in right lung: Anteriorly note impaired to first rib. In supra-clavicular region vocal resonance increased, but expiration inaudible. Posteriorly note impaired from above to below spine of scapula, and vocal resonance increased in supra-spinous fossa. Left lung: Anteriorly note impaired and movement of whole lung restricted. Dulness is absolute, with friction from fifth rib to base. Respiratory murmur feeble at apex and hardly audible at base. Vocal resonance increased to second rib, and diminished from fifth rib to base. Posteriorly note dull from apex to base, absolute below angle of scapula. Respiration generally feeble, especially at base. A line of ægophonic resonance is detected at point where absolute dulness begins, and friction sounds are audible. Patient was inoculated with 0.001 grm. of tuberculin at 10 A.M. on Dec. 27th, 1890. At 9 P.M., highest temperature of reaction 102.6°; patient from this date to March 31st, 1891, had twenty-one inoculations, increasing gradually from 0.001 to 0.1 grm., equal to 0.5635 grm. of tuberculin. The highest reaction, temperature 103.2°, was registered on the third inoculation of 0.002 grm. on Jan. 2nd. Condition on leaving: Height 5ft. 5½ in., being a growth of ¾ in. The weight is 9st. 1lb. 8oz., a gain of 2 lb. since the treatment began, but a recovery of 8lb. 4oz. on the lowest weight recorded on Jan. 11th, up to which date the loss of weight had gone on steadily. The skin, which was covered with acne, is now almost clear, and the whole appearance decidedly more healthy. Appetite good, tongue clean, and bowels regular. Pulse between 70 and 80; much less irritable. The cardiac sounds healthier and strong, only a short slight roughness is heard with the first pulmonary, and the second sound is slightly accentuated. Very slight cough, and expectoration to the extent of one drachm on an average daily. Still suffers from dyspnoea on exertion, and occasional pain in left base. Right lung: Movement excellent. There is a full resonant note on percussion, and there is normal vocal resonance over the whole lung. At the extreme apex the expiratory murmur is quite audible, but it is slightly prolonged. Left lung: Movement is freer than before the treatment, but is still deficient from apex to nipple, and in that region vocal fremitus is slightly increased. The note over the front of the lung to the sixth rib is resonant, but higher pitch than on right side. Behind, the dulness begins an inch below the angle of the scapula, and is absolute.

(To be concluded.)

THE TREATMENT OF CHRONIC DISEASES OF THE HEART BY MEANS OF BATHS AND GYMNASTICS.¹

By THEODOR SCHOTT, M.D., BAD NAUHEIM.

A REVIEW of the history of the treatment of chronic diseases of the heart reveals the fact that until comparatively recent times but little progress had been made, and it appears to have been generally agreed that, even when recognised in its earlier stages, "heart disease" must be regarded as a more or less hopeless ailment. The patient was practically condemned to exercise the virtues of self-restraint and resignation until such time as want of compensation came to seal his fate. In digitalis the physician possessed an admirable therapeutic agent, but its good results were rarely of a lasting nature, and, in most instances, the remedy sooner or later ceased to be effectual, even when its nauseating or other toxic effects were escaped. Yet, in spite of its drawbacks, and having due regard to the virtues of strophanthus, caffeine, sparteine, and calomel in cases of hydrops, it must be admitted that among drugs digitalis still holds the first place in the treatment of cardiac disease. But a new era opened when in 1872 the late Professor Beneke showed that by the use of the Nauheim baths relapses of acute articular rheumatism could be long averted or altogether escaped, and that it is possible to have recourse to balneological treatment in cases

of cardiac disease, not only without danger, but with curative effect, ensuring even such effectual removal of recent endocardial exudation as to secure immunity from permanent organic valvular damage. By more extended observations and experience, and pursuing the lines laid down by Beneke, my late brother, August Schott, and I have endeavoured to formulate a system of treatment of chronic cardiac diseases of which I now propose to give an outline. It was not long before our observations showed that a surprising measure of alleviation, and even complete cure, of affections of the heart could be secured by the combined influences of a medically directed course of baths and an equally scientifically regulated course of gymnastic exercises, followed by graduated mountain pedestrianism, as suggested by that distinguished physician, Stokes. Later, we were able to publish evidence that the benefit to be derived from each of these measures accrues from one common cause—namely, the periodical and regulated stimulation of the heart to increased action, the muscles of that organ obeying the natural law of the relation between exercise on the one hand, and nutrition and growth on the other, as surely as do other muscles in which such changes as necessarily follow are apparent to the eye. A rapidly ensuing contraction of the dilated heart and distinct gain in the force of the pulse, as well as relief of dyspnoea and the other consequences of impaired circulation, were clearly observed to follow recourse both to baths and to gymnastic exercises; and it became no less apparent that, in the various forms of cardiac incapacity, the relative or actual inefficiency of the heart muscles is the morbid condition, to correct which attention should be mainly directed, and that the therapeutic agents alluded to had established their claim to hold the foremost place. Our experience further showed that it would be difficult to insist too strongly on the important influence which early recognition and treatment of the cardiac condition exercises on the certainty, rapidity, and permanence of the curative process.

I will now proceed to describe somewhat in detail the methods which we were led to adopt as the result of observations based on some 4700 cases, and extending over a course of nearly twenty years.

Balneological treatment.—Under this head I would desire at the outset to state that, if the physician have mastered the principles of treatment by baths and acquired the knowledge necessary for adapting their application to the actual condition of the patient from time to time, results almost as favourable as those obtained from the use of natural springs may be secured by recourse to artificially prepared waters. But it must be borne in mind that balneological treatment is an agent of great power as regards its influence on the heart; and that, unless it be applied with due caution and under uninterrupted medical supervision, combined with frequent observation of that organ, results the reverse of favourable may ensue. The treatment of cardiac incapacity should commence with baths containing chloride of sodium in the proportion of 1.5 per cent., with the addition of chloride of calcium to the extent of from 1 to 1.5 per 1000, and, in the early stages of the treatment, the duration of a bath should never exceed ten minutes. As regards temperature, one varying from 91° to 93° F. is suitable to conditions of anæmia and rheumatism, but for cardiac cases the proper temperature is 95° F. However useful higher temperatures may be in diverting the blood to the surface in cases of renal congestion, deficient secretion of urine, and engorgement of the more deeply seated vessels generally, their influence on the heart is to diminish its power, and therefore calculated to defeat the end in view—namely, the development of the heart muscles under the influence of more powerful action. On the other hand, if a sense of cold endure more than half a minute after immersion and the maintenance of a perfectly quiet attitude, or if it recur, it must be concluded that the temperature of the bath should in some degree be immediately raised. The mineral strength of the baths should be increased in proportion as they agree with the patient, up to from 2 to 3 per cent. of chloride of sodium, and from 0.5 to 1 per cent. of chloride of calcium, and, lastly, by the addition of carbonic acid. At Nauheim the proportional increase of the calcium salt is obtained by adding to the water of spring No. 7 the stronger water of No. 12, and, finally, by dissolving in the blended waters the still necessary quantity of the mineral in question. Our waters contain carbonic acid in proportions varying over the widest range, and the effervescing current bath presents as much as 1340 cubic centimetres to the

¹ Being an abstract of lectures delivered before the Balneological Society of Berlin.

litre of water in addition to mineral ingredients, and a natural temperature which brings it to the level of the strongest iron baths of Schwalbach, Pyrmont, and Spa. The desired effervescence of carbonic acid could be artificially produced by a very simple process, which we have described elsewhere. The duration of the bath must be increased simultaneously with its concentration, without, however, ever exceeding twenty minutes, especially in serious cases. As the course proceeds, the temperature of the water is to be reduced by cautious steps, with due observance of the objective symptoms already specified, and attentive observation of the heart, pulse, respiratory organs, and of the general health. Further, it must be laid down that intervals of repose should interrupt every course. At first the bath should be omitted every second or third day, until in fact it become apparent that the system has accommodated itself to the treatment and is ready to bear stronger and more frequently administered baths. By such means the patient may be brought to bear with advantage one of the most powerful balneological agents in existence—the Nauheim effervescent “current” bath, in which the patient lies in a stream forcibly propelled by the gas which it naturally contains. Unfortunately not a few are found to be unwilling or unable to devote sufficient time to admit of their being brought to a condition to bear with advantage this potent therapeutic agent. In some instances a graduated course extending over several months is needed for this purpose—in some, indeed, a succession of summer seasons.

Treatment by gymnastic exercises.—A suitably adapted system of gymnastic exercises of itself presents a sufficient means of treating chronic disease of the heart. It must provide a certain measure of resistance to be overcome by the muscles which are brought into action, and it must be of two kinds: that offered by a second person properly trained for the purpose, and that which is brought into play by the spontaneous action of antagonising muscles. The object in view is successively to bring into activity different groups of muscles, such as those of the arms, the trunk, and the lower extremities. If the patient retain sufficient endurance, the exercises may be repeated in the order indicated, or in any other which may be suggested by special circumstances. Consideration of the special action of individual muscles and of the joints with which they are connected will suffice to direct the physician in the management of the course. With a little training an attendant of even moderate mental capacity will soon learn to modify the resistance which he should oppose in such a manner as to avoid inducing any, or more than passing, acceleration of the patient's pulse. For that purpose it is desirable that the exercise of individual limbs should be interrupted by short intervals, during which the limb should lie in a state of repose, supported by the attendant's hands. Attentive observation of the state of the respiration, as indicated by the mouth, *alæ nasi*, and chest movements, will afford useful and necessary guiding indications. Each movement must be performed evenly and steadily, and without jerking, lest dyspnoea be induced, and the patient should be instructed to exercise a certain discrimination to which the attendant must be obedient. The latter must bear upon, but never grasp or constrict, the patient's limbs, lest the movement of groups of muscles be impeded or arbitrarily promoted. These precautions duly attended to, the resistance, always slight at the beginning, may be gradually increased, and, in the case of self-imposed exercises, the patient can attain the same end by calling into play antagonising muscles. The gymnastic course concluded, there must follow a graduated system of hill climbing, as recommended by Stokes. It must, however, be carefully borne in mind that the gymnastic is a necessary preliminary to the climbing course, in order that the muscles of the heart may be prepared to endure without harm the greater exertion involved in the latter. I have elsewhere drawn attention to the fact that climbing exercise practised at too early a stage of improvement must involve serious risk, and may even become a cause of death, especially if practised under the rules laid down by Oertel, which involve a considerable reduction in the supply of liquids. On the other hand, experience proves that valvular disease offers no barrier to the performance of even such difficult ascents as those of Mont Blanc and Monte Rosa when they form the crowning effort of a slowly and carefully graduated course.

(To be concluded.)

ON THE TREATMENT OF INTUSSUSCEPTION BY INJECTION OR INFLATION; AND ITS DANGERS.

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IN the cases of intussusception which commonly occur in infants and young children, treatment by injection or inflation has certain obvious advantages, to which only brief allusion need be made. Relief may thus be afforded to a condition, almost invariably fatal if left alone, by an operation which is not likely to arouse much parental opposition, and can be easily performed under almost any circumstances. Many successful cases have been recorded—e.g., in the Hospital for Sick Children, under the care of Drs. Cheadle and Barlow,¹—and from time to time accounts of others appear in medical journals. The treatment, in fact, seems to be so generally adopted that I have thought it desirable to bring forward further evidence of those dangers which have already led to its condemnation by several authorities, and which should at least induce the utmost caution in its performance.

It may be remarked that some of the accounts of “successful cases” are, from want of detail or otherwise, of no value at all, and that in others the diagnosis is fairly open to question. I need hardly point out, besides, that there are few inducements to publish an “unsuccessful case” which has been dealt with in a way generally considered orthodox. It may also be difficult to tell without post-mortem examination whether the invagination was reduced or not, and, still more, whether any damage was caused which contributed to the fatal result.

Before beginning the operation it is evident that one should know as far as possible (1) the best way to do it; (2) what force may be used without danger. I must own to some surprise at the vagueness of the directions given in most text-books, and even in special treatises, in regard to both these points, especially the latter. I have even seen it frankly stated that “no rule can be given, but the force must be considerable.” As I hope to show, the force which ought to be used is much less than is generally supposed to be safe. It should be even, not intermittent, there being in the latter case increased danger of exciting peristalsis and of rupture, and should be capable of exact estimation at any moment. Most authorities agree that any method (such as the use of the bellows of Higginson's syringe, of syphons of aerated water, &c.) not fulfilling these conditions, is very dangerous, and ought to be altogether abandoned. The plans which have been suggested of plugging the rectum to cause accumulation of intestinal gas, and that of generating carbonic acid gas within the bowel, are open to the same objections, apart from other considerations.

It has been urged that air or gas has the advantage of being compressible and is not so likely to cause diarrhoea as fluid, or to rupture the intestine by its weight acting laterally.² Considering how the bowel is supported within the abdomen, and that water enough to fill the colon of an infant only weighs about 1 to 2 lb., it seems evident that a bowel which cannot bear injection of water is equally unfit for insufflation at a similar pressure. The elasticity of a gas certainly would to some extent neutralise the evils of irregular pumping, but otherwise this property is not obviously of much value. Insufflation cannot, moreover, be carried out at a regulated pressure without a special apparatus, not likely to be always available when wanted. Water, on the other hand, can be allowed to flow in from an ordinary funnel or irrigator with tubing, the height to which the vessel is raised indicating the exact force of the stream. The rate at which the water is passing and the amount injected may also be observed. Leaking may be avoided by Lund's instrument,³ which is readily improvised by coiling a piece of distended rubber-tubing on a bung through which the rectal tube is passed; or lint, or a bandage, may be rolled round the tube to form a slightly conical shoulder. Pressing the nates together is unreliable.

¹ THE LANCET, Jan. 26th, 1889.

² Lucas, THE LANCET, Jan. 16th, 1886, and others.

³ Treves: Intestinal Obstruction, 1884.