could hardly hope to obtain a really thorough knowledge of the Phylum in one short lifetime, even were the existing knowledge in a readily available and satisfactory condition, which it is not. The classification, even in some cases where broad and important points are involved, is in a hopeless state of confusion. Many of the most active workers are medical men whose technical zoological training only began when they commenced to make original observations upon parasitic protozoa in connexion with the diseases they cause. We fear that in too many cases a sound foundation in a knowledge of the free-living protozoa is regarded as quite unnecessary and a waste of time by such men. Yet a moment's thought makes evident the supreme importance to medicine of a familiarity with the life-cycles and general facts relating to the free-living protozoa; for the parasitic forms must necessarily have been derived originally from the non-parasitic.

At the present time a grave confusion in morphological terms exists, particularly with regard to the parasitic protozoa, a confusion which may be attributed to the invasion of zoological fields by observers who have not received a special zoological training; but against this must be set the fact that our great clinical lessons have all been taught us by just this energetic and self-sacrificing class of workers. The morphological terms that were already available before the medical investigation of the parasitic protozoa were comparatively simple and reasonable. We had the nucleus and cytoplasm of the cell. The latter, from which the motile and other organs of the unicellular organism are developed, was further divided into endo- and ecto-plasm; and sometimes we find, particularly in vegetable cells, a definite cell membrane. Minute bodies, generally on the limit of microscopic vision, the centrosomes, are almost invariably found in the cytoplasm. We know of these structures in two very different relations: (1) as occupying the centres of force or great activity in the mitotic figure; and (2) in connexion with the motile organs of individual cells. This connexion with motile organs is most marked in the case of the flagella (e.g., spermatozoa), but they have several times been described as multiplying beyond the usual pair in the case of ciliated cells, one centrosome being found at the base of each cilium. Professor Calkins leaves his readers in great doubt as to what he thinks about the centrosomes in protozoa, and, indeed, about the whole process of mitosis in them.

Maupas's classical work upon the fertilisation of unicellular animals gave us the lead in the investigation of the life-cycles of the protozoa. Zoologists were already familiar with the micro- and macro-nuclei present in so many of these forms. He first showed that the function of the macronucleus was almost certainly entirely concerned with the nutrition of the cell, while the micro nucleus only took part in conjugation and subsequently gave rise to macro-nuclei in the new generation of individuals. We therefore have macro- and micro-nuclei already named, and also the centrosomes.

With regard to identifying the two nuclei of Trypanosomes, Trypanoplasma, and other parasitic protozoa with the macro- and micro-nuclei of *Paramecium*, for instance, objections certainly exist, but they are rather of a negative than a positive nature. We believe that we are right in saying that in no case has an account of fertilisation in these parasitic forms received general acceptance. While our knowledge is in this state it would appear more reasonable and less likely to produce confusion if the old terms were adhered to. Let us take a concrete case. In Trypanoplasma there are two nuclei—one large one, generally spherical in shape; the other smaller, elongated and curved. The latter stains far more densely than the former, so much so that with the methods usually employed it is difficult to make out any structure in it at all. Outside the small nucleus are two minute bodies situate at the base of the two flagella, or, rather, one at the base of the flagellum, the other at the base of the filament which runs along the edge of the undulating membrane. There seems every reason to believe that these small bodies are centrosomes; at any rate, there is nothing whatever against such a supposition. Yet they have recently been called "blepharoplasts," and, unfortunately, this term is very often, perhaps generally, applied to the small darkly staining nucleus, which is also known by the complicated name of "kinetonucleus." This one examle shows in what a puzzling condition the morphological nomenclature of these forms is. There is, therefore, a splendid chance for anyone with sufficient authority to rectify these matters by going back to the old and well-known terms where they can be used, and by refusing countenance to all new ones, except in the cases where undoubtedly new structures with new functions are found. Blepharoplasts, kinetonuclei, and the rest may some of them be such structures, but the proofs are yet to seek. Professor Calkins, it seems to us, has missed this chance of simplifying