force was supposed to be traceable to its influence—or, in short, to be electricity. It is only owing to the numerous experiments on living animals that we now know that a nerve impulse is the rapid transmission of a chemical change or protoplasmic explosion, as it were, passing along the axis cylinder of the fibre. It was in the earlier part of this century that by the experiments of Sir Charles Bell, Magendie, and Johannes Müller the distinction of motor and sensory nerves was definitely established. This was the first great step since Galen, and was the key to the understanding of the functions of the nerve centres. Without it Whytt and Prochaska were but groping in the dark. It was chiefly by following the question of the functions of the roots of the spinal nerves by repeated experiments on living frogs that Johannes Müller was led to his accurate conclusions as to the functions of the spinal cord. But it is, no doubt, to our fellow countryman, Marshall Hall, that most credit is due for both originality of discovery and energy in advocating the laws of reflex action which really form the basis of our present knowledge of the uses of the nervous centres. Now we have a precise acquaintance with the localities in which lie the nerve cells that preside over many of our most important organic motions, such as respiration, deglutition, &c.; and a kind of localisation of higher functions seems to be promised by certain modern methods of experiment, which have so far only given results which tempt the sanguine physiologist to look forward to great advances in psychical therapeutics.

Any account of the growth of physiology would be most faulty which did not give prominence to the name of Albert von Haller. By his exertions as an experimentalist, a teacher, and an author, Haller gave a most powerful impulse to the study and progress of physiology. His original investigations have given us a series of results unequalled in number, accuracy, and importance by those of any other physiologist. But Haller's claims to the gratitude of posterity rest less, perhaps, upon the discoveries which he himself made than by his bringing together in his "Elements of Physiology" all that was known of this science, which had been previously scattered throughout the cumbrous writings of the numerous earlier observers and experimenters. Further, he created a spirit of experimental research which had never before existed, and which, I hope, will never again disappear from our methods of medical study. He gave the first short and comprehensive view of physiology that ever appeared. In short, Haller may be said to have created our science as it now is, and he has been well called the father of physiology. I have here his "Præparatæ," which is the oldest and one of the best student's handbooks of physiology. Our science, then, which was conceived in the days of Galen, was only born in the eighteenth century, having undergone a remarkable quickening in the time of Harvey.

It is in connexion with the irritability of muscle, independent of the nervous system, that the name of Haller is most familiarly known, for this was the point raised by him which gave rise to the widespread pathological theories which I mentioned in my last lecture. Galen and all his successors believed that the activity of muscle came from the brain or the cord. "All the muscles," says Galen, "have a communication with the brain and spinal marrow; for they must receive from the brain or the spinal marrow a nerve which, though small in appearance, is by no means inconsiderable in power. . . . There is certainly some great power in the nerves, flowing into them from their primary origin, for they have it not in themselves, neither do they originate it in them. This is proved most distinctly by the fact that if you divide any of the nerves, or the spinal marrow itself, the part above the incision and in continuity with the brain will still retain its powers; but the part below will be incapable of producing either sense or motion." The first dissentient from this view seems to have been Glisson; and he also first used the term irritability as applied to a muscle independent of its nerve. Indeed, he also seems to have had an idea of reflex action. According to him muscular fibres may contract in response to three different kinds of stimuli: (1) To those applied to them directly; (2) to a sensory stimulus coming from without through the medium of the nerves; and (3) to a voluntary impulse arriving from the brain. Haller explains the matter much more fully and clearly than Glisson, and applies his views to all the motions of organic life. He says, "Every muscular fibre when irritated contracts itself, and this character distinguishes it from the vegetable fibres, and perpetual irritation alone is the cause of the continuation of motion in the vital organs, after the

animal organs had ceased to move. . . . The irritability of the muscular fibre is independent of the nerves and of all known property." Elsewhere he says: "Irritability is different from elasticity, and from the dead contraction common to all fibres; it seems to constitute a power which is quite peculiar to the muscular fibre, and characteristic of it, so that every muscular fibre may be said to be irritable; and, on the other hand, everything which is irritable may be said to be muscular fibre. It is a power distinct from every other power and to be referred to the sources of motion—of the ultimate cause of which we are ignorant." How apposite is Haller's muscle-force at this moment, when there is a difficulty in explaining some vaso-constrictions which occur without nerve influence and vaso-dilatations which follow nerve influence.

Although Germany be the cradle in which our comparatively young science is now fostered, I think, from the sketch I have given, it may be gathered that England has made a fair contribution to modern physiology.

Are English physiologists now to stop working, or must they proceed with the heavy incubus which has been placed around their necks by the opponents of experimental research?

COMPOUND SUPPURATING HYDATID CYST OF THE LIVER,

TREATED SUCCESSFULLY ON THE ANTISEPTIC PLAN.

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AND

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SIMPLE hydatid cyst of the liver is far from uncommon; its diagnosis is generally easy, and its treatment successful. But simple cysts may change at times into those of compound form by fusion or otherwise, and yield a high death-rate from the accidents of size, situation, laceration, or change in the nature of their contents, and occasionally from the very means adopted for their destruction. The case to be described would fall under this second division, and may be thought worthy of notice, not only from its special complexity or the freedom of the operative procedure, but from the unusually large amount of hydatids discharged during the progress of the treatment (to state the number, at two thousand would probably be an under-estimate), and also from the apparent completeness of the cure, without the occurrence of any untoward symptom of more than transient duration.

Thos. M—, aged thirty-seven, unmarried, was admitted into the Royal Free Hospital, under the care of Dr. Cockle, on Nov. 22nd, 1881, with the following history. He comes of a healthy family. Was formerly a commercial traveller, but for the last four years has been in the police force. He has been subject at times to a cough in the winter, unattended by any shortness of breath. Has had no previous illness beyond an attack in 1875, supposed to be lumbago, which lasted six weeks. Since then he has suffered at times from wandering pains in the back, and more or less from weak digestion and some failure of the appetite. Within the last year or two he has got thinner and become paler, and eventually observed that his feet and ankles were swollen at night. In the beginning of November he states that he caught cold, followed by shiverings, subsequently recurring at irregular intervals, with severe cough and difficulty of breathing. However, he still kept on night duty, but was at length compelled to go on the sick list for bronchitis. On Nov. 20th he felt great pain in the pit of the stomach, which was relieved by the application of iodine liniment.

Present condition.—He presents the appearance of a man originally of good muscular frame, but now considerably emaciated, and he states that he is still losing flesh. His complexion is of a markedly earthy tint, but without the slightest jaundice; the conjunctivæ are quite natural, and the urine clear. His skin is harsh and dry, the tongue coated, and digestion impaired. The left lung generally is unduly resonant on percussion as compared with the right; a few scattered râles are audible at the bases, and dry

sonorous rhonchi at the upper portion of the chest, especially towards the left apex. The expectoration is moderate, clear, frothy, and somewhat viscid, but never tinged with blood; cough is occasional, but not great. The heart occupies, apparently, its natural position; its rhythm and sounds are normal. The pulse is full, soft, and slightly quickened. The area of hepatic dulness is very markedly increased, extending from about the upper border of the fourth rib in the right mammary line to upwards of two inches below the umbilicus; in the mid-axillary line from the lower border of the fifth rib to three inches above the right crista ili. Upon placing one hand posteriorly, and the other over the anterior face of the liver, the antero-posterior depth feels greatly increased, yielding a sense of resistance. The entire right lobe on its anterior face felt tolerably firm and smooth, without any particular bulging or sense of fluctuation at this time, and, from its perfect painlessness and absence of tenderness on pressure, rather suggesting the idea of amyloid enlargement. The enlargement has a remarkably square end to the left of the umbilicus. The position of the organ remains unchanged during respiration, and is probably fixed, at least in places, by adhesion. The splenic dulness seems normal. Very marked oedema of both lower extremities exists. The patient continued in much the same state until Nov. 28th; the bronchitic symptoms were greatly lessened, but he complained of a "tight feeling" at the pit of the stomach.

Dec. 2nd: There was now apparent a marked and visible prominence over the middle of the enlargement, it being tense, elastic, with obscure hydatid fremitus on percussion, and a distinct feeling of fluctuation. Upon firm and sustained pressure over the prominence the fluid in the swelling seemed to be displaced, reappearing slowly with a rebound as the pressure was gradually relaxed.

Leaving for the moment these later physical signs it was necessary, in order to include all the data for accurate diagnosis, to look again into the past history of the case so far back as the supposed attack of flumbago in 1875. For it is probable that this attack may have been connected with the development of a cyst deep in the liver, near its posterior surface; such a view seems consistent with what is known as to the ordinarily slow and painless growth of a hydatid cyst. Although no particular symptoms immediately followed the attack beyond a wandering pain in the back and impaired digestion, more remotely there occurred, without other obvious cause, gradual loss of flesh, change in the complexion, and, finally, oedema of the lower extremities, the latter result only to be explained by the pressure of a cyst upon the inferior cava, for the urine was fairly normal in quantity and free from albumen. Finally, the severe pain at the pit of the stomach, together with the rigors and the comparatively rapid development of the anterior fluctuating swelling, led to the diagnosis of a compound suppurating hydatid cyst of the liver.

Mr. Rose was requested to open the cyst by incision, which was done on Dec. 6th under the antiseptic spray, and the antiseptic treatment was continued unintermittingly throughout. All notes from this date were taken daily by Mr. Pollard. An incision, one inch and a half in length, was made just internal to the cartilage of the ninth rib, when a large amount of pus and hydatids escaped through the opening. The number passed at once, and by subsequent manipulation, was about five hundred. The hydatids varied in size from an ordinary pea, or smaller, to cysts whose walls were two inches in diameter. A large-sized caoutchouc drainage-tube was inserted and the wound dressed. In the evening severe pain of a shooting character was complained of. Pulse 100; temperature 98.6°. A quarter of a grain of morphia was administered.

December 7th: Wound dressed; free discharge of pus and hydatids; discharge more serous; drainage-tube left in situ; dressings tinged with bile; odour of sulphuretted hydrogen. Pulse 100; temperature, 98°.—8th: Wound dressed; discharge less free; hydatids tinged with bile blocking tube, which was removed and reinserted. Pulse 84; morning temperature, 98°; evening, 99.8°.—9th: Appetite good; feeling stronger and has less pain. Wound dressed; discharge of feculent odour, tinged with bile; tube removed, shortened, and reinserted. Salicylic cream applied round the wound. Morning temperature, 98°; evening, 99.4°.—10th: Some cough; wound dressed; free discharge of the same character. Temperature 98°.—11th: No discharge has come through the dressing; bowels acted for first time since operation. Morning temperature, 98.6°; evening, 97.2°.—12th: No dis-

charge has passed through; feels comfortable and free from pain. Morning temperature, 97.4°; evening, 100°; has slept through the rise.—13th: Wound dressed; drain blocked by cysts; four ounces of muco-biliary matter evacuated. Morning temperature, 98°; evening, 99.4°.—14th: Patient looking clearer and brighter; occasional darting pains in region of liver; complains of presence of the tube; wound dressed; free biliary discharge; fewer cysts. Morning temperature, 97.8°; evening, 98°.—15th: Discharge not through; no pain; looking and feeding well. Temperature, 98°.—16th: Wound dressed; discharge thicker and more grumous; still feculent odour; tube shortened; before reinsertion the dressing forceps had to be used, as the liver appeared to have risen somewhat. Morning temperature, 98°; evening, 97.2°.—17th: No discharge through. Temperature normal.—18th: Slight throbbing pain. Morning temperature, 97.4°; evening, 98°.—20th: Wound dressed; drainage-tube removed; slight serous discharge tinged with bile; free from pain; sat up; protective used for the first time.—22nd: Wound dressed; no special odour with discharge, which is serous, but the protection is blackened.—26th: Dressed; same character of discharge.—29th: Wound open to one inch depth; not much discharge; got up.

Jan. 1st, 1882: Dressed; less discharge, without smell; sinus about the same depth.—4th to 6th: Dressed; no smell detectable since Dec. 18th until Jan. 8th, 1882; temperature ranged between 97.4° and 99°; no hydatids were discharged; patient was up daily.—9th: More pain complained of; the discharge on dressing had again a feculent odour; six hydatids came away; dressed with salicylic cream, spray and deep dressings. Morning temperature, 98.2°; evening, 100.2°.—10th: Some pain complained of; expression of countenance evidently anxious; kept in bed.—11th: Still complains of pain; no change in respect of temperature.—12th: Morning temperature, 101.2°; evening, 98.6°; felt in the evening a rush of discharge from the wound; feculent smell detected two beds off; pulse full; headache; furred tongue.—13th: Incision reopened by inserting and opening drainage forceps; thirty or forty hydatids passed with about six ounces of pus of feculent odour. The cysts measured more than two inches and a half in diameter. The finger introduced detected a kind of shelf, behind which it entered a cavity deep in the liver. A large caoutchouc drainage-tube two inches and a half long was introduced, which, after passing upwards, dipped into the cavity. Morning temperature, 98.4°; evening, 100°.—14th: Dressed; a longer tube of four inches was introduced, the present tube being absolutely blocked by hydatids. The forceps were used and several more extracted, with four ounces of pus of feculent odour. Morning temperature, 99.8°; evening, 98.4°.—15th: Pain in wound less; looks brighter; discharge not through. Morning temperature, 98°; evening, 99.4°.—17th: Dressed; a larger tube introduced; six ounces of pus and more cysts discharged; it seems as if a large mother cyst had existed behind the first which was opened.—19th: Dressed; tube again blocked. A silver tube is to be made of such a size that it cannot be blocked, and will be capable of being cleaned without removing it.—21st: Dressed; pus to a large amount, and with decomposing cysts, escaped. Morning temperature, 100.4°; evening, 98.4°.—27th: Since the 21st the wound has not been dressed, as the discharge has not come through; temperature has varied between 98° and 99.4°; dressed to-day; discharge smelling less, and less abundant; drain shortened.—28th and 29th: Patient more comfortable; discharge not through. Morning temperature, 98°; evening, 99°.—30th: A silver drainage-tube with collar made specially, 6.5 centimetres long, collar 1 centimetre broad, calibre 1.4 centimetres; this was inserted after the removal of the previous tube. Its insertion was followed by a gush of a very large quantity of pus and hydatids, the sheets &c. being soaked in addition. During the night dressing and draw-sheets were soaked. Morning temperature, 98.2°; evening, 99.4°.—31st: Dressed; eight large cysts on dressing and in tube; discharge serous; air enters and is expelled during respiration through the tube, which is protected both by the spray and a piece of gauze dipped in carbolic lotion. Temperature, 100.2°.

Feb. 1st: Dressed; a copious serous discharge, which has coagulated round the tube. Morning temperature, 98.4°; evening, 99.4°.—2nd: Dressed; discharge serous, thinner; no cysts. Patient complains in the evening of the pressure of the tube. Morning and evening temperature, 98.2°.—3rd: Brown serous discharge; tube projecting half an inch;

collar protected by wet gauze, and protective with salicylic cream.—4th: Dressed as yesterday.—5th: Dressed. Night temperature, 101°. Bowels not open for several days; purgative.—6th: Discharge not through. Morning temperature, 98.4°; evening, 99.4°.—7th: Dressed; tube kept half an inch out; serous discharge.—9th: Dressed. If the dressing over the tube is touched much pain is felt, and patient feels as if "something was forcing out the tube."—12th: Dressed; much less discharge; tube in only two-thirds of an inch; well padded with wet gauze.—15th: Dressed; tube forced out; little discharge; liver dulness nearly normal; silver tube finally removed.—17th: Dressed; superficial wound dressed with protective and gauze with collodion to keep it impervious. Patient got up.—23rd: Granulations prominent; probe enters a quarter of an inch, touched with nitrate of silver and dressed with dry gauze and collodion.—26th: Wound healed; covered with collodion; since Feb. 1st the temperature, except on two occasions, has not risen above 99° or fallen below 98°. The patient is now able to go out, and seems quite strong again.

April 9th: The patient expresses himself as perfectly well, and leaves the hospital to-morrow for a convalescent home. He has gained appreciably in weight; his face has again filled out, and the complexion is natural. Both appetite and digestion are now excellent, and every function is naturally performed. The liver has retracted nearly within its normal limits, some slight sense of resistance being still detectable. The shape of the abdomen is quite normal. It may, therefore, be fairly hoped that the cure will remain permanent.

Remarks.—The case was probably one in which two hydatid cysts were developed in the liver; the larger and earlier commencing deep in the right lobe, occupying the middle and posterior portions, and eventually communicating with the anterior cyst, which latter, judging from the history of the case and the late appearance of visible bulging, seemed to be of more recent formation. This, at least, may be regarded as the probable order of development, inasmuch as the finger, after passing through an apparent anterior cyst, entered a well-defined opening at its further end, barely admitting it (and which, judging from the thickness and the resistance of the walls, appeared to consist of healthy hepatic tissue), and leading into another cavity, the exact extent of which could not be accurately gauged, but, judging from its contents, seemed to be of very considerable size, sufficient to exert pressure upon the inferior cava, and to induce secondary dropsy of the inferior extremities. It will have been noticed that on several occasions during the progress of the treatment discharge of bile took place through the tube. Some biliary duct or ducts had evidently opened into the cavity. Although several of the cyst membranes were stained with bile, large numbers of hydatids were subsequently discharged at intervals apparently quite unchanged, retaining their tense and semi-translucent appearance, seemingly tending to show (contrary to what is usually supposed) that the bile during this period had neither excited inflammation nor exercised any lethal influence over the parasite. In many of the secondary cysts that were entire numerous minute buds studded the germinal membrane, to which they were more or less firmly attached. Such of the undamaged cysts as were microscopically examined contained either hooklets or echinococci. Some cysts were passed ruptured and decomposing. The feculent odour was tolerably persistent, more or less detectable in the discharge through the tube, and probably resulted from the proximity of the mother cyst to the intestine, as usually happens wherever pus forms near the latter; or from some change in the character of the cyst contents. At no period did there exist the slightest ground for supposing that any communication with the bowel existed. If there were, it must have been a *mère* capillary fissure. In conclusion, it may be observed that considering the high mortality of cases of suppurating hydatid cyst of the liver, treated heretofore by incision in the ordinary way, the advantages of the antiseptic plan are clearly manifest.

P.S.—May 2nd: The patient has returned from the country in excellent health, and is about to resume duty as a constable.

THE Société contre l'Abus du Tabac offers a prize for the best essay on the question, "Do there exist characteristic symptoms sufficient to warrant the conclusion that amaurosis or defect of sight is caused by the excessive use of tobacco?" The prize consists of books to the value of 200 francs and a bronze medal.

ON CONVULSIONS IN CHILDREN.

By EUSTACE SMITH, M.D., F.R.C.P.,

PHYSICIAN TO HIS MAJESTY THE KING OF THE BELGIANS, PHYSICIAN TO THE EAST LONDON CHILDREN'S HOSPITAL AND THE VICTORIA-PARK HOSPITAL FOR DISEASES OF THE CHEST.

THE commotion in the nervous system which goes by the name of eclampsia, or a fit of convulsions, is a common phenomenon in infancy, and is sometimes seen in early childhood. It depends upon an exalted sensibility of the reflex centres seated in the pons and the medulla oblongata, but is attended by no change in those parts capable of being detected on examination of the dead body. The disturbance is essentially a symptom, and may be produced by a variety of causes. Irrespective, then, of the immediate danger to life, the phenomenon may be of serious moment or of trifling consequence, according to the cause which has induced it. It is therefore of great importance to ascertain its mode of origin, for only by this means can we speak with any confidence as regards the influence which the attack is likely to have upon the future well-being of the child.

It is during the first two years of life that the tendency to this form of nervous derangement is most active. At this period of childhood the nervous system of the infant, although immature, is undergoing rapid development, and the reflex centres respond briskly to every form of peripheral irritation. The tendency to eclampsia is not, however, confined to this age. Convulsions may even affect the infant in the womb. Early death of the foetus and premature labour can be sometimes attributed to this cause, and it is to this accident that some varieties of congenital deformity have been referred—those which are characterised by permanent contraction of special muscles. After birth the proneness to convulsions may continue for a longer or shorter time, according to the natural sensitiveness of the nervous system to external impressions. It is therefore much more persistent in some children than in others, and may endure in exceptional cases to the ninth or tenth year.

There are certain conditions which predispose a child to convulsions. Thus, the liability to eclamptic seizures sometimes runs in families so that all children born of certain parents are found to suffer from these attacks. In other cases the tendency is confined to certain individuals of the family, or even to one sex. Thus, all the boys may have convulsions, while the girls escape. Again, in rickets there is a special convulsive tendency, which is very remarkable; and a very large number of the cases of reflex convulsions are found in children with this constitutional condition. When the predisposition exists, very slight causes—causes often so trifling as to escape recognition—may induce the attacks.

Within certain limits, the state of a child's nutrition does not appear to affect his susceptibility to convulsive seizures. A strong child and a weak one may be equally prone to suffer from this nervous disturbance. When, however, an infant is greatly reduced by long-continued interference with nutrition, a remarkable difference is noticed in his sensibility to nervous impressions. Not only is there no exaltation of reflex function, but the normal excitability of the reflex centres is diminished or annulled; so that in a child so enfeebled convulsions are seldom of reflex origin, but usually indicate grave cerebral disease.

In every case of convulsions we should examine the patient very carefully for signs of disease of the brain or its membranes; more especially as the first question usually asked by the parents, after their excitement and alarm have somewhat subsided, relates to the possibility of any affection of the brain. In infants of twelve months of age and under—if the child be fat and robust-looking, the fit is in all probability reflex; if he be under-nourished, weakly, and wasted—i.e., in that condition where all reflex excitability is practically in abeyance, the convulsion is no doubt the consequence of an intra-cranial lesion. In a weakly emaciated infant by far the most common cause of a convulsive seizure is general tuberculosis with secondary tubercular meningitis.

The character of the fit itself will give some indication. Cerebral convulsions are often partial; therefore if the spasms are limited to one side of the body, or to one limb, we should search carefully for signs of cerebral disease. Paralysis of