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ADDRESS.

THOUGHTS ON GENERAL AND CARDIAC THERAPY.

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During the last quarter century remarkable advancement has been made in every department of medicine. While in the realm of therapy, advancement toward scientific accuracy has perhaps hardly been in keeping with the general progress, still modern therapy is becoming one of the more exact branches of medicine. It is not based entirely upon empiricism, as was formerly the case, but is establishing itself upon a basis which may be called scientific or rational. In treating disease empirically, a certain remedy is used because it seems to have been valuable in treating the same disease or conditions. I do not deny, or wish to under-estimate, the value or success of such treatment in many cases, but would emphasize the fact that the method is anything but scientific. A system of scientific medication must be founded upon a knowledge of the natural history of the diseases to be treated, and of the agents to be used. Or more accurately, scientific therapy must be based upon a knowledge of physiology, pathology and materia medica. This implies a knowledge of physiologic effects of drugs, and their action upon healthy states and conditions, and of the indications for treatment, based upon clinical and post-mortem observations of the natural history, that is, the cause, course and results of diseased states and conditions, as well as a knowledge of the physical and chemic characteristics of remedies. I am aware that we are at present unable to base all our therapeutic methods upon this scientific basis. But as our knowledge of pathology and the natural history of disease advances, I believe there will be a corresponding advance in scientific therapeutics. Every physician possessed of the truly scientific spirit and equipped with all the knowledge available along the lines above indicated, will hardly be satisfied with what are known as shot-gun prescriptions, or with happy combinations, but will select his therapeutic agents with an eye to the good of his patient and the honor of his profession.

With a deeper insight into physiology and pathology we shall surely learn more of the value of what may be styled physiologic remedies, and place more reliance on a proper application of air, food, water, rest and exercise. If we recognize our dependence upon the *vis medicatrix nature*, and learn to make a more intelligent use of scientific and of physiologic remedies, we ought certainly, as a natural result, to abandon any allegiance we may have formed with polypharmacy, and also in a great measure with symptomatic therapeutics. To illustrate, let me call

your attention to the symptomatic treatment of typhoid fever by modern antipyretics, and by modern antiseptic remedies. With what enthusiasm has one and another physician lauded the use of antipyrin, phenacetin or acetanilid in reducing the temperature and ameliorating the symptoms in this disease! But to-day we are well awakened to the fallacy of considering hyperpyrexia the principal destructive agent or process, and the coal-tar derivatives are practically abandoned, as being not only useless, but actually dangerous. What is known as intestinal antiseptics is much in vogue at the present time. We are asked to believe that naphthol, salol, zinc sulpho-carbolate, bismuth salicylate, hydrogen dioxid, sulphur, etc., administered at intervals of two to four hours, will disinfect or render aseptic the mucous membrane of the intestinal canal, and destroy the pathogenic micro-organism which is the cause of the disease, or the toxins which are generated thereby. This treatment is supposedly based upon the germ theory of disease. Suffice it to say that thus far none of its advocates has done more than to advance their claims; they have proved nothing. The drug has not been discovered which shortens by a day the course of the disease.

Allow me to call your attention briefly, by way of contrast, and to illustrate the difference between empiric or symptomatic treatment and what I have called scientific treatment, to a remedy, a physiologic remedy, which has established itself firmly in the therapeutics of enlightened medicine the world over. I refer to the Brandt method of balneo-therapy. I take pleasure in quoting the following from an eminent authority¹ as to its effects: "The rationale of the bath is so simple that it appeals to our best judgment at once. We have an overwhelming of the nerve centers by the products of infection. The shock and the subsequent stimulus to the cutaneous surfaces are conveyed to the nerve centers, and thence reflected to the heart, lungs and other organs. Observations at the bedside at once renders these effects patent. The first effect is a refreshment, an enlivenment of the cerebrum. The eyes are opened; the face loses its apathetic stare; consciousness returns after one or more baths; the inspiration is deepened; expectoration is facilitated; the widening of the peripheral vessels and the stimulation of their coats relieve the heart; blood pressure is increased and the laboring organ becomes as quiet as does a sea-tossed ship in the hands of a skilled mariner. The secreting glands are aroused to activity. Moreover, the temperature is reduced, not so violently as by medicinal agents, but more definitely, more in accord with normal tendencies. . . . It has been recently shown by Thayer, in the Johns Hopkins laboratory, that the leucocytes are more than doubled after a Brandt bath. On the other hand, the destructive

¹ Simon Baruch.

effect of medicinal antipyretics on the leucocytes, their inhibition of excretion of products of tissue change and their effect on the heart have been again and again demonstrated." I believe that one of the greatest improvements in our methods of treatment, which may result from what I have styled scientific medication, will be the withholding of remedies of uncertain value, in other words, less medication. I do not say that scientific medication means no medication, but I believe that as our skill in diagnosis increases, our faith in polypharmacy will decrease.

With these remarks on therapy in general, I wish briefly to call your attention to a branch of the subject in which there seems to have been considerable advancement toward scientific precision, viz., cardiac therapy. I venture the statement that there is no department of therapeutics in which knowledge is so exact as in that relating to cardiac disease. Our knowledge of the action of the heart in normal as well as in pathologic conditions, ought to tell us why and under what circumstances a given remedy may be useful, provided we know its physiologic effects. The principal remedies which directly affect the heart and blood vessels are digitalis, strophanthus, strychnia, spartein, convallaria, caffein, glonoin, aconite, veratrum viride, opium, bromids and ergot. Let us briefly review the physiologic action of some of these remedies, when administered in medicinal doses.

Digitalis stimulates the motor ganglia of the heart, increasing the force of the ventricular contractions. By stimulating the inhibitory fibers of the pneumogastric, it lengthens diastole, thereby giving time for the cavities to receive more blood. It also acts upon the vaso-motor ganglia in the medulla, causing contraction of the arterioles and thereby increasing arterial tension. It is a vascular stimulant raising arterial pressure, and steadying the heart by lulling it into long diastoles. Is digitalis a cardiac tonic as well as stimulant? It certainly increases the nutrition of the heart muscle by supplying it liberally with blood. The coronary arteries fill during diastole and when the heart is acting powerfully and steadily under the influence of digitalis, the increased volume of blood swells the aorta, which, in turn by a mighty recoil, fills the coronary arteries and carries food to every part of the heart.

Strychnia stimulates the vaso-motor centers, constricting the capillaries and causing an increase of arterial tension. It also stimulates the vagus, inhibiting cardiac contractions. Thus we see it has a double action in slowing the heart.

Cocain affects the vaso-motor centers and the cardio-motor ganglia, increasing arterial tension and the force of the heart's action.

The action of belladonna is to increase the force and the frequency of the heart's action by stimulating the cardiac ganglia and by paralyzing inhibition. It also raises the blood pressure through capillary contraction, due to vaso-motor stimulation.

Ergot, by stimulating the vaso-motor ganglia, decreases the caliber of the arterioles and produces a marked increase in arterial tension, thereby causing the heart's action to become slower. It also acts on the unstriped muscular fibers in the arterioles, aiding their contraction. All the remedies thus far considered, viz., digitalis, strychnia, cocain, belladonna and ergot may be classed as vaso-constrictors.

Aconite, by lowering the action of the cardio-motor ganglia, lessens the force of the systolic contractions

and by stimulating the vagus, lengthens the interval between the beats. It also dilates the peripheral vessels, probably through vaso-motor depression, thereby lowering blood pressure and slowing the heart.

Veratrum viride depresses the vaso-motor centers, dilating the vessels and reducing vascular tension. By a direct effect upon the heart and its contained ganglia it lessens the force and frequency of its pulsations.

Glonoin increases the energy and rate of the heart's contractions and lowers vascular tension by widening the blood paths. The former is done by directly stimulating the heart, the latter by its action on the muscular coats of the arterioles, and not by depression of the vaso-motor centers. Aconite, veratrum and glonoin may then be classed together as vasodilators, but with this difference in their action, while aconite and veratrum depress the heart's action, glonoin increases it.

Strophanthus slows the heart's action, lengthens diastole and increases the force of the muscular contractions, thereby raising arterial pressure, but does not affect the caliber of the vessels through the vaso-motors.

Convallaria, by direct action on the heart, lessens the frequency and increases the force of systole, thus raising arterial pressure. It does not affect the vaso-motors or the pneumogastric.

Caffein stimulates directly the heart, increasing its contractions in force and frequency. It causes dilatation of the arterioles, not by vaso-motor depression, but by an action upon the intra-vascular nerve ends (Semmola). Large doses affect the vagus, decreasing the number of systolic contractions.

Cactus shortens and increases the energy of systole, raises arterial pressure and shortens the intervals between the beats. Under its use the pulse becomes quicker and stronger.

Spartein primarily increases the pulse rate, and the force of the heart. This increase of the heart's action is soon followed by a decrease of the same. The augmented rate is due to an action of the drug on the heart's muscle or its ganglia, and the decrease to stimulation of the cardio-inhibitory centers. Spartein increases the blood pressure by its action on the heart and by stimulating the central vaso-motor system, and subsequently decreases it by a depressing effect through the same channels.

Thus we see that strophanthus, convallaria and cactus have no appreciable effect on the caliber of the vessels, while the effect of caffein and spartein in this direction is less marked than is that of the drugs we have classed as vaso-constrictors. The affect of opium is to stimulate inhibition, producing a slow and full pulse with increased arterial pressure. Systole and diastole are both lengthened. Bromids lessen the force and frequency of the pulse, as well as arterial tension. It is claimed by Hammond that bromids produce contraction of the arterioles of the brain, thereby causing cerebral anemia. In the study of cardiac therapeutics it is well to bear in mind that the heart is a double pump with normal valvular insufficiency on the right side and with perfectly closing valves on the left side; that the principal resistance to the flow of blood is in the arteries and arterioles, and not in the veins; that the capacity of the veins is double that of the arteries, and that the abdominal vessels when dilated are capable of holding

all the blood in the body. By the use of the vaso-constrictors we increase arterial tension, and as a result send an increased quantity of blood through the coronary arteries, thus improving the nutrition of the heart muscle. In a dilated heart without compensatory hypertrophy, we may, by increasing peripheral resistance and keeping it just within the power of cardiac contractions, bring about hypertrophy of the left ventricle, and thus restore the circulation to a nearly normal condition. This has been proved by Oertel. The effect of the vaso-constrictors may be carried too far, and so narrow the arterioles, as to send the blood so rapidly through the capillaries as to cut off nutrition from the heart. The administration of nitro-glycerin, which has the power of dilating the capillaries, will, however, remedy this over-contraction. The vaso-constrictors increase peripheral resistance and lower the rate of the heart's action. The vaso-dilators, on the other hand, decrease peripheral resistance and lower the rate and the power of cardiac contractions.

Now the question arises, what working conclusions are to be drawn from these considerations? Let us try for a moment to apply the above data to some of the conditions which we daily meet. In mitral stenosis we have at the mitral orifice an obstruction to the free flow of the current of blood from the auricle to the ventricle. The orifice being narrowed, the auricle can not pump the normal quantity of blood through it, in the time allotted, and in an attempt so to do, the heart works at an increased rate. Dilatation of the auricle follows, and there is a stasis of blood on the venous side of the heart while the vascular tension is lowered on the arterial side. What must be done to help that heart? We must increase the power of the ventricular contraction in order to overcome the effect of the dilatation, at the same time that we lengthen diastole, to give the auricle time to empty itself. We must also increase the blood pressure in the arteries for the benefit of the coronary circulation, and must work the blood over from the venous to the arterial circulation. If our findings in the physiologic action of drugs are correct, here is a field for the use of either digitalis, strychnia, strophanthus, spartein, convallaria or ergot, or a combination of two or more of them. In regurgitation at the mitral valves, we have the conditions above noted, with the addition of eccentric hypertrophy of the ventricle. Such a heart may be in great distress, putting in thirty to fifty extra beats per minute, with the veins full and the arteries empty. Systole is weak and diastole too short for the ventricle to fill with blood. The indications are plain; shorten and strengthen systole and lengthen diastole. To do this we must turn to the same remedies mentioned in speaking of mitral stenosis. Here is an opportunity to use the full physiologic effect of digitalis. Having secured that effect, having restored the equilibrium of the circulation it is probably better to combine glonoin with the digitalis, in order to cut out the vaso-constrictor effect of the latter. In some cases a combination of ergot, for its vaso-motor effect, with spartein or strophanthus, will accomplish all that is desired. The other drugs mentioned in connection with these lesions are valuable and play an important rôle in cardiac therapy, but having pointed out the general indications for their use, we will not attempt to do more at the present time. In aortic stenosis, so long as hypertrophy keeps pace with the obstruction

and with the ventricular dilatation, all goes well. But when the compensation is broken, when the obstruction or the dilatation, or both, get ahead of the hypertrophy, then the ventricle is unable to send the full charge of blood through the narrowed aortic opening. At each contraction of the ventricle some blood is left within its cavity, and the blood flowing in from the auricle as usual, causes a surcharge of blood within the ventricle. This condition makes it impossible for the auricle to fully empty itself and here again we have dilatation resulting. Nature at once attempts to compensate by starting a hypertrophy of the left auricle; but this only adds fuel to the flame, for the increased power of the auricular muscle sends more blood into the crippled ventricle, which is already distended to such an extent as to destroy the compensatory balance. The effect upon the circulation is decreased arterial tension, and engorgement of the pulmonary and venous circulation. Now what are the indications? Plainly, to strengthen systole, shorten diastole and increase arterial tension. We certainly must not look to digitalis and its congeners to meet these indications. Cactus, caffein and cocain, from their physiologic effects, may be expected to do much for us, and experience has proven their value in aortic stenosis. In aortic regurgitation we have eccentric hypertrophy of the left ventricle from a reversed current of blood from the aorta. Regurgitation becomes rapid and prevents the perfect filling of the coronary arteries. The hypertrophy so increases blood pressure as to produce endarteritis and finally atheroma. Thus the heart muscle becomes impoverished and dilatation without compensation results. Regurgitation through the aortic orifice takes place during diastole. If we can shorten diastole and strengthen systole, we are certainly doing something toward restoring the circulatory equilibrium. Again our physiologic findings point to cactus, caffein and cocain. We have it on so good authority as that of Dr. Reynold W. Wilcox, of New York, that cactus has proved itself, clinically, to be the remedy, par excellence, in aortic regurgitation. Lesions of the right heart being rare we will pass over their consideration. In cases where there is increased peripheral resistance as in pneumonia in the first stage, chronic disease of kidneys, etc., we find a special field for the use of the vaso-dilators, viz., aconite, veratrum and nitro-glycerin. In the first stage of pneumonia we have engorgement of the blood-vessels of the lung, with increased action of the heart. If we give veratrum, we bring down the heart's action and dilate the blood-vessels throughout the body. We take the blood away from the lung, and we practically bleed the patient into his own vessels. I am well aware of the important rôle played by hygienic, dietetic and mechanical agents in cardiac therapy. However, a consideration of these in detail is entirely without the scope of this paper, in which I have endeavored to call attention to the scientific use of some of those agents, which strictly speaking, must be set down as secondary to a proper regulation of rest, diet and regimen, in the treatment of cardiac disease.

Insufflation as an Aid in Diagnosing Gastric Stenosis.—A severe case of what was supposed to be cicatricial stenosis of the pylorus, was differentiated as constriction through the center of the stomach and treatment indicated by means of insufflation. The *Prov. Med.* of January 11 records the case, with details of effect of insufflation as aids to diagnosis.