help the medullary centres in their fight against the increasing intracranial pressure is when, as in type three of the temperature chart changes, the temperature has risen to about 102° or 103° and there halts, where the blood pressure is raised to 180° or 200° , where the pulse-rate is slowed to 50 or less, the pulse being full and perhaps slightly intermittent, and the respiration is noisy but not yet stertorous. This is the critical stage of the case, and the surgeon should watch the progress with the utmost vigilance, and where, in the event of persistence of compression symptoms and in the absence of any real sign of improvement, he should carry out such measures as are indicated. These are (1) a direct attack in the presence of an osseous lesion of the vault, and (2) an indirect decompression operation in all other cases.

Such operations should be carried out, whenever possible, under local anæsthesia, or without any anæsthetic, the operation being preceded by the administration of a dose of morphia. A decompression operation has for its main object the provision of such decompression as will compensate for the increased intradural pressure.

Any operation should be conducted with the least possible disturbance of the patient, and the patient returned to bed as soon as is possible. From this it would appear that, judging from my own experience, every head case requires the most careful supervision, and operative measures should only be carried out during that stage of compression to which I have alluded. It is absolutely futile to decompress a patient in the later stages of compression, when the medullary centres are failing, when the blood pressure is falling, when the pulse-rate is rapidly increasing, when the respiration becomes deeply stertorous, even Cheyne-Stokes. In such cases nothing can be done to save the patient's life.

Before concluding I should like to say a few words about the operations that may be carried out. In the event of a direct attack on a vault fracture the injured area must be fully exposed, preceded by the excision of the scalp wound itself. Trephining may or may not be necessary, but all depressed fragments of bone should be elevated or removed and the dura mater widely exposed. Under normal conditions this membrane is sufficiently translucent to allow of the inspection of the underlying conditions. If very tense, and showing obvious subjacent blood extravasation, the dura should be incised and the blood allowed to escape. This course should, however, only be adopted under the conditions specified; the risk of secondary infection of the meninges has always to be considered.

In respect of decompression operations carried out for the attempted relief of general compression symptoms, the following points require consideration. The decompression is conducted so as to allow of that outward bulging of the brain which would compensate for the degree of increased intracranial pressure. It is obvious, therefore, that such

decompression operations should always be conducted over a silent area of the brain, never over the Rolandic region. A wide removal of bone over the temporo-sphenoidal lobe, on the right side of the head so as to avoid any possible inclusion, in the subsequent protrusion, of Broca's speech centre, fulfills all the desired requirements. The aperture should be generous in size, not less than four inches in the antero-posterior direction and two inches in the vertical, lying over and running parallel to the temporo-sphenoidal lobe. The dura mater must be incised freely, and the brain permitted to bulge as much as it desires. The scalp flap is then accurately approximated. The intradural pressure is thus relieved, and it is hoped that the decompression will tide the patient over the acute compression period.

The surgeon, when dealing with these cases of head injury, will meet with many disappointments, but the successes obtained will compensate for his failures and encourage him in the future.

SPECTRAL "HEART DISEASE"

AND RESPIRATORY ARRHYTHMIA.*

BY

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PRESENT-DAY psychologists, as I believe, still define an illusion as a false perception, something seen or felt by a person who wrongly interprets it—and a delusion as an erroneous judgment.

By the term "spectral" in the title of my lecture on this occasion, I wish to include both of these ideas as applied to supposed "heart disease." My main theme, however, is illusory "heart disease." In that phrase I wish to imply a fear of heart disease based, it is true, on what are popularly considered heart symptoms, but on such as have little, if any, pathological importance.

As I imagine it, the fear of "heart disease" in the popular mind is derived from the idea that persons with heart disease often die suddenly, or "drop down dead" as the phrase goes. The proper treatment for "spectres" in general is, we know, to face them and, if it may be, lay them. This end, I take it, we shall best further by trying to educate the subjects of such "heart symptoms," and, at the same time, arouse their medical advisers rightly to estimate importance, and rightly to estimate probability in this relation.

Some years ago a friend of mine, at that time holding a commission in the R.A.M.C., came to

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me, not truly in a state of fear but in a condition of, shall I say, mild suspicion of this type. It appeared that he and his brother officers had been amusing themselves in an hour of leisure by examining each other's radial pulses and one of them had told my friend that his pulse was irregular and had also emphatically recommended him to seek advice about it forthwith. On examination I found he had the premature contraction

FIG. 1.

of his ventricle called by us extrasystoles. There was no other sign or symptom or other circumstance, so far as I could judge, suggesting heart disease, and I expressed the opinion that beyond a degree of irritability of the heart his pulse irregularity had no pathological significance. From quite recent information I know that he has only very occasionally noticed this pulse peculiarity during the intervening years and that he is still living a strenuous life.

A little later another doctor friend complained to me of his pulse being irregular, and in his case, too, the arrhythmia proved to be due to extrasystoles, but of the auricular type. I similarly tried to reassure him as, in my belief, I was wholly

FIG. 2.

The lower tracing shows sinus irregularity with a slower rate of the pulse than in the upper tracing (from the same patient), which shows a more rapid and regular pulse under slight emotional stress.

entitled to do. Two or three years afterwards I may say, he developed signs of cholecystitis which eventuated in the surgical removal of his gall-bladder, an operation which, as I believe, he stood perfectly well. He is now in quite good health and a few days ago wrote to me "the auricular extrasystole is now much better but is troublesome at times."

These cases I have referred to because they were those of doctors (to whom the "spectre"

was never a really fearsome one), but such cases could be multiplied indefinitely.

You know the kind of complaint that some of the subjects of extrasystoles make—that there had been slight momentary giddiness, that the heart had seemed to stand still or to turn over, that it had next given a great thump, and so on. We have already discussed together the physical explanation of these sensations and we need not do so again. As you know, extrasystoles have been called the irregularity of the aged, and one thinks that in them and in the middle aged the spectral influence may well be at its minimum, but as was shown to you at an early demonstration of the present course they may occur in the child, and in their case this influence, as exerted through solicitous parents or friends, may be very pernicious. Extrasystoles, then, may occur at any age and in persons whose health is otherwise perfectly good. It ought, however, to be added to that statement that they may, and often do, occur in association with gross disease of the heart, but then the disease, it may be of

FIG. 3.

Jugular and radial, and apex and radial tracings from case of sino-auricular block, showing pauses.

the myocardium, is the serious matter, not the occurrence of extrasystoles which might, in some cases at any rate, be termed accidental. In short, this irritability of the heart may be favoured by heart disease itself as well as by non-cardiac causes. It is, however, the heart arrhythmia called, not perhaps very accurately, the youthful arrhythmia, which is the main subject now.

Before turning to our special theme, let me say a few words about some other causes of spectral "heart disease" other than the arrhythmia. How often have you heard the crudely expressed aphorism of the out-patient room that when patients come complaining of palpitation and their "heart" there is probably nothing wrong with the heart but not unlikely something wrong with their digestive organs. In that case the palpitation is of short duration and obviously illusory as a spectre of "heart disease." With others the palpitation may last many minutes or hours, coming on abruptly and ending abruptly and being often due to a series of extrasystoles, and these cases, too, are often spectral in having toxic or

other functional causes of their paroxysmal tachycardia.

There is not the need to do more than call to your minds some of the many different substrata of spectral "heart disease"—whether it be oedema of the feet, possibly in anæmic girls, or the numerous non-cardiac forms of sternal pain usually in older persons, the dyspnoea on exertion of anæmic subjects or of persons "out of condition," or that feeling of faintness experienced by debilitated persons on rising suddenly from the sitting or recumbent to the standing posture.

To turn now to the respiratory cardiac arrhythmias may I, in the first place, remind you of some elementary facts about the nervous control of the heart.

Faradic stimulation of the exposed vagus nerve in the neck of an animal leads, as you well know,

FIG. 4.

The upper tracing shows ordinary breathing, the lower deep breathing. From a case of sino-auricular block.

to "standstill" of the heart which lasts as long as the stimulation is continued. You may remember that Czermak, the physiologist, had a cartilaginous nodule over the vagus, pressure on which caused slowing of his heart; no one, however, would say that he had heart disease on that account. Partial arrest of the heart, as we are all aware, may be similarly produced by emotional causes, instances of fainting from physical pain or mental shock are of daily occurrence. I wonder if you have ever heard, as I have heard, that when for the first time chloroform was to be given in hospital before operation, the patient died on the operating table before its administration was commenced. Other dramatic illustrations of the effect of vagal inhibition as the result of emotion will occur in number to all of us.

May I, however, refer to the case of an alpine climber, whom I saw a few weeks ago, in illustration, as it seems to me of a similar emotional effect on the heart after hours of strenuous physical effort.

The patient being in middle life was climbing with her husband last summer in the Dauphiny. They had done several long and strenuous excursions including two high passes, some of which involved almost continuous physical exertion from 2 A.M.

to 4 P.M., and then, late in their holiday, with a good guide or guides, attempted one of the higher peaks. They got to almost a stone's throw from the summit when she fainted and, to her great

FIG. 5.

Electrocardiogram from a case of sino-auricular block, showing pauses.

mortification, had to descend without actually reaching it.

Examination made at the instance of apprehensive friends showed nothing wrong with her heart and there could not have been much doubt as to its integrity, one would have thought, without this, considering the physical feats she had accomplished, and yet she fainted under, as I judge, the stress of emotion at the very end of her climb.

The next thing I wish to remind you of is that the cardio-inhibitory centre of the vagus is influenced by the respiratory centre, and so there is in

FIG. 6.

Electrocardiogram from same case as Fig. 5 showing abolition of pauses by exercise.

healthy persons and warm-blooded animals generally a variation in the length of individual pulse periods corresponding with inspiration and expiration, first a group of slightly shorter beats and then a group of slightly longer, regularly occurring. This, as was explained at our earlier meeting, constitutes the respiratory irregularity of the heart or sinus arrhythmia, because it is due, as is believed, to an influence exerted through the vagus on the sino-auricular node which is the pacemaker of the heart. It varies in degree, so that in the

adult it may be so slight as to escape observation except by the most careful measurement of pulse tracings or as in children and older persons of nervous type, so distinct as to be readily appreciated by the palpating finger. It is on account of this obviousness in early life that it is sometimes called the youthful irregularity of the heart. Similarly in the lower animals it is very distinct, being particularly conspicuous perhaps in the healthy dog.

In children and young people it is most noticeable of all in those who are recovering from some febrile illness, particularly while the heart-rate is falling with the disappearance of the pyrexia. And it is primarily in these circumstances that this respiratory arrhythmia has time and again given rise to doubt as to the integrity of the heart. Many a time and oft in the past have parents been greatly alarmed by the discovery of the irregularity and by that unfortunate idea resulting from it and these have led in all too many instances to a harmful

FIG. 7.

Radial tracings before (upper) and after (lower) atropine injection.

restriction of the activities of youth—no running, no strenuous games, so that the unlucky victims have gone softly for years. I need not further elaborate this point, but say once more that it is against such a position that the word "spectral" is directed.

As regards older persons it is also very obvious in those who are "neurasthenic," and it is probably the usual type of arrhythmia in the cases of those persons who of later years have been grouped under the category of "D.A.H."

From what has been said it will appear that this arrhythmia is characteristic of the healthy heart and in degree, whether greater or less, corresponding with the age of the patient. One might say therefore that a human heart is not physiologically normal if it does not show it; at any rate the late Sir James Mackenzie put in print his view that "its presence indicates that the heart is healthy." Surely, therefore, in the case of those young persons who have been treated for "heart disease" on this alone it has been "spectral" heart disease indeed.

We have already at previous meetings discussed in some detail the character of this arrhythmia, so I will say no more on that head, but content myself

with showing you yet another tracing of the condition (Fig. 1).

Let me, however, now remind you of circumstances that will temporarily abolish the irregularity. Section of the vagus nerves in the neck in the case

FIG. 8.

Case of auricular flutter with Cheyne-Stokes breathing, showing regularly recurring change in the pulse-rate from quick (160 per min.) during apnoea to slow (40 per min.) during dyspnoic phase.

of the lower animals will do so; so will paralysis of the cardio-inhibitory portion of the vagus nerves with atropine. Deep breathing will usually abolish it. Anything, moreover, that quickens the heart's action will cause it to disappear, as muscular exertion, pyrexia, emotion, and so forth. The tracings I now show you illustrate in a rather amusing way the effect of emotion. The case was that of a girl in her early teens who was recovering in hospital from some febrile illness. On my visiting the ward with the house physician I was told that her pulse was grossly irregular. I felt it and said I could not detect any such irregularity. At my next visit the house physician repeated his assertion, and then tracings were made and one of them, taken in the presence of the visiting physician (an occasional visitor), showed a rather rapid pulse with perfectly regular rhythm; the other, in the sole presence of the house physician (a frequent daily visitor), showed a slower pulse with an exaggerated irregularity of the sinus type (Fig. 2).

As illustrating the effect of exercise and of atropine, I will take the case of a patient with so-called sino-auricular block manifested by standstill of the whole heart at intervals, each pause lasting two pulse periods. This condition, a somewhat rare one, may for our present purpose at least be looked on as an exaggerated representation of sinus arrhythmia. I show you tracings, also some electrocardiograms kindly made for me some years ago by Sir Thomas Lewis, displaying the irregularity as it first presented itself, and of its abolition by deep breathing exercise, and by the injection of atropine (Figs. 3-7). In this patient, a young woman, then 21 years of age, as is not unusual in such cases, there was a slight degree of auriculo-ventricular block as well (as the electrocardiograms show) and yet her only complaint was of occasional faintness or partial fainting which in association with the pulse irregularity gave rise to much alarm. I do not, of course, maintain that this is a pure case of "spectral" heart disease.

I mention it as an instance of respiratory arrhythmia.

Lastly, as another illustration of the influence of respiration on the cardiac rhythm (not this time a case of "spectral" heart disease at all but one of auricular flutter with Cheyne-Stokes' breathing) I show you tracings in which there is a heart rate of 160 per minute during the apnoëic phase (representing a 2 to 1 heart-block) and of a quarter of that rate, 40 beats per minute during the dyspnoëic phase (representing an 8 to 1 heart-block) and this sequence regularly recurring. I invite you to connect in your minds this tracing (Fig. 8) with these of sinus arrhythmia which were given you the other day.

As I do not wish to say to you now all I could about respiratory arrhythmias and still less to say again what you already know about them, let me stop here.

Of course, what I have tried to set forth in all this in regard to the illusory nature of "disease," based for our present conversation on this type of cardiac arrhythmia applies, may I suggest, to other organs of the body. What would you say, for instance, about the case of a patient, met with in my own experience, who was paralysed in a "spectral" or ideational way so that she was confined to bed for twenty years and had not walked for two or three years before that, and yet as a result of appropriate treatment, mainly psychical in nature, was walking about the hospital ward in less than six weeks—a case, happily, of cured functional paraplegia—but what a waste of life is implied.

My object, then, has not been so much to supply you with facts concerning the physiological and other cardiac arrhythmias—that has already been attempted on earlier days of the present course—but rather to bring before you once again the possibility of such illusory disease. The late Mr. Joseph E. Adams, surgeon to St. Thomas's Hospital, whose untimely death on Dec. 22nd last we are now deploring, as a loss to the post-graduate cause as well as to many others, is reported to have said, "Personally I would rather spend my time in reassuring patients who have not cancer than in operating on those who have." So he, too, in his field,

"... faced the spectres of the mind
And laid them."

We are much interested to learn that the Royal Westminster Ophthalmic Hospital is moving to a much larger site in Broad-street, W.C. 2, opposite the Princes Theatre, and it is hoped that the new hospital will be completed and occupied by April, 1928. Much improved facilities for clinical work, for patients, and for post-graduate classes will then be available. There will be 14 rooms for paying patients. The Dean will be pleased to give further information.

SURGICAL TUBERCULOSIS.*

BY

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IN treating a patient with surgical tuberculosis it must be constantly borne in mind that the patient is suffering from a disease which is affecting the whole of the body. Tubercle bacilli have gained entrance into the body, and after circulating in the blood stream have settled down in one particular spot, and dug themselves in. In the healthy patient the tubercle bacilli will be at once destroyed whilst in the blood or, at any rate, as soon as they have settled down in an organ of the body; it is only in the patient that has a poor resistance to the tubercle bacilli that the bacilli will be allowed to settle and create a dwelling place for themselves in the body. Normally when bacteria enter the blood stream they are killed off by the regular protective cells of the blood; if temporarily they prove too strong for the regular defence, their presence stimulates the body to produce a specific protective cell or a specific antitoxin to attack and destroy them. Now, the tubercle bacillus is curious in this respect—it is not aggressive; once settled in some organ it causes a slow local destruction of tissue, but the presence of a tuberculous lesion does not quickly induce the body to protect itself by manufacturing a specific antitoxin capable of exterminating the tubercle bacilli. Such a specific protective mechanism against tuberculosis takes a long time to be formed. From this it follows that inoculation and vaccine treatment are of little use, because in neither case do the injected dead tubercle bacilli stimulate the patient to form a specific protective mechanism against the bacilli. It also follows that in tuberculosis treatment must be prolonged—it takes a long time to effect a cure.

As far as we know at present there is nothing we can do to stimulate the patient to form this protective mechanism. Our efforts have to be directed towards increasing the general health of the patient, so that he will the better protect himself against the tubercle bacilli. We therefore aim at improving the general health of the body, by treatment in the open air, by heliotherapy, and by good food.

OPEN AIR TREATMENT.

Most people know that a tuberculous patient should be treated in the open air, but few know why; nor is it easy at first sight to answer this question. It may be that fresh air possesses specific health-giving properties that we know nothing about, but in our ignorance we have to assume that the value of open air treatment lies in its power of increasing the metabolism of the body. Man is a warm-blooded animal, and his temperature is kept constant within certain narrow limits.

* A Lecture delivered at the Royal National Orthopaedic Hospital on Sept. 28th, 1926.