the frequency of the pulse, of the respirations, of the slightest dyspnea, and of fatigue on the part of the patient. These symptoms may indicate merely that there is a slight disproportion between "demand" (degree of exercise) and "supply" (cardiac energy) and one easily to be corrected.

Indications of the *unsuitability* of both baths and exercises are a marked fall in blood pressure and an increase in the area of cardiac dullness during their administration. The latter sign has recently been observed by me in my wards in the Presbyterian Hospital in a single instance, during the use of exercises of the gentlest form. The case was one of organic mitral incompetence with dilatation and an almost complete loss of compensation.

I have occasionally observed in my use of the exercises a very slight increase in the area of cardiac dullness, without appreciable change in the blood pressure. It has been in cases of suspected myocarditis without valvular disease. If a modification of the exercises has corrected this sign, I have not regarded the treatment as inapplicable.

I would add a final word on the administration of the exercises. To be efficient they must be attended with "little exertion and no fatigue." A certain amount of training of the patient and a careful selection and instruction of the operator is necessary. To secure the proper conditions, the patient must be taught not to hold his breath or his body rigid (a common tendency), which involves increased conscious effort, to make the movements slowly and very steadily, and to recognize the degree of resistance advised by the physician. The operator should be light of hand, intelligent and trained in the observation of ordinary symptoms. The use of too great resistance, sometimes at the demand of the patient, is the most common fault of the operator and the most difficult to correct, I have found. At the beginning of treatment I am in the habit of demonstrating the degree of resistance I wish employed in the individual case. In so adapting the treatment it is needless to say that the pulse rate, the blood pressure, the site of the apex impulse and the outline of the heart, must be noted before and after the first employment of the exercises, and from time to time throughout their use.

I have had convincing proofs in my personal practice of the great benefit to be derived from the use of the resistance exercises *alone* in many forms of cardiac inadequacy. That discrimination and judicious care are required in their application, I have endeavored to show. Schott advises their employment with "self-imposed resistance" as an after treatment in many cases. It is within the competence of any one who has become thoroughly familiar with the different movements and involves little risk of injury through over-exertion.

It is to the credit of Schott that he has always maintained that the efficiency of artificial Nauheim baths is similar to that of the natural

ones, and there is abundant clinical evidence to this effect. There is equal evidence that results are attainable where the treatment is conducted under the conditions which obtain at well-ordered spas and in institutions which are not seen in cases treated at home.

I was impressed with the mental atmosphere at Nauheim. It was one of hope and cheerful expectation, the stimulus of which must ever be regarded in our therapeutics.

Purposely I have omitted the recital of cases in the present paper. I have chosen rather to give my general conclusions based upon a personal and careful study of these cases.

THE TREATMENT OF ORGANIC HEART DISEASE BY THE PNEUMATIC CABINET.*

BY CHARLES E. QUIMBY, A.M., M.D., NEW YORK, N.Y.

If the teachings of history alone were not sufficient clearly to define the difficulties which one must encounter, who ventures to ask recognition of any new measure that is a radical departure from accepted methods, certainly fourteen years' experience in the struggle to gain such recognition leaves nothing further to be desired in that line of instruction. I am now the happy possessor of such an experience.

While perfectly conscious, therefore, of my position to-night, I nevertheless count myself most fortunate in the full assurance that, from such an audience, in this center of American learning and culture, my propositions and claims whether accepted or not at least will not meet that "*A priori*" condemnation, which is the outcome of ignorant conceit. No one can appreciate more keenly than myself the profound significance of the fundamental proposition, which it is the purpose of this paper to demonstrate and defend; that, of all available measures for the treatment of organic heart disease, the pneumatic cabinet is the most potent and valuable; and, from the standpoint of our present knowledge of cardiac pathology, provides a scientifically ideal method of treatment. No one can be more surprised in recognizing the truth of that statement than was I. Begun in a hope, born of affection, that it might give transient relief to the distress of a very dear friend, its use was continued for nearly a year before I awoke to a consciousness of what was being done. From that time each year has added unvarying proof of its incomparable value.

The difficulty which every one finds in following a technical presentation of an unfamiliar subject is my excuse for the very familiar form of this paper.

Four things are necessary for a demonstration of the value of the pneumatic cabinet in the treatment of cardiac disease. First, a review of the mechanics of the circulation; second, an explanation of the physical principles involved in the action of the cabinet; third, the applica-

*Read at a Library Meeting of the Suffolk District Medical Society, Medical Section, March 28, 1906.

tion of this action to the pathic conditions of heart disease; and, fourth, clinical evidence of the accuracy of the previous demonstration.

First, the circulation. It is sufficiently accurate for our present purpose to say that the sole function of the vascular system is mechanical, and consists simply in keeping up a flow of blood through the vessels. This flow depends upon push from behind and obstruction in front. The amount of flow is determined by the difference between pressure behind and resistance in front; or, as both of these are manifest by blood pressure, by the difference of blood pressure in heart and arteries. This difference of pressure upon which blood flow depends we shall speak of hereafter simply as differential pressure. Making this statement general we say that all circulation of the blood is determined by differential blood pressure, or tension, and is always in the direction of the lower pressure. Just here comes the point which has special bearing on the cabinet action. Since blood flow is purely mechanical, and dependent solely on difference of pressure, the result will be the same whether this difference be gained by increase in one, or decrease in the other pressure; *i.e.*, it makes no difference, so far as blood flow is concerned, whether we increase ventricular, or decrease arterial pressure. It does make a very great difference in another way, however, as we shall see later. It is evident that a single, permanent differential pressure could not maintain a circulation in which blood must be returned to keep up the supply in the heart. Therefore, this differential pressure, in which the high pressure is in the heart and the low in the arteries, lasts for only half the cardiac cycle, and in the other half there is a reversal of the pressure difference, with the low in the heart and the high in the arteries. Thus the mechanics of the circulation is seen to consist of an alternating differential pressure, first in favor of the arteries and then of the heart. A single word here as to the mechanism of the circulation. The heart and arteries are made to do their work under an established blood pressure. Their ability to maintain their nutrition, and hence power, under increased blood pressure is limited. Every permanent increase of blood pressure above normal demands an increased force expenditure, which requires increased nutritive supply. And cardiac degeneration, failure and death are inevitable results when nutritive repair of the vascular mechanism fails to keep pace with the demand for force expenditure. Therefore, increase of blood pressure as compared with tissue repair is the fundamental cause of death in all forms of organic heart disease. Since all valvular lesions cause an absolute increase of pressure in one or another heart cavity, while primary muscular degenerations cause an increase of pressure as compared with heart power, we now see why it does make a very great difference to the patient and in the duration of his life, whether that differential blood pressure which maintains his circulation is gained by a reduction or increase of pressure.

From the foregoing mechanics of the circulation we have, therefore, the following propositions:

1. The circulation depends upon an alternation of differential blood pressures, and its amount is determined solely by the difference, not by the absolute amount of such pressures.

2. The integrity of the vascular mechanism and, hence, duration of life depend directly upon the maintenance of the absolute amount of blood pressure below a fixed limit; or below an established ratio to heart power.

3. Every cardiac lesion causes an immediate and progressive increase of blood pressure, either absolute or relative, and such increased pressure is the essential cause of death. Therefore,

4. The ideal treatment of organic heart disease is to maintain the circulation under low blood pressure; or to hold any inevitable increase of pressure within the limits of possible compensation.

To what degree, then, does the pneumatic cabinet make possible this ideal treatment?

The apparatus itself is a box of sufficient size to contain a single patient, which can be closed air-tight. (Fig. 1.) On the top is a bellows by

FIG. 1.—Interior view of cabinet, showing ozone generator through glass front.

means of which the air within the cabinet can be rarefied, the degree of rarefaction being shown by a mercurial gage on the front. Passing through the front is a stop-cock, and the patient is provided with a tube, to be attached to this cock on the inside, through which he can breathe from the outside, as he takes the tube in his mouth and the cock is opened. There is always, however, sufficient air in the cabinet so that the patient can breathe when desired, under the lower pressure of the rarefaction. With a patient enclosed in such a cabinet it is evident that respiration may take place under three different conditions of atmospheric pressure.

First, barometric pressure within the cabinet, and, hence, upon both the pulmonary and cutaneous surfaces. Second, rarefaction, or

lowered pressure on both those surfaces. (Fig. 2.) Third, barometric pressure on the pulmonary and a lower pressure on the cutaneous surface. (Fig. 3.) To obtain this, the patient takes the

Fig. 2.

breathing tube in his mouth with the lips tightly closed about it, the stopcock is opened, thereby connecting the lungs with the outside air, and rarefaction made within the cabinet. What, now, will be the effect of these different atmospheric pressures on the circulation? The last is the only absolute differential pressure, and we take that first. (Fig. 3.) Let us assume that the rarefaction in the cabinet is, say, one inch of mercury. This represents essentially a diminution of pressure over the entire cutaneous surface of one-half pound to the square inch. Thus, the patient, breathing through the tube from the outside, has normal or barometric pressure within the thorax, on the pulmonary vessels and on the outside of the heart, while that on the systemic circulation is one-half pound to the square inch less, or about five hundred pounds less in all. In other words, we have applied one huge dry cup to the entire systemic circulation, that pulls one-half pound to the inch. It is obvious that the effect must be exactly that of a small cup, only manifested generally instead of locally. There will, be, therefore, dilatation of vessels, lowering of blood pressure, and suction of the blood from the lung into the systemic vessels; thus giving hastened circulation, with less work on the part of the heart. The result is pulmonary anemia and systemic plethora, of a degree determined by the amount of differential pressure, and the length of its continuance. With a rarefaction of two inches, three minutes' breathing

under these conditions will give the strongest man distressing dyspnea. The most striking illustration, however, of the power of this motion of the cabinet is in the almost immediate arrest of pulmonary hemorrhage. This motion may be used either with low rarefaction for two or three minutes, the patient breathing in and out through the tube; or with high rarefaction very briefly. For our present illustration we assume the latter, with a rarefaction of one inch of mercury. With this rarefaction the differential is maintained only while the patient takes a long, slow inspiration and a second or two after the inspiration ceases. This represents from six to ten heart beats, and in that time pulmonary hyperemia will be relieved and the systemic vessels filled, under lowered pressure. Now, at the end of such an inspiration, with mild pulmonary anemia and systemic plethora, the patient suddenly drops the breathing tube as the cock is closed, preventing any inrush of air from without. The result is an immediate drop of pressure on the pulmonary surfaces from barometric to that within the cabinet. (Fig. 2.) This sudden change makes the absolute pressure on the two circulations the same; but, by reason of the weaker anatomical supports of the pulmonary vessels, it practically makes a differential pressure in favor of the lung, thus reversing the previous differential, and sucking the blood from the full systemic vessels back into the lung.

I always find this point the hardest to make clear: that lowered atmospheric pressure is the

Fig. 3.

equivalent of a differential pressure in favor of the pulmonary circulation. Every one recognizes the effect of extreme rarefaction as manifested at very high altitudes. Every one admits that

the dyspnea, palpitation, bronchial and nasal hemorrhage caused by such altitudes are the result of vascular dilatation and intense pulmonary congestion. In view of this it is difficult to understand failure to recognize that the effect of milder rarefactions must be the same in kind if not in degree. It is obvious that the extreme vascular disturbance resulting from high rarefactions must be started with the first reduction of atmospheric pressure; and, indeed, it is a well-known fact that in ascending mountains one appreciates a gradually increasing oppression. It should, therefore, require but a moment's reflection to see that the slight rarefaction of the cabinet air is, so far as concerns the circulation, essentially a mild differential pressure in favor of the pulmonary circulation, which acts to draw the blood from the systemic vessels in precisely the same way that the previous absolute differential drew it from the lung into the general circulation.

We thus have the round of the circulation complete, with an alternation of differential pressures,—one drawing the blood out during inspiration, and the other drawing it back during expiration. The blood flow is thus maintained by mechanical forces acting in precisely the same manner as the physiological; which, at the same time, lower blood pressure and give rest to the heart and arterial muscles.

Let us now make the application to conditions of disease; and for this purpose I shall take a case of aortic incompetency as the simplest. With this lesion the first pathic increase of tension is in the ventricle during diastole, and its degree depends, so far as any controllable factors are concerned, upon the tension in the arteries. And these two tensions react to increase each other. Arterial tension driving the blood back during diastole causes ventricular dilatation; and the consequent increased amount of blood thrown into the arteries with systole produces a progressive increase of arterial tension, to continue the process of dilatation with each succeeding diastole. Now let us place a patient with this lesion in the cabinet and see the effect. As the cabinet is closed with the breathing cock open, the patient takes the tube in his mouth, and at once the cabinet air is rarefied. This gives the absolute differential pressure (Fig. 2), in favor of the systemic circulation, with these results: the vessels are dilated, arterial tension lowered, obstruction to heart action diminished, the work of the heart lessened, the force and amount of diastolic dilating reflux decreased, and, best of all, excessive ventricular tension removed, whereby the heart has opportunity to regain its tone and elasticity, and to restore its failing nutrition. If this differential be held only through a long, slow inspiration, pulmonary congestion will be relieved and the systemic vessels well filled. Then the tube is dropped and the cock closed. (Fig. 1.) At once we reverse the differential and with expiration suck the blood back to the lung. Thus the blood is hastened in its flow while arterial tension, aortic reflux, and both cardiac

and arterial strain have all been lessened. A regular treatment consists simply in repetition of these motions; and no patient suffering from this lesion can take a dozen such breaths and not be conscious of relief. This motion, under which the patient, sitting in a rarefied air, inspires from without air at barometric pressure, *i.e.*, under a differential pressure favoring the systemic circulation, and expires into the rarefied air of the cabinet, I have termed "forced inspiration." It is the most powerful motion and may be used with rarefactions of from one to one and a half inches. It is liable, however, at first, to increase the distress of extreme pulmonary congestion with failing right heart. For such cases the proper beginning treatment is what I have termed "differential respiration." In this motion the patient both inspires and expires through the tube, thus maintaining barometric pressure on the lung, while only a slight rarefaction is made in the cabinet air, of from one fourth to one half inch. (Fig. 2.) The patient makes from six to a dozen or more respirations under this mild absolute differential, according to his strength; and then, to avoid the suction effect of rarefaction in increasing pulmonary congestion, as he drops the tube the cock is left open and barometric pressure is at once restored in the cabinet. In this way we gain all the cupping effect in relieving pulmonary congestion and lowering systemic tension and avoid increasing pulmonary congestion by not aiding the return blood flow.

The application of these two motions in the treatment of mitral insufficiency, aortic obstruction, and the various forms of cardiac degeneration should be obvious from what has already been said. It is equally plain that the cabinet is not adapted to the treatment of mitral obstruction. As much relief may be gained by its use even in that condition as from the Neuheim method, but it requires some special skill to avoid doing harm.

The natural criticism which comes at this point is this: Granting all that has been said to be true, a patient cannot spend his life in the cabinet, and the amount of relief which can be gained by any reasonable length or frequency of treatment can hardly be sufficiently great, or enduring, to make the treatment practicable. To this I should reply, "That is precisely what I thought at first." But even the most skeptical must agree that, whatever the nature of the cabinet action may be theoretically, its therapeutic value will be decided by the clinical results. It may help, however, to a fuller comprehension of those results if we recall for a moment the conditions under which the heart does its work and maintains its nutrition. While the heart is made to take up nutrition in very brief intervals of rest, the ability to take that nutrition depends upon the condition of the muscle cells themselves; and although these cells are made to endure rapidly repeated strains yet, if a certain limit is exceeded, they suffer what might be called nutritive paralysis; a paralysis analogous to that

of a voluntary muscle which has been kept constantly contracted for a long time. Now, we know that such a muscle, if allowed complete relaxation for even a short period, may be made to contract again for a considerable time. If

Pl. G

such short rest does so much to restore nutrition in a voluntary muscle, which requires long periods of rest for full repair, is it not fair to assume that twenty minutes' complete relief to heart strain is practically a very prolonged rest for a muscle that regularly gets its nutrition in such brief periods?

In support of the foregoing claims as to the value of this treatment, I desire to present first a few sphygmographic tracings. They are intended to show only the effects of the cabinet upon arterial tension.

In Plate T the first two tracings show the effect of the cabinet, which was not very marked or persistent, in a case of pure arterial fibrosis. The last three show a very decided effect, which was essentially permanent, in a case of mild arterial disease with moderate mitral reflux. Plate G, from a case of pure mitral incompetency, shows the effect of the cabinet in reducing the pulse rate at the first treatment, from 120 to 96,

Pl. G

and the effect upon the amplitude of the pulse of five days' treatment. Plates C and C' are from a case of aortic regurgitation with slight chronic renal trouble. Their significance will be appreciated after reading the record on the

tracings of the time and manner in which they were taken. Plates H and B'' are from cases 3 and 4 reported below. The first three tracings of Plate B'' are especially significant and valuable, showing, as they do, the immediate reduction of tension by the cabinet (tracing 2 compared with 1), and the effect upon the heart in enabling it to take up work after this brief complete rest. (Tracing 3 compared with 1.)

I shall report but four cases, and those as briefly as possible. They have been selected with the view of showing the failures of the cabinet, as well as the successes, so far as there is failure.

Jan. 10, 1906. Mrs. B., thirty-seven. Has had trouble with heart for eleven years since birth of only child. Two years ago became worse, and for past year has been very ill, suffering from the regular results of mitral leaking, with the back pressure on the abdominal circulation and liver. Large doses of digitalis gave some relief, but is still in great distress

Pl. C'

and can hardly walk across the room. Is, and has been, taking 20 drops tr. Dig. every six hours, but has constant angina and severe pain in left leg. Examination shows thin anemic woman, moderate edema of feet, considerable ascites and large pulsating liver. These symptoms of back pressure are out of proportion to the dyspnea, as respirations are only 24. Dyspnea is quickly increased, however, by the least exertion. Heart beats are 88 to the minute and come in pairs. Pulse at wrist is 44, and too weak for tracing. There is a loud systolic mitral murmur.

Digitalis was at once stopped and replaced by small doses of glonoin. Patient was kept at office and given three treatments during day of about ten minutes each. Motion used was differential respiration with very low rarefaction, and the ten minutes was broken by two periods of rest. The angina was entirely relieved by the first of these treatments; pulse and respiration not affected. At end of day patient says she feels better than for a long time.

Treatment was continued six weeks. On third day pulse began to show regular rhythm, and at end of first week this was constant except on exertion, and was then quickly restored by rest. In ten days swelling of feet was all gone, but abdomen changed very slowly. At end of third week there was no longer appreciable ascites, and at end of treatment the measurements about abdomen and over liver had

decreased nearly three inches; but liver still pulsated. During third week patient gave up coming to office in carriage and walked to and from her room, a distance of nearly two blocks. Family reasons caused discontinuance of treatment. Soon after returning to her home in New Jersey she began to go backward, and has now lost about all she had gained. Cases like the above, in which the symptoms of back pressure in the abdomen are out of proportion to those in the lung, I regard as the most unfavorable for any treatment. Yet here, the cabinet gave immediate and progressive relief when all medication had failed. And such a case, if I understand it aright, is not fitted for the Neuheim treatment.

Pl. B'

The second case is quite different. Mr. M., age forty-two. Has had an aortic lesion since he was twenty-four. It caused him no great trouble until the spring of 1904, when, following severe muscular strain, he developed an intermittently persistent angina, of rather mild degree, which was associated with palpitation and much general discomfort. He consulted a justly prominent New York physician who diagnosticated a double aortic murmur, put him on digitalis and told him that he would have to continue its use the rest of his life. The digitalis gave rather uncertain relief and did not prevent the anginal attacks, or much affect the general discomfort.

Examination, a year later (April 12, 1905) confirms the diagnosis as to the aortic lesion. Digitalis was stopped and patient put under cabinet treatment, which was given twenty minutes daily for a month. Result, entire relief, and the patient returned to his home in the Berkshires to live the life of country gentleman. In the year since, he has been in town three times for three or four days at a time and has then come in each day for a treatment. Beyond this he has done nothing and has been entirely well.

Case III is an extreme illustration of success and final failure through no fault of the treatment.

F. M., age thirty-five, was admitted to my service at the City Hospital on Dec. 13, 1904. The following is a brief abstract of his history: Fourteen years ago was in bed eight weeks with inflammatory rheumatism. Since then gradually increasing trouble from disturbed sleep, palpitation, shortness of breath, pains in limbs and swelling of feet. Was treated in Bellevue six years ago for heart trouble with all the above symptoms. Four weeks ago had acute attack at night; obviously an acute dilatation, with intense dyspnea

and angina. Feet swelled rapidly and all symptoms grew worse up to time of admission. Examination gives all the signs of extreme cardiac dilatation, with double aortic and double mitral murmurs, and a presystolic thrill. Patient can breathe only in sitting position, and any noise or disturbance in the ward starts an attack of angina and most distressing dyspnea. No medication affords relief except morphia, and this has to be given in frequent doses. The history notes, "Dec. 16, three doses of $\frac{1}{2}$. Dec. 21 to 28, $\frac{1}{2}$ every four hours. Dec. 29, $\frac{3}{4}$ gr. was required to relieve an attack. Dec. 30, small amount of fluid in abdomen; liver 5 cm. below ribs and tender; respirations 44; patient complains of great precordial distress; apex in sixth space past axillary line." The history continues unchanged with constant use of morphia, to Jan. 19, when a still further dilatation occurred, and every one thought the end had come. But he lived, and improved slightly until Jan. 25, when I had a cabinet in the hospital ready for use. On that date patient was taken to the treatment room and given fifteen minutes' treatment in short pieces. The effect on the circulation is shown in the tracings of Plate H. The pulse was reduced from 98 to 92; the systolic blood pressure raised from 140 to 150; and the diastolic from 60 to 110. The precordial pain and dyspnea were much relieved. Owing to inexperience of the staff and my inability to be at the hospital every day, treatment was not given daily, but every treatment gave obvious relief. Morphia was still required at times for the relief of angina, largely because the staff did not dare use the cabinet for that purpose. As they became accustomed to its use I directed that they should do so, and this note appears in the history for Feb. 5: "Patient found in very severe pain, with pronounced dyspnea; pulse rapid, tension high; with each spasm of pain the systolic sound at apex distinctly changed in pitch, becoming higher. Patient was taken to cabinet on stretcher. For the first five respirations the pain and dyspnea were very evident, and it was with great difficulty that patient could properly use the tube. After five respirations patient became suddenly better. Was given two sittings of five minutes each and was returned to the ward with the dyspnea entirely gone, the pain much relieved."

This experience was repeated several times until, owing to frequent disturbances in the ward, on Feb. 18 the patient was taken to a private room. From that time until his discharge on March 9, there was no medication except iron pills and the cabinet. He had no further attacks of angina or dyspnea, and, on leaving the hospital, said he felt better than he had in six years. This patient promised to call at my office for continuance of treatment. He did so the day after leaving the hospital, but from that time all trace of him has been lost, although persistent search was made at the address given. The history as given, however, is sufficiently striking and convincing as to what may be done with the cabinet.

The last case which I shall report is the first case of organic heart disease ever treated by the cabinet. In 1885 W. B., then twenty-eight years of age, suffered a severe attack of endocarditis and aortitis. Such recovery as he made was gained only after nine months' absolute rest, most of the time in bed, and left him with an extensive aortic insufficiency, but poorly compensated. He attempted to resume his business as a lawyer, but the frequent interruptions, incident to recurring attacks of acute dilatation soon compelled him to retire to the country, where he became interested in what has proven to be an immense enterprise. This he was able to carry, at first, because the work could be made to await his ability to do it. As the

demands on his strength increased, and became more imperative, however, the attacks of heart failure returned with increasing frequency and severity until, just as he was preparing to give up he was prostrated by an unusually severe attack and I was called to see him. This was seven years after his first attack, during which time he had been under the most competent medical supervision. He presented all the symptoms of extreme acute dilatation, following aortic insufficiency. The pulse was intermittent, irregular and uneven to an extreme degree. The heart gave loud double aortic and systolic mitral murmurs. He could not lie down, and even in the erect position angina was intense, while the throbbing in the head was almost worse. He had learned by sad experience that digitalis only increased the former as did glonoin the latter. My mental prognosis was speedy death, but in about two weeks he was able to walk slowly without exciting serious increase of cardiac irregularity. A few days later he received his first treatment by pneumatic differentiation, on Dec. 23, 1892. This was given daily for some two months and then daily when he happened to be in town, which varied from two days to two weeks at a time, with intervals extending up to a month when he had no treatment. In six weeks from the first treatment he resumed his business, which he continued despite constantly increasing burdens, for thirteen years, to the summer of 1905, with but a single relapse. For three years he took no vacation, but in the spring of 1896, after a winter of unusual strain, he asked permission to go abroad, to which reluctant consent was given. Although the voyage was smooth, by the time he reached London he felt the warning headache and called a physician who took him through a mild attack of dilatation. On recovery he consulted Dr. A. E. Sanson. By permission I quote from letters of Dr. Sanson and the attending physician, Dr. Edwards. The latter says, "Mr. B. came under my care April 26. He had a very threatening attack of heart failure, with intermittent systole at frequent intervals, often every third or fourth beat. Obvious evidence of aortic and mitral disease with constant regurgitation at the mitral and regurgitation at all kinds of pressure on the aortic valves. He has, of course, a heart which is permanently infirm and will at all times be gravely worsened by anxiety, worry or over work." Dr. Sanson says: "May 19, 1896. I have to-day examined your patient. I find evidence of hypertrophied left ventricle, some dilatation and hypertrophy of the right chambers, a fusiform dilatation of the aorta and abundant signs of obstruction and incompetency at the aortic valve orifice. The left ventricle has dilated to the production of the systolic murmur of mitral incompetency." Both physicians advised the patient to devote the remainder of his life to the study of botany. He reached New York the last of May. Within a week he resumed business, taking treatment constantly. The first of September he went to the country for a vacation, where he was under treatment, and by the end of the month his only murmur was the original aortic regurgitation, which had been the only murmur up to the time of his trip abroad. The disappearance of both systolic murmurs when treatment began in 1892 had similarly shown that they were purely dilatation murmurs.

Soon after this the patient made his permanent home in the country and installed a cabinet in his own house. At that time in reckoning up, he found that he was a director in 15 companies; secretary and treasurer of 5, all involving very large investments, and that, during the previous year he had spent, on the average, one night in every four on a railroad train. For the

next eight years he continued the same active life without any discomfort until the fall of 1904, when, at my regular fall examination, a new murmur was discovered, which, however, had caused no discomfort. It was a mitral systolic of entirely new character, which I believed was due to eccentric hypertrophy of the left ventricle, and of most serious import. Despite all warnings the patient neglected himself and insisted on marrying. This he did in February, 1905, and from that time until his death Sept. 30, the heart failure was steadily progressive. The only gross change in the heart, which weighed 23 oz., aside from the original aortic lesion, was hypertrophy, apparently limited absolutely to the left ventricle. This hypertrophy the pathologist of the City Hospital considered remarkable for the absence of all signs of inflammatory change.

If this were the only case I had to report, I feel that it would justify my claims as to the value of the cabinet treatment. For, while I am well aware that cases of aortic regurgitation often surprise us by their continuance, I do not believe that any such case, after a progressively downward course of seven years to the point of death, suddenly turns in six weeks under any other known method of treatment, and continues for thirteen years an uninterrupted course of health under increasing strain.

In conclusion and in summary permit me to say:

1. The pneumatic cabinet does not cure incurable organic heart lesions.
2. After nearly thirty years' observation and reasonably careful study of the results obtained by other methods, in the hands of acknowledged authorities, and fourteen years' personal experience in the use of the cabinet, I am firmly convinced that it affords more immediate, extensive, and lasting relief than any other known measure.
3. That its use is based upon such strictly scientific principles, and the results are so plainly determined by established physical laws, as to justify its description as the nearest approach to the ideal method of treatment in organic cardiac disease.

DEPLETION IN HEART DISEASE.*

BY FRED'K C. SHATTUCK, M.D.,

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ABSOLUTE rest of the heart spells death. It must work. Rest is for it a relative term. Moreover, its work feeds itself as well as the rest of the organism. The treatment of a diseased myocardium, therefore, whether the disease is primary in the muscle or secondary to either a block at one or more of the valvular orifices or to impeded coronary circulation, falls into two main divisions, — economy of work and efficiency of work.

It is my duty this evening to speak briefly on the first of these divisions: economy, which indirectly may be of great value, nay, indispensable, to efficiency, the direct means of securing which will be discussed by Dr. Pfaff. Economy

* Read at a Library Meeting of the Suffolk District Medical Society, Medical Section, March 28, 1906.