

the bowels. The abdominal tumour was supposed to be, in all probability, a fibroid tumour connected with the uterus, if it were not ovarian. As soon, however, as the signs of pulmonary consolidation made their appearance, associated with unmistakable evidence of excentric pressure, I had no longer any doubt of the real nature of the case, especially as with the supervention of these signs there was a remarkable subsidence and eventual disappearance of the signs of mucous irritation. The physical signs were unmistakably those of consolidation rather than of effusion. The disappearance of all signs of mucous irritation, and the non-occurrence of any evidence of ulceration, rendered it extremely improbable that the consolidation was due to tubercular deposition; and the history of the case, as well as the general symptoms at this time, contradicted the notion of pneumonic consolidation. It is difficult to explain the occurrence and subsequent entire disappearance of the tympanitic cracked-pot sound. This phenomenon, it is well known, is not unfrequently met with in connection with consolidation of the apex, both from pneumonia and pleurisy. The absence of vocal fremitus, the marked transmission of the heart's sounds throughout the lung, and the existence of an apparently pulsating tumour at the sternal end of the left first rib, are also very noteworthy. A little attention, however, soon proved that the apparent pulsation was a respiratory phenomenon, and was due to the partial dislocation and consequent movement of the end of the rib during respiration. In the later stages of the case there could be no reasonable doubt as to its real nature. The displacement of the heart; the distension of the superficial veins; the stridulous breathing; the extension of dulness across the upper part of the median line; the pain and forced breathing; and, finally, the appearance of external tumours at the base of the neck, all pointed to the existence of an intrathoracic tumour, and that of a malignant character.

The varieties in form, size, and precise situation, presented by mediastinal tumours, are very great and numerous. The particular anatomical relations of these growths, it is evident, will give to their symptoms corresponding varieties. Both the immediate and the ulterior consequences of the pressure that they exert, as well as the kind and amount of inflammatory action induced, differ greatly in different cases. A small tumour may, from its particular site, at a very early stage give rise to symptoms both of pressure and deranged innervation of great severity; whilst another will attain to a considerable magnitude before the patient experiences any distress, or before any decided evidence of pressure is manifested. Thus dysphagia has been in some instances a very early symptom, and in others has been absent throughout; and the same may be said of dyspnoea, spasmodic action, and cough. The diagnosis, in so far as relates to the direct signs of tumour of some kind, may be often easily made, when it will be difficult or quite impossible to say what that tumour is. But the diagnosis between aneurism on the one hand or cancer on the other may be approximately arrived at, by careful consideration of other circumstances, especially of constitutional condition. In more advanced stages of intrathoracic cancer, there is nothing that presents greater difficulty in the diagnosis than the kind and degree of inflammatory action that supervenes, and the existence or absence of effusion. Adhesions more or less general take place very early in some cases, and serous effusion is prevented; in others, there are few or no adhesions, and considerable effusion. Changes in the tissue of the lung, with varying degrees and forms of consolidation, are met with not infrequently; whilst in many others one or more lobes of the lung remain permeable to air up to a very late period. In no less than six of the thirty-nine cases that I have examined, there was copious effusion into the pleura. It is evident, therefore, that the mere fact of the existence of signs of effusion cannot be conclusive against the existence of cancer. But, on the other hand, it must be admitted that the physical signs of effusion are sometimes very closely simulated by a large cancerous tumour, where no effusion exists. Neither the form of the chest nor the state of the intercostals will be sufficient to protect us from error. I have met with one case in which the early history was that of recurring attacks of pleurisy, and where, subsequently, tenderness and a liquid impulse during cough over the most prominent part of the enlarged side so deceived the medical attendant as to induce him to puncture the chest—convinced that the case was one of empyema of necessity. Time would not allow of my illustrating more than a few of the varieties and clinical puzzles that are presented by mediastinal tumours.

My colleague Dr. Sutton has furnished me with the details of a case that fell under his notice, which well illustrates the difficulty of diagnosis in some of those cases where the side is dilated by the magnitude of the internal growth.

A little girl, eleven years of age, was admitted into the London Hospital, supposed to be the subject of pleuritic effusion of the left side, and suffering from great dyspnoea, with lividity of countenance. There was absolute dulness throughout the left side, before and behind. In

front, the respiration was inaudible, except under the clavicle. There was bronchial breathing close to the spine on the left side, where tactile vocal fremitus, which was elsewhere absent, could be perceived. The heart was displaced, and was felt beating to the right of the right nipple. The left side was bulged, and apparently enlarged. The epigastrium sank in during inspiration. The temperature was normal; pulse variable; respirations from 32 to 36. The diagnosis was, *very great effusion into the left pleural cavity*; and the chest was twice punctured. The points chosen for puncture were between the eighth and ninth ribs, in front and behind the angles. A little dark blood issued on each occasion, and on the second occasion something like pus. The dyspnoea increased, and the child died on March 26th. Before making the *post mortem* examination, Dr. Sutton found, on measurement, that just below the nipple the left side measured an inch more than the right; and so convinced was he of the existence of fluid, that he thrust in a trocar between the fifth and six ribs, when some brain-like substance escaped through the cannula. On laying open the thorax, the entire left side was found to be occupied by a mass of medullary cancer, which had pushed the heart considerably to the right. The left lung was collapsed and pushed backwards, and spread over the cancerous mass.

The patient was repeatedly examined by so accomplished an auscultator as Dr. H. Davies, as well as by others; and all came to the same conclusions—that the chest was full of fluid. The case, therefore, sufficiently proves how very deceptive are the ordinary physiological signs of effusion, when the side is distended by a large cancerous tumour. I believe that, in similar cases, importance may be attached to the peculiar sense of resistance under percussion which characterises a solid growth. This has sometimes been observed to a degree that has been painful to the finger under percussion. In cases of some standing, the persistence of great dyspnoea, associated with signs of pressure, will usually be in favour of a solid tumour, rather than of effusion.

There is another point of some importance in connexion with such cases as, from their history, are liable to mislead on this point of pleuritic effusion; viz., that effusion probably does occur to some extent, is absorbed, and adhesions take place long before the growth has attained sufficient size to distend the chest; whilst in others effusion of a more passive character only occurs late in the disease, long after undoubted signs of pressure have existed. In these latter cases, if they have been watched for any time, it will be found that the dulness has extended from above downwards, rather than from below upwards, except in some very exceptional instances, where the growth has invaded the lower lobes of the lung in the first instance. I need not say that but little assistance can be expected from any modification in the phenomena produced by alteration of position.

ON THE NATURE OF THE CONDITION CALLED EPILEPSY.*

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CLINICAL observation shows two very distinct conditions as the extremes of epilepsy, though the means exhibit almost every conceivable blending of the one condition with the other. The extreme conditions are expressed as *le haut mal* and *le petit mal*.

The former, characterised by violent convulsions, has loss of consciousness in variable degree, and usually has little or no mental disturbance as a secondary stage. In December 1869, in a paper on Catalepsy, published in the BRITISH MEDICAL JOURNAL, I mentioned, among others, one case of *le haut mal* which may be considered as an extreme. In it the stage of perfect unconsciousness quickly passed away, leaving most violent convulsions, during which the patient was able to observe what was passing around.

The latter—*le petit mal*—has for its dominant symptom loss of consciousness only, and this sometimes only momentary in its duration. It is always, however, followed by mental disturbance, sometimes of the most profound character. In November 1867, I published in the BRITISH MEDICAL JOURNAL the details of a remarkable case of *le petit mal*, in which a girl had cut her throat during the *non compos mentis* period which follows the *petit mal* seizure.

In discussing epilepsy, however, we have one purely physiological element to take into consideration; viz., that currents pass along the nerves in one direction only—from the periphery to the centre. The heads of the evidence of this fact I gave in a paper on Matter and Force, published in the *Journal of Mental Science* for July 1869. If we admit, as we must do, that in health there is a perfect balance of

* Concluded from page 569 of last number.

control between the nervous and other systems, it only needs a disturbance of that balance to produce any anomalous action. A muscle remains in tone so long as the nerve-centre which presides over it continues its control, but the moment that is removed the muscle contracts. Now the centres of muscular control are themselves under the governance of the surface-cells of the brain; hence it follows that, if we have surface-lesion according to the degree of surface-destruction, a corresponding loss of central control will result; and if convulsive manifestations occur, the position and degree of them will always be determined by the particular centre affected and the extent to which it is deprived of its potentiality. The fact must not, however, be lost sight of, that neither convulsion nor the diminishing of the potential energy of a central ganglion are essential to epilepsy, and both may occur without it. They often, however, coexist with epilepsy; and my object in speaking of them at this point is to embrace the opportunity of clearly showing how they are secondary.

Additional evidence of the localisation and degree just mentioned is to be found in the fact that the muscular affection of epilepsy is always more marked on one side than the other, and that side is always the opposite of the one where lesion is found: and further, certain limited regions are sometimes affected alone, and in some cases single muscles only. The duration of the muscular manifestation depends entirely upon the extent to which the central organ is affected. If in any given seizure the centre be almost entirely deprived of its potentiality, the muscular spasm will continue until the potentiality of the muscle is also so far exhausted that it balances that of the centre; or, in other words, the contraction and spasm continue until the muscle is exhausted to a degree beyond that of the centre. The centre, again, is in the ascendancy, and able to control it. It thus clearly appears that, if a portion of the surface be destroyed by tumour, pressure, atrophy, or any other cause, part of the governing organ of some centre is wanting; so that, if the brain be deprived of its blood, the imperfectly governed centre will be the one which most speedily loses its potentiality, and also the one which is longest in regaining its control.

The foregoing, however, points to the conclusion that muscular contraction and spasm—or, as it is commonly described, convulsion—is an accident only of epilepsy. In *le petit mal* there is not any particular location of lesion. It is certain that the attack may be dependent upon pressure or destruction of the brain's surface; but the lesion in such a case is in a position not seriously involving the seats of muscular control, or that portion of the surface which has under its governance the centres of muscular control. The mental disturbance, however, in this form of the epilepsy is sometimes profound, and seems often, though not necessarily, to bear an inverse ratio to the duration of the stages of unconsciousness. The actual degree and duration of the mental disturbance are, however, dependent upon the extent and degree of the general imperfection of the brain's surface, which may range from a condition of almost health, or a very slight stage of atony, to an almost perfect condition of fatty degeneration and atrophy.

Whatever be the exciting cause of the condition in any individual—whether tumour, atrophy, pressure on membranes, distant irritation, poison, or depletion—the *modus operandi* of a fit appears the same, and is often as well expressed in the dramatic descriptions which patients themselves sometimes give of *auræ* as in more finely drawn and scientific explanations. A patient will describe a sensation commencing in a toe or a finger and running up a leg or arm to the head, or he will become the subject of illusion or hallucination of either sight or sound—more frequently the former—and he feels what he calls the “sensation” running towards his brain; he then becomes unconscious. What the patient really experiences is the final and imperfect current conveyed from the periphery to the exhausted centre; and if this, for instance, be in association with the centre of sight, or sound, or touch, it is not surprising that “mistake of the sense”, *illusion*, or even that “a baseless creation of the fancy”—*hallucination*—should occur.

The patient becomes unconscious; the centre, to which the current producing the *aura* was conducted, has become exhausted and irritable, and its exhaustion and irritability, communicated to the seat of its control on the surface, has brought about contraction of the small arteries and capillaries of the surface. If a centre be imperfect, it is much more readily exhausted than the remainder of the brain; and continuance of the cause of the exhaustion appears to produce irritation, and this in its turn contraction of the smaller vessels.

Thus it would seem that epilepsy, fearful as the manifestation often is, may almost be regarded in some cases as a conservative effort on the part of Nature to provide rest for an exhausted centre. The ordinary effect of over-work of brain or any organ is irritability, so that the idea of the “sufficiency” of irritation from exhaustion in an imperfect brain to induce capillary and arterial contraction can hardly be considered as wholly hypothetical.

I must here remark that what I have said above in connection with “*aura*” is intended merely as an illustration of the general principle of the *modus operandi* of epilepsy; and I have chosen the example because it may be considered as an extreme one. “*Aura*” is not a common attendant of epilepsy; but its interpretation is an expression through the senses of the source of the exciting cause of the attack, and it points to the direction of the centre which is affected; or, in other words, it is a pointing out of the source of the exhausting influence which produces the attack.

Further evidence that exhaustion is usually the immediate exciting cause of the attack is to be found in the fact that epilepsy occurs very frequently during sleep—perhaps as often as during the period of wakefulness. The amount of blood circulating in the brain during sleep is much less than that which courses through its vessels during the period of wakefulness; and it appears that at the moment when sleep occurs—*i.e.*, at the moment when the cervical sympathetic ganglia become primary centres and lessen the size of the central arteries—the diminution of the quantity of circulating fluid often produces sufficient irritation to contract the minute vessels and capillaries of an imperfect brain. The moment of going to sleep is very often the period of the invasion of an epileptic seizure. Again, I have seen many cases in which the period of attack was the moment of rising in the morning; and in a large proportion of these I have found that a little food, taken before getting out of bed, usually had the effect of warding off the fit.

The last point to which I shall refer is the comparative conditions of the brain in *le haut* and *le petit mal*, the only real difference between them being that the former is attended with muscular manifestations, while in the latter they may be altogether absent. If, from coarse disease, for instance, or from any other cause, a limited portion of the surface be destroyed, and all the remainder be healthy, or sufficiently so for average performance of function, if that portion so destroyed be the seat of control of the ganglion presiding over a muscle or a set of muscles, any irritation primarily affecting either the muscles, the ganglionic centre, or the seat of lesion, will, the moment it bears on the seat of lesion, induce contraction of the lesser vessels, and the epileptic seizure; *i.e.*, loss of consciousness and complete loss of control, will take place. As the circulation begins to return—and it always does so within forty seconds, and frequently within ten seconds—consciousness commences to be restored, and is completed more or less quickly according to the degree of healthiness of that part of the surface not involved in the lesion. The centre of muscular control, however, exhausted by the seizure, comes under very slender governance, since the lesion involves the portion of surface presiding over the centre. The result is that, though the tonic spasm disappears, clonic spasm takes its place, and continues until the muscles are exhausted to such a point that their potential energy balances that of the centre; control is only then restored. In the case of *le petit mal*, as a rule, the whole surface of the brain is more or less abnormal—usually atrophic; there may be a specific and localised lesion, but the essential condition affects the whole surface. It is unusual in this case for the muscular centres to be involved in any marked degree; and consequently, after the recurrence of the contraction of the small arteries and capillaries and anæmia of the brain, muscular spasm in the secondary stage is often absent, or nearly so, or at all events is often only very slightly expressed, while the perversion of intellect is often exaggerated, and continues for many hours, sometimes days; its duration indicating in some degree the extent of the cerebral imperfection, and pointing to the incapacity of the brain-material for ordinary cerebration until normal control has been restored to its cells. This is effected through the medium of rest, nutrition, and a more equable circulation. The seizure of *le petit mal* may be momentary and fleeting. Its duration often seems like momentary vertigo; and very often the patient, if walking, walks on or stops and staggers, and for an instant seems bewildered; and, having forgotten where he is, he tries to re-collect his ideas and thoughts; or, if he be talking, he will lose the thread of his discourse, and he may or may not recover his train of thought immediately. It is not by any means a rule that he should fall. Often his actions and conversation are incoherent, senseless, and unreasonable, for some time after the attack; and, as a rule, when mental equilibrium is restored, he has not the slightest recollection of what occurred during the period of mental aberration.

The detail of many of the manifestations of epilepsy has been unavoidable, since their analyses demonstrate their relation and bearing on the subject of this paper; namely, the actual pathology or the actual nature of the condition we call epilepsy; and this, I think, now cannot but be admitted to be a contraction of the small arteries and capillaries commencing on the surface of the brain, whereby the thinking and controlling material becomes bloodless; and I think we may fairly draw the following conclusions from the facts I have brought together.

1. The essential condition of epilepsy is a contraction of the cerebral small arterial vessels and capillaries.

2. The occurrence of the contraction is sudden.

3. The duration of the contraction is variable. It may be momentary, or it may continue as long as forty seconds.

4. The cause of the contraction is irritation, which may be direct, but is frequently remote, and the result of a variety of causes, all of which, however, tend to exhaustion, which in its turn secondarily bring about an irritable condition of the lesser vessels.

The phenomena corresponding with the conclusions we have adduced are—

1 and 2. With the contraction of the vessels we have loss of consciousness, always sudden, though the patient may have some warning of the attack through the medium of the irritation by which the attack is brought about.

3. The duration of the loss of consciousness will vary with the continuance of the capillary and arterial contraction. It may be so instantaneous as to appear only as a momentary vertigo, or even to escape observation altogether; or it may be most profound and of long continuance. There is no rule for determining any difference in the duration of unconsciousness between *le haut mal* and *le petit mal*; while the only essential difference between the two forms of the disorder is the muscular manifestation. In short, the two forms of epilepsy named have been used as extreme illustrations; but they are not by any means natural divisions of the disorder, if it be considered in the light of a class. In fine, epilepsy is loss of consciousness, the result of contraction of the cerebral smaller arteries and capillaries, induced by irritation, either direct or secondary to exhaustion. Epilepsy may be attended with an endless variety of phenomena, all of which are manifestations of an arrest of control. None of them are essential, and all are dependent upon accidental cause. All are secondary, with the exception of the "aura", which certainly is not primary, and can only be regarded as an imperfect and uncorrected mental impression.

PRACTICAL REMARKS ON THE EXAMINATION OF RECRUITS FOR THE ARMY.

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THE efficiency of an army, when called upon to perform active duties against an enemy in the field, almost entirely depends upon the measures which have been adopted for its training during the time of peace. The experience gained in actual warfare should obviously form the basis of such training, every link in the chain being tested by the most practical and approved means.

The British nation, having great resources, and occupying so important a position in relation to other countries, should possess an army approaching the nearest to perfection; not necessarily a large force, but model-like in its construction and organisation, and capable of any extension without impairing general efficiency. And what, in a primary sense, applies to the regulars, is, at least in a secondary sense, applicable to the militia, the true source of supply for any sudden emergency.

What Sir Charles Napier said of his few hundreds at the battle of Meane may serve to characterise the material of which the British army is composed: "They went forth to victory, not counting their enemy's numbers." It is in England's severest difficulties, when her flag is menaced by foreign potentates, that the knowledge of this fact—the bone and sinew of her trained soldiers, as well as the skill of her generals, inspires confidence to ministers in the dictation of their despatches.

The regulations for the admission of candidates into the service are unavoidably subject to change, being invariably relaxed when the demand is urgent, and more stringent when the need is less pressing—referring not only to stature and age, but also to physical capacity. The medical examiner has, therefore, to be guided in his inspections by existing instructions. No man, however, of inadequate physical strength, or possessing any manifest disqualification, should be allowed to enter the service.

Napoleon's opinion holds good to the present time. Speaking of boys, he exclaimed, "They serve only to fill the hospitals and encumber the roadside." Or, in the words of Mr. Marshall, an army surgeon, who wrote thirty years ago, "to enlist recruits before they have acquired sufficient strength to qualify them to execute their duties, and to undergo the fatigues of a military life, is to multiply the victims of disease and vexation, and to augment the expenses of an army, without adding to its strength."

As it is generally admitted that it takes five years to make a man a

serviceable soldier, it is evident that an army chiefly composed of recruits would prove a lamentable failure, if military precision, energy, and success were the objects to be desired. It would be like sending a ship-of-war to sea manned with landmen. Moreover, the discipline of such a force would not be so manageable, on account of the offences commonly committed by young soldiers—disobedience to orders, violence to superiors, desertion; added to which, inexperienced non-commissioned officers would greatly augment such difficulties, for on them mainly depends the maintenance of discipline and good order throughout the ranks.

The medical examiner may have his mind stored with theoretical knowledge relative to his duties as inspector, and yet frequently fail in the selection of eligible men, unless his eye be also trained as to the requisite qualities of a soldier. There can be no greater mistake than to conclude that, because a recruit may not exhibit any apparent infirmity, he is therefore eligible. A man, for example, may be free from blemish, and yet not possess the requisite aptitude and strength. He may, moreover, be able to read and write, without having sufficient mental decision for the efficient discharge of military duty. In order to form a sound judgment as to the fitness of a recruit, it is absolutely necessary to keep in remembrance "the toil, hardships, and exposure incidental to military life;" and how readily certain trifling affections are liable to be considerably aggravated in the soldier, rendering him incapable, perhaps, of serving beyond two or three years, which, in the ordinary occupations of civil life, would be of no detriment.

A recruit, to be eligible, should be sound all over—not only well formed in every respect, but fully developed, with clear reason, clear sight, clear voice, and distinct hearing. He should be free from marks of medical treatment, such as cupping, extensive leeching, blistering, etc. particularly if such marks exist at the nape of the neck, the region of the heart, or liver. There should be no cicatrices adherent to bone, resulting from serious injury; no abnormal curvature of the spine, or contraction of the joints; and no deformity of the chest. Tattooing below the left nipple must be closely examined, for the detection of the letters D. or B. C., denoting "deserter" or "bad character". In examining the head and face, it is important to notice the condition of each auditory passage, to be certain that it is in a healthy state. The corneæ require close inspection, for the detection of opacities; the nostrils, for polypus; and the throat, for enlarged tonsils. The teeth should be generally sound, and the speech free of impediment.

As a general rule, no recruit should be passed, who, at the time of examination, is suffering from any disease requiring treatment in hospital. It is also important to note that no blemishes exist, which, though apparently trifling in themselves, would afterwards form the plea of alleged causes of unfitness for the service. Recruits are disposed to make light of any defects at the primary examination, but afterwards may find it convenient to magnify such complaints, if a release from engagement be desired.

The disqualifications which are commonly overlooked at first inspections are the following: syphilis, primary and secondary; muscular tenuity and debility; diseases of eyes and eyelids, including corneal opacity, strabismus, and oscillatory eyeballs; disease of heart; disease of veins, constituting varix; hernia; varicocele; defects of the lower extremities from fracture, contraction, luxation, bunions, overlying of toes, very flat feet, etc.; malformation of chest and spine. It will be observed that the foregoing causes of rejection claim special attention. The greatest possible diversity of opinion exists with regard to what is termed "flat feet". A clear judgment is, therefore, necessary in such cases, that no defects exist likely to interfere with marching.

The Adjutant-General writes: "It is considered very detrimental to the service, and distressing to the individuals, that men once passed as medically fit for recruits should be afterwards rejected by Military Medical Boards."

Now that "all recruiting is to be carried on in an open manner, like any other agreement between employer and the party engaging to serve;" and that "no recruit is to be enlisted in a state of intoxication, which would render his enlistment void,"—it will very seldom happen that recruits will be found to simulate infirmities when undergoing examination; but sometimes they do, and it is proper to be guarded against such sources of imposition. Two men presented themselves for my inspection, who had been previously passed by a civil practitioner. The one declared that he could not see the test-dots at any distance with the right eye, while the other man alleged that he could not see with the left eye. I passed both these men; forwarding at the same time to the medical officer of the regiment to which they belonged a report of their cases, with my opinion thereon.

Though the examining surgeon is not responsible for the chest-measurement, yet he ought to satisfy himself that the circumference is agreeable to regulation. The tape should be carefully placed round