Original Articles.

ON THE TREATMENT OF CHRONIC DISEASES OF THE HEART.*

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ALLOW me first of all to thank you heartily for your kind invitation, which affords me the opportunity to lay before you a few particulars of the treatment of heart diseases and some of my experiences in this connection.

Hardly twenty-five years have elapsed—and many of you remember that time—since there were, apart from hygienic directions, only two means of dealing with chronic cardiac diseases, viz.: rest and digitalis.

The general opinion, and the one generally held in our universities at that time, was that when these two means failed heart diseases were a *noli me tangere* for medical therapy. Even the view of Stokes, that in certain cases of fatty heart stronger exercise and climbing might prove very useful, was soon forgotten. This was partly due to the fact that, especially in the matter of chronic heart complaints, particular attention was devoted to pathological anatomy and to physical diagnosis, whereas therapy itself was more or less neglected.

No longer than twenty-five years ago, three methods of treating cardiac diseases appeared nearly simultaneously and, as I shall point out, quite independently of each other; they are known to-day as physical therapeutics. They were: the so-called Swedish method, the leading feature of which was Zander's treatment by the use of machinery; Oertel's mountain-climbing cure; and the balneological gymnastic treatment described by my late brother, August Schott, and myself.

You are well acquainted with these different methods. I may therefore enter at once into the consideration of the single points which are perhaps of special interest to you.

For the sake of completeness I must not fail to mention that the number of remedial agents used in the treatment of chronic cardiac diseases has largely increased. But I find it impossible, to my regret, at present to dwell on this subject at greater length and intend to treat it more extensively in the manuscript.

Digitalis, either with or without digitalin and digitoxin, is and always will remain our most important remedy. But sometimes its cumulative and toxic effect compels us to look for other means, the most important of which is tincture of strophanthus, which acts more slowly and safely.

A special reference may be made to strychnia, which is used *by mouth* and also subcutaneously. Strychnia may, of course, be used when the heart muscle is weak and relaxed. Its use is often desirable, but in recent years there has been perhaps too strong a tendency to resort to it as

a heart tonic. It produces stronger contractions of the walls of the heart, but unless carefully watched, or when used for too long a period, it sometimes sets up a condition of abnormal irritation, occasionally followed by a recurrent weakness of the cardiac muscle.

Many other heart tonics, called vasodepressors, have likewise been adopted, especially the nitrites. Their chief representatives are erythrol-tetranitrite and nitroglycerin, the latter being more successfully employed in liquid form, generally a 1% alcoholic solution. The action of this is highly effective in some cases of pain and oppression.

In angina pectoris the haloid salts, especially those of iodine, often produce effects similar to those of nitrites. But they are not counted among the vasodepressors, and it is still an open question whether a changed viscosity or other circumstances exercise an influence in this respect.

Salts of mercury and, above all, calomel are not remedies for the heart in the strict sense; combined with digitalis, they are, separately or collectively, excellent diuretics.

The slowing of the pulse caused by morphia is the result of weakening of the ventricular contractions; thus it fails to tone up the heart. This view is amply supported by clinical observations. For all that, this remedy is not to be discarded entirely in cases of intense pain, oppression or conditions of great cardiac anxiety. A strong dose may then be administered, though not too frequently or for too long a time.

The inherent defects of remedies and the oft-recurring want of success obliged us to look for other means, and led at last to the methods, which, as I have said, are known as the physical treatment of chronic heart diseases.

Let us begin with the method which, though the most recent, aroused general interest for a short time, viz.: that of Oertel.

OERTEL'S METHOD.

The Dublin physician, Stokes, had already observed that an enervating régime is injurious to persons suffering from the heart, and more especially in cases of fatty heart. He expressed himself in favor of bodily exercise, chiefly mountain-climbing, and described how patients that were breathless as soon as they had begun to climb returned with an improved action of the heart. His teaching was soon forgotten until, some twenty-five years ago, it was taken up by Oertel, who modified his method, combined it with a limitation of the supply of liquids and applied it to the sphere of all disturbances of circulation.

Oertel had three objects in view, viz.: to facilitate the circulation by reducing the amount of liquid in the blood, to strengthen the heart by walking and climbing, and to remove the superfluous deposits of fat by a strict diet.

Numerous experiments and observations have proved the unsoundness of Oertel's original assumption that every quantity of liquid absorbed increased the amount of water in the blood. On the contrary, we have discovered

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that the composition of the blood is much more constant and, above all, that a reduction in the quantity of the blood does not tend to strengthen the circulation in the lungs. Oertel's diet may be employed successfully in dealing with fatty hearts, and especially with persons whose blood is of normal quality. His dietetic scheme possesses the great advantage over those of Harvey-Banting, Schroth, Ebstein, etc., of coming nearer to the components which Voit and those of his school have laid down as best adapted to the nourishment of the human body. However, the point must be insisted upon that most sufferers from cardiac complaints do not want to lose fat but to increase muscle, and that a too great and too rapid loss of weight should be avoided. Losing from 40 to 50 pounds in from four to six weeks, as mentioned by Oertel, may be allowed now and again without injury, but experience shows that small losses of weight produced by inadequate nourishment combined with a diminution of liquids may cause serious harm within a short time.

The mechanical part of the Oertel treatment consists in the exercise of walking and climbing. For the latter the author selected mountainous localities of middling altitude named "Terrain kurorte," in which different degrees of climbing were prescribed. In this manner he hoped to obtain a development of strength of the heart by means of an increased action of the muscles. In later years Oertel combined the climb-cure with pneumotherapy, application of dry heat, electricity and massage. His manner of treatment was originally devised for fatty heart. In order to generalize it for the treatment of all chronic cardiac diseases, he propounded a number of theories, which were for the most part erroneous. It was, above all, the want of success attending these therapeutic measures and the dangers to which they so obviously gave rise that led many to abandon them. Instead of a low diet we often require a very strong and general one. Furthermore, climbing entails so much exertion on the organism that such a course should follow and not precede other cures; moreover, climbing should only be resorted to when by other means the heart muscle has become sufficiently strengthened to allow it to perform such an increase of labor without danger.

In accordance with this, Oertel's treatment may be adopted only in a very limited number of cases. Undoubtedly his greatest and undisputed merit is, that he has given a remarkable impulse to the mechanical treatment of chronic heart diseases.

THE SWEDISH METHOD.

Gymnastics and massage were first carried on practically on a large scale in Sweden. Having no scientific basis and not being improved upon, the Swedish method never went beyond Sweden until Wide and others took it in hand.

The system began to find general acceptance only through its most clever exponent, Zander, who, besides manual therapy, invented very in-

genious apparatus, expecting to render the patient independent of the position of the body and of the assistant. Opinions, however, are much divided on these points. Nevertheless, it is beyond doubt that Zander's method constituted a most important improvement. It is an excellent means for strengthening the muscles of the heart and accelerating the circulation of the blood. Many points applicable to gymnastics in general hold good in regard to Zander's system.

But a continual supervision is needful here, in order to regulate the resistance of the apparatus and the maintenance of the patients during and after the exercises, otherwise failure is the result. These failures occur very easily, because exact individualizing in the determination of the resistance of Zander's mechanical contrivances is very difficult to obtain.

The great expense of the apparatus and of their use, also the restricted conditions under which the patients can have recourse to them, must be an obstacle to their general adoption. In recent times Herz has improved the Zander machines by the introduction of an eccentric wheel and a weight moving on a smooth inclined plane. There can be no doubt that the apparatus in question may be preferred to others, whose action is more limited, such as Gaertner's ergostat, the so-called hygienist, rowing apparatus, tri-cycle and many other modern apparatus.

THE BALNEOLOGICAL-GYMNASTIC TREATMENT.

As far back as 1872 Beneke, in opposition to former views, showed that patients subject to acute rheumatic fever could successfully use mineral baths when the polyarthritis rheumatica acuta was complicated with cardiac complaints. Even when a freshly developed valvular lesion exists it may be cured within a short time by absorption of the exudations on the valves, obtained by the baths. My late brother and I found that a carefully executed balneological cure combined with gymnastics which culminate in mountain-climbing frequently and even regularly produce an improvement which is soon noticeable, and even, according to the nature and the condition of the complaint, an absolute cure. I wish to point out to you how we explained the mode of action of our treatment. We conclusively proved that the same principles obtain as regards baths as well as gymnastics, viz.: to promote the action of the heart with the view to stimulate its activity, i.e., toning up a weak heart. In the majority of cases we have to deal with a comparative or absolute inadequacy of the heart muscles to impel the circulation of the normal quantity of blood. This inadequacy involves an insufficient expulsion of blood from the cardiac cavities and hence leads to dilatation. But not every dilatation, as first proved by A. Schott, leads to the danger of want of compensation. We must differentiate between a dilatation produced by congestion and a compensatory one. The latter serves to overcome the obstacles caused by valvular lesions. Only the first form

of dilatation requires treatment. The action of the heart muscles must be stimulated in such a manner that, by stronger systolic contractions, it may rid itself of the superfluous amount of blood. The dilatation -- be it owing to insufficient ability to contract, or to a valvular lesion -- means congestion of blood within the heart itself. The heart goes through many but insufficient contractions, and after each systole a certain quantity of blood remains within the heart cavities. The pressure within the aorta cannot be overcome merely by the force of the heart itself. My brother and myself were at last enabled to describe how, by means of our balneological as well as our gymnastic treatment, the heart becomes stimulated to a more forcible and vigorous systole.

The pressure within the aorta and within the entire arterial system, as established by experiments on animals, often increases to a considerable extent, but on account of the hyperkinesis and hyperplasia of the heart, it is in better condition to overcome this increase of pressure within the arterial system. The heart is now able to empty its cavities completely during the systole and, concomitant with this, the suction-effect of the diastole is more effective. In this way the heart is relieved from the constant overpressure which previously, during the permanent overfilling, acted upon the inner surface of the cardiac cavities, inciting the muscles to incessant and feeble beats. The increasing intra-arterial pressure endows the heart with new inhibitory impulses, and on this account it is enabled to beat more slowly and also more vigorously. This last fact is easily noticeable and has not only been frequently demonstrated by us, but also been confirmed by many others.

Various authors have attempted to explain the effect of the baths on the heart by a derivation of the blood from the internal organs to the skin and muscles. In this manner a saving and an alleviation of the heart's action may be produced. But to my view this theory does not sufficiently explain the vigorous and immediate effect of the baths and gymnastics. The action of the bath is generally weaker but more enduring, whilst that of gymnastics is more energetic but less lasting, especially at the beginning of the treatment. We observe a diminution of congestion within the pulmonary circulation as well as in the general venous system; in consequence of this a quieter respiration as well as a decrease of hepatic congestion and reduction of the cyanosis. Immediate observation usually shows a decrease in the frequency of the pulse. In consequence of the increased quantity of blood thrown into the arterial system the sphygmographic tracings show higher primary elevations. The slower pulsation causes the systolic and especially the diastolic tracings to be prolonged. The latter circumstance is the expression of a longer period of restoration of the weakened heart muscle. In suitable cases we notice that an already existing arrhythmia disappears. Herewith (Fig. 1) I show you the diagram of the pulse of

a man fifty-two years old, who suffered from mitral insufficiency with long existing myocarditis complicated with emphysema. Within the first week of his stay at Nauheim, and even immediately

1. Before treatment.
2. After the first thermal bath, June 7, 1906.
3. After the first effervescent mineral bath, Aug. 20, 1906.
4. Mitral insufficiency after acute articular rheumatism, June 5, before treatment.
5. The same case after forty-two baths, Sept. 15.
6. Mitral insufficiency and stenosis, before treatment, June 28.
7. The same case after forty baths, Sept. 8.
8. Aortic stenosis, before treatment, June 17.
9. The same case after thirty-six baths and resistance exercises, Sept. 8.
10. Mitral stenosis, before treatment, June 1.
11. The same case after seventeen baths and exercises of resistance, June 23.

after his arrival, he experienced two violent attacks of embolism of the lungs. Besides that, he suffered from congestion of the liver, edema of the legs, etc.

The second diagram of the pulse (Fig. 2), taken after a bath, and which I demonstrate here, shows not only a decrease in the frequency of the pulse from 104 to 96, but also the disappearance of the arrhythmia. The blood pressure, measured by Gaertner's tonometer, rose from 82 to 90 mm. Hg.

A third diagram of the pulse (Fig. 3), shows the character of the pulsations at nearly the end of the treatment after an effervescent (sprudel) bath of spring No. 14. The frequency diminished to 78, the tonometric pressure rose to 105 mm. Hg. (Figs. 4 to 11.)

The effects of the balneological and gymnastic treatment may both be ascertained in the same way by percussion. The narrowing of the limits of the heart obtained by the bath is often not very considerable, though more lasting, whereas the gymnastic exercises reduce the size of the heart more quickly and considerably at the beginning of the cure; this effect is, however, less lasting, as I have mentioned before.

I take pleasure in demonstrating to you these changes in the heart-limits with a few drawings, which have been made partly by professors and other medical men who visited me in Nauheim, and partly by myself.

The radiograms including orthodiagrams are of valuable assistance in examining the size of the heart. But the difficulties for the patient to invariably assume the same position at different times, and the fact that the skiagrams do not give well-defined outlines of the heart, are both liable to give rise to errors and do not render the other methods of examination superfluous. By means of auscultation we often realize the change of the cardiac sounds during the treatment. The weak sounds of the heart often become more audible; some which were not audible become so. A murmur produced by a relative insufficiency changes into a divided sound and ultimately into a normal one. But in other cases, for instance in valvular diseases, a murmur which was not audible becomes so by a stronger contraction of the cardiac walls. Palpation and inspection also demonstrate that the apex beat moves upward and inwards; this with the simultaneous rise in position of the diaphragm constitutes a further proof that the size of the heart has been reduced. The ability to walk and the general condition are improved. The diuresis becomes more copious, chiefly by balneological treatment. As you may observe, a tonifying result is obtained similar to that following the administration of digitalis, but with the difference that injuries may easily be avoided. In addition to this the whole organism, and especially the cardiac muscles, gain strength. This strengthening of the heart is produced by the disappearance of congestion in the venous system and an increased volume of blood within the arteries. Owing to these facts the blood which flows into the coro-

nary arteries is more highly oxygenated, the heart is better nourished, and more and better muscular substance develops itself.

In a large number of cases I have instituted exact investigations concerning the changes which the blood undergoes during a course of balneological-gymnastic treatment. In a dissertation, in which I communicated the results of these investigations, I proved that in such cases where the amount of hemoglobin had been diminished, it again became considerably increased by the treatment in question.

And now I should like to give you a short description of our balneological and gymnastic system. You will find something about it in many medical publications. Some of these have also been issued in America, such as those of William Osler, Babcock, Tyson, Anders, Solis Cohen, John K. Mitchell, Kinnicutt, Camak, Manson, etc.

THE BALNEOLOGICAL METHOD.

Let me begin by stating that it is just as impossible to give more than general rules in the matter of balneological treatment, as in that of internal medicine at large. I need scarcely say that strong individualizing in treatment is absolutely necessary. Balneological treatment is an agent of great power as regards its influence on the heart; and unless it be applied with due caution and under uninterrupted medical supervision, combined with frequent observation of that organ, the clinical picture often changes; without this careful supervision and observation, results the reverse of favorable may ensue. *Pari passu* with the treatment cooler temperatures are better borne and also applied with good results. Opinions supporting this view may be found in the publications of several Nauheim medical men. It is very often advisable to observe the patient before, during and after the bath. In severe cases it is best to begin with a simple brine bath. Our Nauheim baths containing from 2‰ to 3‰ NaCl and the same proportion per mille of CaCl, they have sometimes to be diluted. The duration of the bath should not exceed ten minutes with a temperature of 93° F., which should not be lowered much during the first week. When we have to deal with anemic patients or such as easily become chilled, prudence has to be exercised with the use of low temperatures. The temperature of 95° F. must not be exceeded, even when a combination of rheumatism and heart disease presents itself, otherwise the tonifying effect on the heart might fail to appear. In such cases cooler but shorter baths should be preferred. If the patient remains quiet he may during the first minute experience a sensation of chilliness. After that time a feeling of comfort must come over him, partly because of the heating effects of the bath, partly by becoming used to it. But should this feeling of comfort not be attained within one minute, and the chilliness not disappear, the bath must slowly and carefully be raised to a sufficient temperature. As a rule the patient must have the

sensation of warmth as long as he remains in the bath. There are cases when patients, in spite of keeping quiet in the bath, feel chilly again in a little while. This second chilliness should be avoided, for it shows us that such a bath was too prolonged for its relatively low temperature. Either the temperature must be raised at once or the patient leave the bath immediately. On the following day the baths should be taken warmer.

If the patient bears the treatment well, more concentrated baths may be given. First of all the concentration of salts should be increased, especially the quantity of CaCl . Later on the baths containing CO_2 may be employed. We concentrate the brine bath by the addition of mother lye condensed from our springs. The next step upwards is furnished us by the so-called thermal baths with their weak percentage of natural CO_2 . For this purpose large open basins are provided into which the water is conducted. Part of the CO_2 evaporates in the air so that the water of three of our different springs reaches the bath with an amount of about 4-500 cc. of free CO_2 per liter. Besides these reservoirs large underground basins have been constructed, which make it possible to keep up the natural heat of the water and to reduce to a minimum the evaporation of the CO_2 in the open air. These reservoirs provide us with the water which we term "thermal sprudel." This water enters the bath with an amount of 1,000 cc. of free CO_2 per liter, and constitutes a transition from the thermal to the effervescent baths. The water for our effervescent or so-called sprudel baths is led directly from the main pipe into the bath tub; besides its strong mineral ingredients it contains between 1,200 and 1,500 cc. of free CO_2 per liter. Finally the strongest of the Nauheim baths is the effervescent running bath, known as sprudelstrombad. The water flows in and out, with an excess of pressure of from one-half to one and one-half atmospheres, whilst the patient is in the bath. The mechanical effect thus produced is still further enhanced by the largest proportional amount of CO_2 with natural temperatures of $86-93^\circ \text{F}$. with which we are acquainted, that is, 2,000 and more cc. of free CO_2 per liter; this renders these baths the most efficient we know of.

The majority of patients require an intermission, in some cases after the first, but generally after the second, day. At a later stage three or four baths in succession may be given and at the same time the duration of the baths may be prolonged, but it rarely should exceed twenty minutes. After each bath the patient should be rubbed vigorously so as to put him into a glow. After that he should remain in bed, at least one hour, in order to rest and maintain an equally warm temperature. The physician's endeavor should be to lead to a constant and careful increase of the efficiency of the bath. The baths should be given progressively cooler, longer and more frequently. A strict supervision of the condition of the heart should be kept up uninterruptedly; the success of to-day's bath should give the measure for to-morrow's. The efficacy of the

Nauheim baths may be explained by the following data:

1. The possibility of the fullest graduation of the baths, which allows of beginning with a weak brine bath and then concentrating the mineral ingredients by means of mother lye, which acts strongly on the peripheral nerves, as it contains 40% CaCl .

2. The employment of waters of appropriate natural temperatures, viz.: $86-93^\circ \text{F}$., such as are used in ordinary life.

3. The possibility of beginning with a small amount of CO_2 which may be gradually increased to the greatest quantity we know of for these bathing temperatures. The water of the effervescent bath being in contact with the integument loses part of its CO_2 on account of the bodily heat. But in the sprudelstrom bath the water containing fresh quantities of carbonic acid gas in the nascent state is constantly being brought into touch with the bodily surface. We know by experiments that the mineral ingredients of the water act by imbibition, whereas the CO_2 with its movable molecules penetrates rapidly through the skin, and hence produces a quickly tonifying effect.

4. The mechanical effect of the sprudelstrom bath is added to this.

The radio-activity of the Nauheim springs was established two years ago by Professors Elster and Geitel, and the results were published in the *Physikalische Zeitschrift*.

The summer months are most suitable for the bathing treatment. In milder cases from four to six weeks are sufficient, after which an after-cure is advisable. This should be taken at a moderate mountain altitude, that is, not over 1,000 meters. On the other hand, in severe cases, the cure requires several months. In such cases it is advisable to divide the cure into two parts, between which the abode in the mountains should take place. In winter the patients should resort to a warm southern climate, in order to remain a long time in the open air.

The Nauheim baths may, to a certain extent, be made artificially. My brother and I have published exact directions on the subject. For this purpose either the Nauheim-bath salts may be used or else their most important ingredients must be employed: *i.e.*, NaCl and CaCl in due proportions. The development of carbonic acid gas is produced by bicarbonate of sodium and commercial hydrochloric acid. The chemical equivalents of both give the proportion in which they should be added to the bath. Should a solution of hydrochloric acid contain 42½% the proportion of bicarbonate of sodium should be the same. But when, as is generally the case, the hydrochloric acid is more diluted, the quantity of the solution must be increased in proportion to its concentration. The quantity of bicarbonate of sodium should at first be 100 gm. per bath, gradually being increased 1,000 to 1,500 gm., the bicarbonate of sodium being dissolved simultaneously with the other salts. The hydrochloric acid should be poured on the water close

to its surface and evenly diffused, or else the bottle containing it should be placed in the bath, some time before the patient enters it, in order to allow a slow diffusion of the hydrochloric acid. In this way the CO₂ may be developed for one half hour or longer.

Through our directions the artificial Nauheim baths have come into very extended use. I wish to lay particular stress on the fact, that many mistakes and misconceptions arise regarding the application of these baths. We often read in accounts of their effects that it is only the CO₂ which acts upon the heart. This, however, is quite erroneous. A good result — as already mentioned — may only be obtained with a gradual increase of all the component parts. Employing ingredients in fixed doses as manufactured and sold leads to the mischief that the quantity of CO₂ cannot be regularly graduated, the difference in the amount of CO₂ being too great and too sudden with each increase.

Thus, I have observed that unsatisfactory results were obtained with many patients, owing to the insufficient graduation, which rendered it impossible to regulate the bath either according to the nature of the complaint or to the temporary condition of the patient. It is evident that constant medical supervision based on long experience is absolutely necessary in the administration of artificial baths. In most instances a good result is obtained only when the patient is relieved from family and business worries, and, if possible, given better air and a change of surroundings. A suitable diet is likewise of great importance. In some cases and when proper means be adopted, excellent results may be derived from the artificial Nauheim baths. The number of successful cases must necessarily be limited, because the strongest forms of the natural baths — effervescent and effervescent running baths — cannot be made artificially.

METHOD OF GYMNASIIC TREATMENT.

As already pointed out similar results may be obtained with graduated gymnastic exercises as with bathing. The baths act through the sensory nerves, gymnastics through the motor nerves. We make use of, —

1. Exercises with resistance, in which the assistant resists the muscular action of the patient.

2. Gymnastics with self-resistance, in which the patient himself brings antagonistic muscles into action. The following principles may be recommended for the application of gymnastics: Each exercise must be performed so slowly and the resistance must be regulated in such a way that the patient is always in condition to breathe freely. This aim is best attained and fatigue of single muscles avoided when new groups of muscles are alternately brought into action and a pause made after each movement. When all the muscles of the trunk, arms and lower extremities have been exercised in this manner and the condition of the patient admits of it, the exercises may be repeated in several series. The different kinds of motion, consisting of flexion, extension,

abduction, adduction and rotation are, of course, determined by the nature of the articulation of the joints. They have been so often described that no further description of them is required. I wish to add, however, that a great variety of exercises are performed. It is not very difficult to teach any one how to become a gymnastic operator, provided that he is conscientious and possessed of a certain degree of intelligence and power of observation. A certain amount of anatomical and physiological knowledge is presupposed; should it not be present it may of course gradually be acquired. In many cases it is advantageous to train a member of the family so that the patient may always avail himself of his services. Further rules for the operator are, that he must not grasp or in any way constrict a portion of the patient's body, so as not to impede the movements but resist them. When an exercise is carried on too quickly or with too great resistance he ought not to begin a new one before the patient breathes quietly and the pulse again becomes slower.

By adopting these exercises a bed-ridden patient may be relieved and strengthened to such an extent that he may be able to get about. I have received, on this point, most favorable reports also from medical men in the United States.

Even many years ago I had the opportunity to observe that in some cases in which digitalis had been extensively administered it ultimately proved inefficacious, whereas when used in combination with a bath and gymnastic exercises it again produced its effect.

It is advisable to resort first to the resistance exercises; later on the patient learns the exercises with self-resistance, which possess the great advantage of allowing him to make use of them at his own convenience and independently of any one else. After the resistance exercises the treatment, as already mentioned, should be concluded with mountain climbing, but only then, when the heart muscles have already become strong enough to bear the increased strain without any risk.

The powerful effect produced upon the heart by the baths and the gymnastic exercises indicates under what circumstances this treatment is inapplicable, in fact, when it is contra-indicated.

These are: 1. Aneurism of the heart and of the large vessels. 2. Cases of advanced arterio-sclerosis and such extensive degeneration of the cardiac muscle that every increase of muscular action becomes dangerous, either by producing rupture of the aneurismal sac or by causing apoplexy or embolism.

It has recently been attempted to include in the treatment by mineral baths cases of advanced arterio-sclerosis and well-developed myocarditis, for the reason that at a suitable temperature these baths cause the blood to divert from the internal organs to the periphery. In such special cases this factor should not be considered decisive, because the ingredients of the baths, with or without the CO₂, have a far stronger

effect upon the heart and may therefore lead to the above-mentioned dangers. Contrary to what has recently been maintained by some French and also by some German physicians it is inadmissible that the absolute height of the blood-pressure is any indication for the decision as to whether a bathing or gymnastic cure should be resorted to.

Thus we see that in cases of renal congestion or excessive dyspnea the unusually high blood-pressure decreases under our treatment while on the other hand a blood-pressure which has become too much lowered owing to debility of the heart increases under this same treatment. My brother and I resorted to massage, especially under the form of *tapotement*, particularly in cases of cardiac excitation, and by this means it often becomes possible to restore tranquillity within a short time. But this result is not lasting, which may also be said of vibratory massage.

The application of cold, especially in the form of ice-compresses or ice-bags, is also a good means for quieting the heart's action. In cases where the heart requires quick stimulation, the use of high temperatures may be resorted to with great advantage. For this purpose an india-rubber-bag containing water of from 140° to 160° F. may be applied by shifting it gradually over the entire region of the heart and chest.

Until recently electricity was mainly used in order to quiet the heart's action. During the last years electricity has been applied in the form of sinusoidal currents; it has been claimed that, in this way, the heart could be quickly and permanently reduced in size; this view has not been generally accepted.

A separate paper would be required to give an adequate description of the diet required by patients with heart disease. I only wish to point out the following general rule: a mixed diet is to be preferred, the nourishment must be easily digested and not spicy. Exciting or effervescent beverages, or such as tend to produce gastric distention, should be excluded. The consumption of any large quantity of liquids or solids at any single time should also be avoided for a distended stomach compresses the lungs and displaces the heart by pushing it upwards and outwards. In addition to this, the heart has to struggle against an increased intra-abdominal pressure, which should be avoided. When this pressure already exists, and is caused by constipation or flatulency, it may be made to disappear by combining a drinking cure of saline waters with the bathing cure.

The use of tobacco may easily prove injurious, and should either be restricted or entirely discarded, if possible.

Owing to want of time, and much as I should like to, I must refrain from dwelling upon certain accessory points such as dress, occupation, the advisability of contracting marriage, etc.

The skepticism which a few decades ago prevailed in the medical world has vanished in a great measure and a very material change has become apparent, especially as far as therapy is

concerned. I should be greatly pleased if I have succeeded in showing you that satisfactory progress has really been made in the matter of therapy of chronic complaints of the heart.

Gentlemen, I thank you for the kind attention you have shown me during this lecture, and I hope that the subject I have laid before you may not have been entirely devoid of interest.

LOCALIZED LEUCOCYTOSIS ASSOCIATED WITH ATYPICAL PHAGOCYTTIC CELLS.

BY W. B. BARTLETT, M.D.,

Interne Massachusetts General Hospital.

S. P., twenty-seven, single, a factory hand, entered Dr. Gannett's wards at the Massachusetts General Hospital on Feb. 26, 1907. He was born in Russia and had been one year in this country. He could speak very little English and was exceedingly stupid.

Family history negative; habits good. He claims never to have been sick until twelve weeks ago when he began to have symptoms of failing cardiac compensation. He took to bed two weeks before entrance to the hospital.

Physical examination showed a well developed man, slightly cyanotic, especially about the ears. Examination of the heart showed evidence of an aortic and mitral insufficiency with slightly broken compensation.

The liver was enlarged and tender; the spleen not palpable. There were no masses in the abdomen and no enlarged glands. The fingers were markedly clubbed. The first four days of his stay in the hospital he ran a slightly irregular fever which never went above 100.8°. Later the temperature became normal. Under digitalis he improved considerably and was