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ADDRESS IN MEDICINE.*

(Continued)

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THE ARTERIOLES AND CAPILLARIES OF THE KIDNEYS.

The arterioles are very muscular and well supplied with vasoconstrictor fibres, and thus while these nerves contribute to raise the general arterial pressure, they protect the capillaries of the glomeruli from any excessive pressure; thus high arterial pressure increases the velocity in the glomeruli, but not necessarily the lateral pressure. The glomeruli are further protected by the endothelial lining of Bowman's capsule, and are not easily permeable to albumen, but readily allow the transudation of water and salts. Moreover, the glomeruli are protected in ordinary circumstances from any backward venous pressure by the second set of capillaries into which the efferent vessels divide. In cases of orthostatic albuminuria there is defective vasomotor action in the whole of the splanchnic area, the kidneys are congested in the erect posture, and moreover the blood is deficient in lime salts as has been shown by Professor A. E. Wright, so the albumen more easily permeates the walls. Here, with the lessened velocity and lowered pressure, the concentration of the filtrate is increased.

The same local conditions occur in a more marked degree in inflammatory disturbances in the kidneys. We have seen that

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only a fourth or less of the capillary pressure is transmitted directly to the surrounding tissues in which they are imbedded, but in some pathological states the whole brunt of the arterial and capillary pressure is transmitted, and woe betide any organ when this pressure is long continued. In those large, congested, chocolate-colored kidneys, when the capsule is stretched to its utmost capacity, and the kidneys are nearly twice their normal weight, the transmitted pressure of the arteries and capillaries stops all secretion. The only salvation for such kidneys and their possessor is to freely incise the capsule and kidneys, as has been ably and persistently advocated by Mr. Reginald Harrison. When the pressure is relieved the secretion is at once re-established. This is a purely physical effect, and may occur in any organ where the limits of its expansion are exceeded. I have felt a big spleen pulsating in my hand till I thought it was going to burst; in this case the transmitted pressure was arterial. An inflamed gland often pulsates.

In granular kidneys the glomeruli are further protected by the increased thickness of Bowman's capsule; the velocity is much increased and the pressure only relatively so; the filtrate is bulky but not concentrated. There is nocturnal diuresis because in the horizontal posture, although there is a fall in the general arterial pressure, the arteries of the kidneys are dilated, and the total amount of blood circulating through them increased.

THE ARTERIOLES AND CAPILLARIES OF THE MUSCLES.

The arterioles are supplied with vaso-dilator nerves, and thus these vessels are reciprocal to those of the splanchnic area. The capillaries are arranged in a fine longitudinal network, and readily allow of the transudation of lymph. When there is a rise in the general arterial pressure these vessels are flushed and allow a free secretion. Dr. George Oliver has shown that during the height of the digestive flow of lymph, tension exercises of the muscles do not further raise the arterial pressure. The lymph in the limbs is not concentrated and is readily absorbed.

The *splenic vessels* are well supplied with vasomotor nerves, and the whole organ seems to have the power of contracting and of thus regulating its own blood supply. Adrenalin has a powerful effect in producing contraction.

THE CEREBRAL VESSELS.

The arteries and arterioles have relatively thin walls in proportion to their calibre. The inner coat is well developed; in the middle coat there is a moderate amount of muscular fibre but the elastic tissue is defective; the external coat is attenuated, and ceases before the muscular coat disappears and the arterioles pass

into the capillaries. The external coat is composed of connective and white fibrous tissue with longitudinal striation, and there are no elastic fibres. Robin described a lymphatic sheath over the arterioles, which strengthens them and helps to supply the place of the defective adventitia.

These vessels are not very contractile, and take no part in regulating the general arterial pressure. Owing to the stress and strain to which they are frequently submitted they are very liable to antheromatous and calcareous degeneration of the internal coat, and thickening or periarteritis of the external coat; there are also frequently small miliary aneurysms. Physiologists, as a rule, do not admit that these vessels possess any vasomotor nerve fibres, but Dr. Alexander Morison says that he discovered their presence; if so they must be very scanty, and perhaps only serve a trophic function. There is not a very great amount of muscular fibre on which they can act, and adrenalin does not cause any contraction of these vessels, of the coronary, or pulmonary arteries, as has been shown by Schäfer, Dixon, Brodie, and Elliott. The capillaries are small, short, well-supported vessels, which seem to be able to bear a considerable amount of strain, as Leonard Hill has shown that sometimes the pressure may be at zero and at other times when the head is down it may rise to 100 mm. of mercury. This latter condition must, however, be rather exceptional, as the carotid arteries have great contractile power. Professor MacWilliam has shown that *post mortem* the carotid can be easily made to contract to half its former diameter, and any one can easily satisfy himself as to the great variations which occur in life. Under these circumstances the circulation in the brain becomes largely kinetic, the velocity is enormously increased, but not the lateral pressure. The cerebro-spinal fluid is very deficient in proteid, from which we may infer that under ordinary circumstances the capillary velocity is relatively great and pressure slight. In cases of meningitis the proteid in the cerebro-spinal fluid is increased.

THE CORONARY VESSELS.

The arteries and arterioles which supply the heart closely resemble the cerebral vessels in being thin-walled, rather deficient in muscular fibre, and in having very few, if any, vasomotor nerves. They are also exceedingly prone to atheromatous and calcareous degeneration of the intima. Newell Martin, Roy, and Adami, and Alexander Morison have found some evidence of vasomotor nerves, but on the other hand, Schäfer, Dixon, Brodie, and Elliott have failed to get any response to adrenalin which acts on all muscular fibre innervated by the sympathetic. The portions of the arteries which are not subject to muscular compression,

and which consequently are constantly under the strain of the aortic pressure are very liable to degenerative changes, but the terminal portions of the arteries which are imbedded in muscle are not as a rule much affected. So when a coronary is blocked the heart may be supplied with blood from the venous side. In cases of stenosis of the tricuspid orifice the coronary veins are often much dilated, and form regular sinuses in the cardiac muscles.

THE PULMONARY CIRCULATION.

The pressure in the pulmonary artery is not more than one-third and the velocity of the blood about three-fourths of those respective conditions in the aorta; but, unlike the vena cava, the pressure in the pulmonic veins is always positive, so that the blood always enters the left side of the heart under pressure, while it is usually sucked into the right side. There is a gradual fall of the pressure-gradient from the right ventricle to the left auricle, and there does not seem to be much resistance to the circulation either in the arterioles or capillaries.

Bradford and Dean, and Francois Franck have shown by a series of very elaborate experiments that the pulmonic vessels are innervated; but while such innervation may be sufficient to maintain slight tone in the vessels, the experiments with adrenalin, to which I have before referred, would show that it cannot constrict the vessels so as to effectively increase the resistance.

The experiments of Lichtheim showed that the greater number of the branches of the pulmonary artery could be ligatured without lessening the input into the left heart or lowering the aortic pressure. But Cohnheim showed that this end was attained by increased work on the part of the right ventricle as demonstrated by the increased intraventricular pressure, and once this ventricle began to fail there was a sudden fall in the input to the left heart, and in the aortic pressure. Any diminution in the pulmonary vessels, such as occurs in pneumonia and in emphysema, increases the work of the right ventricle, but so long as it is able to meet the demand, the circulation is maintained. It is the failure of the right ventricle which is the principal cause of death in pneumonia. The pulmonic arteries are fairly well endowed with muscular fibre, and even after death have a considerable power of contraction so to drive the blood right on through the capillaries into the pulmonic veins.

If formaldehyde, which firmly clots the blood, be injected down the trachea after death, there will often be found firm thrombi in all the pulmonary veins, but not in the pulmonic arteries. It is therefore highly probable that any nerves which the pulmonic vessels may possess merely maintain the tone of the vessels or have a trophic effect. In cases of mitral stenosis the intrapul-

monic tension is raised throughout, and atheromatous changes are as common in the pulmonic veins as in the arteries.

Respiration renders great assistance in carrying on the circulation to the right side of the heart, and to a less extent to the left; that the assistance extends to the whole circulation is shown by the fall in the arterial pressure which occurs at the beginning of inspiration. In the so-called *pulsus paradoxus* (there is no paradox, but merely an exaggeration of a perfectly normal phenomenon), and in Müller's experiment of expanding the chest with the glottis shut, the pulse may disappear at the wrist. This is due to the sudden emptying of the veins to fill up the vacuum in the chest, and with this removal of the obstruction to the capillary flow there is a simultaneous depletion of the arteries. It is not due, as has been supposed by Kussmaul, to any kinking of the large vessels, nor to any sucking back of the blood into the aorta as has been imagined by those who seem to have forgotten that the pressure in the aorta is always high and cannot be affected by a negative pressure in the thorax. It is due to a certain fall in pressure affecting the veins, capillaries, and arteries, and it is most marked in cases of low arterial pressure. When the arterioles are much contracted and the arterial tension high, as in cases of Bright's disease, it does not occur. The lungs form a blood reservoir for the left side of the heart, and during this expansion the reservoir is increased and has to be filled up before the left side of the heart is sufficiently well supplied with blood to enable it to throw the proper quantities into the aorta at each systole; the arteries are therefore emptied at their distal end and not filled at their proximal end and so the pulse disappears until an equilibrium is restored. I recently had a very good example of this in a case of bradycardia under my care where the frequency of the pulse varied from twelve to twenty-four beats in the minute.

When Dr. John Hay, and my house-physician, Dr. Jones, were taking cardiographic and sphygmographic tracings I found that when the patient took a long deep breath and then held his chest expanded as long as possible, the following events occurred:

During the deep inspiration there were two beats of the heart and two pulses at the wrist, then the pulse disappeared in the carotid, brachial, radial, and femoral arteries, and remained absent for several beats. At the same time the impulse of the heart disappeared, and the clear loud first sound and systolic murmur were replaced by a low, dull-toned, obscure sound, and the second sound was not audible. After four or five faint systoles, which I attributed to the right ventricle, the clear first sound and systolic murmur, and the double second sound reappeared and were associated with a return of the pulse in all the arteries. Here, undoubtedly, the blood was stored up in the lung reservoir, and the proper systoles of the left ventricle and the pulse in the arteries

did not reappear until the reservoir overflowed. He had several attacks of semiconsciousness and one slight epileptic seizure during the periods of suspended breathing with the chest expanded. These attacks always occurred after the pulse had ceased for about twenty seconds.

In 1904 Dr. George Oliver gave a great stimulus to the study of the peripheral circulation by the publication of his admirable work on the tissue-lymph circulation. He showed that during the first hour of digestion there was a rise in the blood pressure—arterial, capillary, and venous—with a flow of lymph into the tissues; during this wave there might be a difference of 10 to 20 per cent. in the number of erythrocytes and haemoglobin between the mixture of blood and lymph obtained by a simple prick of the finger, and that of the pure capillary blood obtained from the same prick after the lymph had been compressed out of the finger.

He also showed that the same extracapillary lymph flow occurred in the muscles and prevented any further rise in the arterial pressure from tension exercises. His observations led him to the following conclusions: "(1) That the food constituents themselves (proteids, fats, and carbohydrates) do not possess the power of starting the mechanism by which lymph is dispensed to the tissues through the body. (2) That nature, however, associates with our foodstuffs small quantities of very active substances which bring into play that mechanism, though these substances themselves are practically devoid of food value, and that man frequently increases this natural lymph by the use of salt and beverages containing bodies which also incite the flow of lymph. Such bodies are uric acid, creatin, creatinin, xanthin, glycogen, and sodium chloride perform an important function in nutrition, for during digestion they act as distributors of lymph to all the tissues—an office which the nutrient constituents themselves (proteids, fats, and carbohydrates) are incapable of discharging."

Dr. Oliver associated the action of these lymphagogues with a rise in capillary blood pressure, but in 1891 Heidenhain had ascribed the action of such agents to a specific excitation of the secretory activities of the endothelial cells. We have before referred to the careful experimental work of Starling in 1893, by which he refuted the conclusion of Heidenhain and re-established the doctrine of filtration under pressure.

From not clearly recognizing how the *vis viva* is very variedly compounded (in the arteries, capillaries, and veins) of pressure and velocity, very many have had great difficulty in giving a satisfactory explanation of capillary filtration under pressure. They assume that the capillary pressure always stands somewhere between the arterial and venous pressures, and therefore, when

these two pressures are high so also should the capillary be high. We know that when a person is standing the arterial and venous pressures in the foot are higher than in any other part of the body, and therefore, according to this view the transudation should be greater, and we should have constantly more or less physiological oedema of the feet and ankles. Dr. George Oliver explains its absence by accepting the dictum of Starling that the capillaries are less permeable. No doubt the support, protection, and permeability, especially if they be damaged, of the capillaries vary in different parts of the body. The capillaries of the lungs and kidneys are well protected and not readily permeable to albumen. The capillaries of the limbs are more perfect and less permeable than those of the liver. The capillaries of the foot may be less numerous and better supported than those of the hand, but to assume that they are less permeable is a gratuitous assumption without a shred of evidence in support of it. The error arises from the assumption that the capillary pressure must be always higher than the venous. The energy always is, but not necessarily the pressure. I have shown that the capillary pressure in the foot may be less than in the nose; why, then, conjure up the unproven factor of lessened permeability?

The pressure in the capillaries is usually higher than that in the veins because this sectional area is greater and there is greater friction, but if the arterioles be much contracted, a tenth or even a twentieth of the capillaries may not be filled with blood, and the sectional area of those may fall even below that of the vessels collecting the blood.

When a person is standing the venous pressure in the foot is raised, but so also is the arterial. Supposing under the circumstances you have a venous pressure in the foot of 100 mm. of mercury obstructing the capillary flow, and an arterial pressure of 300 mm. of mercury, you have a difference of 200 mm. of mercury driving the blood through the capillaries with great velocity and very little lateral pressure. If, then, the subject assume the horizontal posture, and raise the foot till the venous pressure be nil, there will be a corresponding fall in the arteries of 100 mm. of mercury, but there will still remain the same difference between the arteries and veins of 200 mm. The following physical experiment readily explains this question of pressure and velocity. If you construct a U-shaped tube out of india-rubber tubing, having both the limbs very wide, and a short connexion made of very fine tubing, then make a small hole in each of the three pieces, and connect one of the limbs with a water-tap, you will then find that the water comes out in a forcible jet from the hole in the proximal limb or artery, with less force from the hole in the distal limb or vein, but from the hole in the capillary there is no escape; the energy in it is all converted into velocity. If you compress the

vein, then you raise the lateral pressure in the capillary and thus cause an escape. In the healthy individual the arteries of the lower limbs are firmly contracted, and although the pressure is high the mass of blood on which it acts is relatively small, and consequently the energy in the capillaries is largely converted into velocity. In proportion as you obstruct the outflow from the capillaries you increase the lateral pressure and diminish the velocity in them, and consequently increase the transudation. In cases of vasomotor paresis and in cases of cardiac failure the mass of blood in the capillaries of the dependent limb is augmented, the pressure is increased, and the velocity is diminished; consequently you get oedema.

THE VEINS.

The veins are smooth, capacious vessels, which practically offer no resistance to the circulating blood. They contain a certain amount of muscular fibre, and are supplied with some vasomotor nerves, which maintain their tone and to some extent regulate their capacity. The great strength of the veins depends on the strong fibrous external coat. They are slightly elastic and attain their maximum distension at a low internal pressure; in this respect they differ essentially from their corresponding arteries. The veins have very flaccid walls, and consequently readily adjust their cubic space to the amount of blood in transit. It has been shown by MacWilliam and by Leonard Hill that veins contract on mechanical stimulation or by cold, and dilate by heat. The co-efficient of elasticity increases with the internal pressure.

THE PRESSURE IN THE VEINS.

The lateral pressure in the systemic veins depends on three factors which it would be well to consider separately: (1) The obstruction to the inflow to the chest; (2) the hydrostatic effect of the column of blood; and (3) the potential energy transmitted through the capillaries.

1. During inspiration there should be a negative pressure of a few millimetres of mercury in the systemic veins in the chest, and from this there is a gradual rise till you reach the smallest vessels collecting the blood from the capillaries, and of course the pressure in these vessels will largely depend on the hydrostatic pressure due to their posture. During expiration there is a positive pressure in the veins of the chest, and this is further increased when there is any obstruction in the lungs such as arises from emphysema, pneumonia, or bronchitis, or in the heart as may arise from pulmonic or tricuspid obstruction or regurgitation, pericarditis with effusion, cardiac failure, etc. This obstruction tells backwards throughout the whole venous system to the capillaries, but its effects are more immediately felt in the liver, and it often gives

rise to transudation into the pleural sacs. In epileptic or tetanic convulsions there is great obstruction to the entrance of blood into the chest, while the high arterial pressure keeps the lungs engorged by damming back the blood, drives the blood on through the capillaries, and thus raises the venous pressure.

2. The effects of the hydrostatic pressure in the veins of the limbs would be very great only for the fact that they are well supplied with valves, and the muscular compression of the vessels drives the blood onwards, thus lowering the venous pressure and diminishing the obstruction to the outflow from the capillaries. If there be a negative pressure in the chest the venous pressure at the level of the vertex should be practically nil. Therefore, when the body is in the horizontal posture and the foot raised to the level of the head, the pressure in the veins of the dorsum of the foot may be at zero, but when a person with large varicose veins and defective valves in the veins of the lower extremity is erect the pressure in the dorsum of the foot may rise to over 100 mm. of mercury.

3. The pressure transmitted by the blood moving through the capillaries. This is a very variable quantity, and largely depends on the amount of blood and the energy which it retains in its passage from the arteries through the capillaries. If the quantity be great and the capillary pressure high the venous pressure is raised, but if the quantity be small and the velocity great in the capillaries the blood in the veins may still retain much of its kinetic energy. In the veins the viscosity of the blood and the friction against their walls are practically negligible quantities. The energy of the blood in the veins is also variously compounded of pressure and velocity; the greater the obstruction to the flow into the chest the greater the pressure and the less the velocity; and the greater the freedom in the flow the more is the *vis a tergo* converted into velocity.

In the portal vein the pressure is always positive, and in this respect it resembles an artery.

VELOCITY IN THE VEINS.

The blood in the veins is one of the very few things which runs more quickly up the hill than it does down it. The velocity depends on the *vis a tergo* and varies enormously; in the veins of the arm it is frequently five times greater when the arm is hanging than when it is held horizontally at the level of the shoulder. The velocity is calculated by emptying a long piece of vein between two valves, and then timing with a stop-watch the period it takes the blood to fill the empty vein. I have seen 23 cm. of a vein in a dependent arm filled in 0.2 of a second, or a velocity of 115 cm. in the second, a velocity as great as often occurs in the aorta. As

in this case viscosity and friction can be left out of account, the only resistance to the flow was the retarding influence of gravity which can be easily calculated.

The resistance would just equal the accelerating influence of gravity on a body falling in vacuo through a height of 23 cm., and from the formula $V = \sqrt{2 Gh}$ we know that this would equal a terminal velocity of 2,100 mm. per second. This is equivalent to a pressure of 230 mm. of blood and equals the resistance, but in order to attain a velocity of 1,150 mm. in the second over and above the resistance of gravity, we must have a pressure which would give a velocity of 3,250 mm. in the second, which would be obtained by the pressure of a column of blood of 530 mm. in height. The pressure-gradient in these 23 cm. of vein would, therefore, be a fall from 530 to 300 mm. of blood, or from 40 to 23 mm. of mercury. This calculation was borne out by observation with a haemometer. In these calculations mercury is reckoned as thirteen times heavier than blood. Where the resistance is nil, a pressure-gradient of 5 mm. of mercury in a vein will give you a velocity of 1,120 mm. in the second. These observations show how kinetic and potential energy in every part of the circulation is constantly varying.

THE ARTERIES.

It would be quite out of place to this audience and to the larger audience which I hope to reach, to describe the constitution of the arteries, but for the clear comprehension of the physics of the circulation it is rather important to emphasize some difference between the aorta and its branches. The aorta and the commencement of its principal branches differ from those of smaller calibre in the enormous amount of elastic and white fibrous tissue which almost completely replace the muscular layer of the middle coat. The external coat is very strong, and is composed of white fibrous tissue and longitudinally disposed elastic fibres, while the internal coat, like that of the other arteries, is divisible into three structures. When we pass down to the small arteries and arterioles, the muscular layer is relatively better developed, and the external tunic gradually lessens, and before the capillaries are reached finally disappears.

The constitution of the respective arteries depends on the functions which they have to perform. The arteries, especially those of large size, are well supplied with nutritive vessels, the vasa vasorum; and, with the exception of those previously specified, are richly endowed with vasomotor nerves; and it is largely due to this influence that the arterial tone is maintained.

As the blood leaves the heart its energy is largely kinetic, and therefore there must be very little lateral pressure at the commencement of the aorta during ventricular systole, but if the aorta

be healthy a large portion of this energy is rapidly stored up in the elastic walls as potential which is paid out during the diastolic period, and then the blood is compressed with a force nearly equal to that which it exercised, and this applies to all portions, including the commencement.

The velocities of the blood in the aorta and pulmonary artery vary considerably in different individuals, and in the same individual under different conditions. The velocity is directly as the cardiac energy and inversely as the resistance to the outflow and the sectional area. The force of the right ventricle is not a third of that of the left, but the resistance is also not a third of that in the systemic vessels; the sectional area is only slightly greater, therefore the velocity in the pulmonary artery is nearly equal to that in the aorta.

In my opinion physiologists place too low an estimate on the velocity of the blood in the aorta, though no doubt their conclusions are based on many careful experiments, but experiments very difficult to carry out and very liable to great fallacies. Chauveau found that the velocity in the carotid artery of the horse reached 520 mm. per second during systole, while at the time of the diastolic wave the velocity sank to 220 mm. per second, and in diastole to 150 mm. per second. In the human aorta the mean velocity has been set down as 320 mm. to the second, while Professor Sherrington is a little more liberal with 500 mm. Now, a fall in the pressure-gradient in the aorta from 100 to 80 mm. of mercury gives you a theoretical velocity of 525 mm. per second. It seems to me that with this easy-going circulation a kind of perpetual motion ought to be set up, and you should live to the age of Methuselah before your arteries were worn out. However, there would be the disadvantage of this theoretically perfect circulation in the present day, that you would be more easily hustled out of existence, and the only consolation would be that your relatives would know that, although you ceased to exist, there was nothing the matter with you.

You must bear with me while I explain these questions of velocity and pressure in the aorta, because a clear comprehension of them is essential for any true knowledge as to how stress and strain produce atheromatous and sclerotic changes in the vessels.

There is no more important subject in the whole domain of medicine, as, after the age of 50, arterio-sclerosis, directly or indirectly, kills more people than any other disease.

As the semilunar valves open the blood has acquired its velocity head, and then the actual velocity depends on the energy or effective head minus the resistance to the outflow; in the aorta the viscosity of the blood can be left out of account. The velocity between any two points depends not on the pressure but on the difference in the pressures. In a healthy aorta the energy is

rapidly stored up in the elastic walls during systole and paid out during diastole, thus making the pressure and velocity more or less uniform. The most perfect circulation is one with a small difference between the systolic and the diastolic pressures—a moderately low systolic and a relatively high diastolic pressure in all the arteries. The systole of the ventricles gives out the energy during a third of a cardiac revolution, and the perfection of the circulation depends on the disposal of that energy not only during the time that it is given out, but also in the interval between the systoles. The diastolic pressure is more than sufficient to overcome all the resistance in the circulation; if it were not, the circulation in the main arteries would come to a standstill towards the end of the diastole. You can therefore look upon the difference between the systolic and diastolic pressures as that part of the energy which is not stored up in the walls of the arteries and which is engaged in producing velocity. I usually think that when this difference exceeds 40 mm. of mercury there is something wrong with the elasticity of your aorta and it is about time that you began to think about repairing the damage. Now we have seen that a pressure-gradient of 5 mm. of mercury in a vein without any resistance would give you a velocity of 1,120 mm. in the second, but in an artery, in order to get a velocity of 1,120 mm., you require a fall in the pressure-gradient from 150 to 100 mm. of mercury. With a pressure of 150 mm. and a resistance of 120 mm. of mercury to the outflow you get a velocity of 640 mm. in the second. With this velocity there is no excessive longitudinal strain on your vessel, and provided the lateral pressure in the aorta does not exceed 150 mm. of mercury the elasticity of the vessel may be preserved till old age. This ideal is not often realized.

When you get a continuous lateral pressure of 200 mm. of mercury or more there is no period of repose for the vessels, but merely periods of greater or less distension; there is interference with the circulation in the nutritive vessels, the vasa vasorum; you get irritative and proliferative changes in the subendothelial layer of the intima, atheromatous and perhaps calcareous degeneration follow, and the elasticity of the aorta becomes impaired. Oskar Klotz says that all the aortas examined by him coming from persons over 25 years of age showed more or less calcareous change in the aortic wall. In proportion to the loss of the elasticity the energy of the heart is not stored up, and with the loss in the conservation of energy the heart has got more work to do in order to carry on the circulation, and a great disparity arises between the systolic and diastolic pressures.

In these cases the immediately resistance to the outflow from the heart is not increased, but the total work is greater, the diastolic pressure in the heart rises, and the ventricle dilates and hypertrophies. The output is increased, the velocity is increased,

and longitudinal straining—especially along the greater curvature of the arch of the aorta—takes place. You may now get a difference between the diastolic and systolic pressures of 120 or 130 mm. of mercury or more. With a systolic pressure of 250 mm. and a diastolic pressure of 120 mm. of mercury you would have a velocity of 2,450 mm. in the second, which would be chiefly expended during the systole. This gives rise to a marked recoil of the heart at the end of the systole, and to negative and positive waves in the circulation which obstruct one another. When failure begins to set in, you may find the force of this big powerful organ which shakes the whole chest only poorly represented at the periphery. In these cases the storage is defective, the pressure and the velocity are more or less intermittent, and there is an enormous waste of energy. In cases of very free aortic regurgitation the difference in the pressure-gradient, and consequently in the velocity, is often very great, the cardiac hypertrophy becomes extreme, and subsequent failure rapidly takes place.

This question of storage forms an important element in prognosis, and for this reason aortic regurgitation occurring early in life from a rheumatic lesion when the aorta is fairly healthy is, *caeteris paribus*, very much less serious than a similar lesion arising secondary to degeneration of the aorta. If there be any elasticity left in the aorta and principal branches, there is an advantage in aortic regurgitation in maintaining a relatively high diastolic pressure, because you thus make circulation more uniform, and you do not necessarily raise the systolic pressure or increase the work of the heart. For these reasons well-regulated doses of digitalis and squill often do an enormous amount of good in this disease, notwithstanding the fact that many well-recognized authorities have entirely condemned the use of digitalis in aortic regurgitation, possibly because they did not know how to use it.

While a combination of these drugs increases the peripheral resistance—which is an advantage if moderate in amount—they lessen the size of the ventricle, increase the length and completeness of contraction, diminish the residual blood, and thus lower the diastolic pressure in the ventricles. In estimating the condition of the aortic wall in these cases some valuable evidence is furnished by the ear, because if there be any delay in the transmission of the pulse wave the aorta is still fairly elastic. You must always be careful to distinguish between the velocity of the blood and that of the pulse wave. With the former, the greater the resistance, the higher the diastolic and the lower the systolic pressure, the less the arterial velocity of the blood; but in the case of the pulse wave, the greater the resistance, the higher the diastolic pressure, the more rigid the arterial wall, and the greater and more rapid the energy of the ventricle the quicker the transmission. The rigidity of the arterial wall may either depend on

the atheromatous and calcareous degeneration with loss of elasticity or on an increase in the coefficient of elasticity due to high blood pressure; in both cases the velocity of the pulse wave is increased. The velocity of the blood in the smaller arteries is inversely as the cross section, and need not here further detain us, as it will be best considered with the pressure-gradient. In the present day it is a very common, and occasionally beneficial, practice to combine cardiac tonics with vasomotor relaxants, such as digitalis and nitroglycerine, but before combining opposing forces I think it is always well to have a clear indication in your mind as to the objects which you wish to accomplish, and the results which are likely to be attained. The circulation of the blood is one of the most perfect pieces of mechanism in the universe, and no amateur should be trusted to keep it in repair, yet American and English people pour tons of baneful drugs down their throats every year on the recommendation of advertising quacks, who care nothing for the lives and health of the community, and care for nothing but their money.

ARTERIAL BLOOD PRESSURE.

During recent years an enormous amount of literature has been devoted to what has been euphemistically described as blood pressure. To much of this I do not wish to refer, and I have no time to devote to the really valuable contributions. With one of the numerous blood-pressure instruments on the market it might seem a very simple matter to make an observation, but it must be remembered that it is not the instrument, but the man behind the instrument, who makes or mars the observation.

The arterial pressure at the level of the heart depends on the force of the cardiac systole and the resistance to the outflow through the arterioles and capillaries. With a healthy heart or self-regulating pump the greater the resistance the greater the force of the cardiac contraction, and consequently the higher the lateral pressure on the walls of the arteries. If the resistance be too great, we may get cardiac failure, and then the pressure falls. A long-continued great resistance increases the work of the heart, and work leads to hypertrophy, which maintains the pressure at a high level. In a healthy aorta the coefficient of elasticity increases with the internal pressure, but long-continued strain impairs the elasticity and leads to degenerative changes in the intima.

Roy considered that the maximum distensibility of an artery occurred under pressures corresponding, more or less exactly, to their normal blood pressure, but since then Professor MacWilliam has shown that this is an error due no doubt to Roy unwittingly using arteries in a state of post-mortem contraction. MacWilliam has shown that the behavior of an artery under varying degrees

of internal pressure depends on the state of contraction or relaxation of the vessel, and on the relative amount of elastic and muscular tissue. A strongly contracted muscular artery resists internal pressure, and the maximum distension does not occur until very highly pressures are reached, while in a completely relaxed artery and one containing very little muscular fibre, the increase in volume is greatest at low pressures. Similar conclusions were deduced from his experiments on the pulsatile expansion of arteries.

"In the intact arteries of men and animals there would be much less pulsatile expansion in a contracted artery than in a relaxed one; and in a relaxed artery expansion would be very much more extensive when the mean blood pressure is low. Further, elongation would occur markedly in the relaxed artery as compared with the contracted one. And when a long stretch of artery is concerned the increase in length is very much greater than the increase in transverse diameter."

I have arrived at the same conclusions from my observations on the pressure-gradient; wherever there is relatively a great disparity between the systolic and diastolic pressures you get marked expansion in the arteries; when the arteries and arterioles are very relaxed and the diastolic pressure low, as in the hyperdiastolic pulse, you get extensive expansion; but even under these conditions if the systolic output be slight the expansion is not great, so we are driven back to the conclusion that even in a relaxed artery the amount of expansion depends on the fall in the pressure-gradient. In very contracted arteries, which are usually associated with high blood pressure, the fall in the pressure-gradient is slight and the expansion is slight. Again, I observed that a contracted artery, no matter how high the internal pressure, does not become tortuous. On the other hand, tortuous arteries are always more or less relaxed, and there is a great difference between the systolic and diastolic pressures. In these arteries there is a want of muscular tone, there is a waste of energy, they are badly nourished, their walls become thickened, the muscular tissue wastes and is partly replaced by fibrous or even calcareous material. This is the condition which has been termed by Clifford Allbutt the involutory form of arterio-sclerosis, but it is involutory in development and is primarily due to want of muscular or vasomotor tone.

When a person is in the horizontal posture there is still the same pressure-gradient between the systolic and diastolic pressures, and in all the arteries of the limbs these respective pressures are about similar levels. The postural variations in pressure have been thoroughly investigated by Leonard Hill and placed on a true scientific basis. These variations are of importance not only from a physiological but also from a pathological standpoint. In arterio-sclerotic changes, the arteries of the lower limbs are most

involved notwithstanding their muscular development and good vasomotor nerve supply. These arteries take part in raising the general arterial pressure, and are also subjected to additional internal strain from the statical pressure of the blood; hence both the middle and internal coats are involved in the sclerotic changes.

In arterio-sclerosis the middle coat is chiefly thickened in the muscular arteries and arterioles which take part in raising the general arterial pressure, such as those of the splanchnic area, the skin, and muscles; while in those arteries which are not very muscular and are subjected to internal strain from both high systolic and diastolic pressures the intima is principally involved. Hence atheroma and calcareous degeneration are very common in the aorta and in the commencement of its branches, and in the coronary and cerebral arteries. The carotid arteries seem to occupy an intermediate position; they are muscular and very contractile, and are not specially liable to sclerotic changes either in the intima or the media.

In my writings on arterio-sclerosis I entered very fully into the numerous causes which give rise to this disease, and the pathological aspect of the subject has been well investigated by Councilman, Cowan, Russell, Welch, and a host of others. A life of indolence and luxury is more deleterious to the circulation than the work of a navy. I must not be supposed as recommending either course of life, but a happy mean with a strong leaning towards hard work. Sir Lauder Brunton and Dr. F. W. Tunnicliffe showed that after the cessation of muscular contraction the intramuscular arteries dilate and thus lessen the resistance. Athletes who have had great muscular training retain very healthy peripheral vessels, but are liable to atheromatous changes in the aorta, and cardiac hypertrophy with subsequent degeneration.

Where there is continued high arterial pressure, especially high diastolic pressure such as occurs in chronic granular kidneys, you get general arterio-sclerosis, but the lesion is more local when the high pressure is intermittent. Women have not got the continued physical strain of men, but they are very liable to sudden increases of blood pressure from emotional causes which chiefly act on the splanchnic area, hence in them the aorta suffers more than the peripheral vessels. It is like the effect of suddenly turning a stopcock in a water-pipe connected with the main supply; it is the larger pipes which get the chief stress. We are not now allowed to put such a tap in a main water-pipe, but it is rather more difficult to legislate for the vasomotor system in an emotional individual. In many of these women the arch of the aorta becomes considerably dilated and the walls thin.

In assuming the erect posture from the horizontal there is not only a rise in the arterial pressure below the heart level but a fall in the arteries above, and to prevent the blood from the upper part of

the body gravitating into the capacious vessels of the abdomen, the regulative vasomotor mechanism contracts the splanchnic area, and so raises the mean arterial pressure, thus syncope is obviated. There are many cases, such as Addison's disease, where there is defective action of the vasomotor nerves, perhaps from lack of their usual stimulus—adrenalin—the splanchnic vessels do not contract, and the patient cannot maintain the erect posture. In the so-called cardio-splanchnic paresis of Albert Abrams, and in cases of orthostatic albuminuria, there is a defective action in the splanchnic area, but the vessels of the skin and muscles contract and make a feeble attempt to compensate for the want of tone in the abdominal vessels. In these cases the systolic pressure is low, but there is an even greater fall in the diastolic pressure.

THE HEART.

No survey of the circulation would be complete without a reference to the self-regulating pump. The heart is composed of two physiologically distinct organs—the right and left heart. Each has got its own varying amount of work to perform, and it, under normal circumstances, performs it without any assistance from the other, but in cases of stress or difficulty they mutually assist one another. They act together, and are set to the same time, but this does not prevent one from beginning or ending contraction before the other, and so much so is this the case—and they are at least to the extent independent—that doubling of both sounds of the heart is one of the most common of cardiac phenomena. In a healthy heart, both sounds are usually doubled every deep respiration.

Ladies and gentlemen, I have said enough to show you the necessity of a well-balanced circulation for the maintenance of life and health. It is only with healthy blood vessels that any one can hope to retain his mental and bodily vigor, and expect to attain a green old age.

Like the circulation, let us run with patience the race which is set before us. "Life every man holds dear, but the brave man holds honor more precious dear than life."

THE EMPLOYMENT OF PHYSICAL MEASURES IN THE TREATMENT OF DISEASE.

BY CHARLES R. DICKSON, M.D., TORONTO,

Electrologist to Toronto General Hospital, Hospital for Sick Children, St. Michael's Hospital; Fellow and Ex-President American Electro-Therapeutic Association, etc., etc.

AS THE art of healing becomes more progressive in the trend of its tenets and tendencies, prejudice and narrowness in its devotees gradually disappear and its votaries come to restrict themselves less and less to the mere exhibition of drugs in the never-ending battle waged against disease, and to depend more and more upon the assistance of methods whose efficacy they scouted and whose claims they ridiculed in no uncertain manner not long since.

The practitioner of to-day whose only weapons are drugs, and who fails to recognize the true value of other methods of attack and defence, and to avail himself of their assistance when necessary, is doing but scant justice to his patients or himself, and the young man who leaves his college halls with an unbounded confidence in his ability to combat disease with drugs and drugs alone, is sadly handicapped in the race for life, and greatly to be commiserated.

But while the employment of drugs to the exclusion of all else in therapy is greatly to be deplored, not less severely should we condemn a restriction to physical methods alone, and the fantastic and fanatical claim that the use of drugs is not only harmful but unnecessary in these days of progress.

Reorganization and reconstruction is the cry of the age, and like much else the science of medicine is in the crucible and becoming reorganized, progressive and more truly scientific than ever before.

This an age of specialism and specialists. The general practitioner is in nowise dethroned thereby, nor is his position even threatened by the advance provided he keep pace with the times and avail himself of his opportunities; but to stand still to-day is to suffer dry-rot.

And fortunately for the general practitioner his opportunities are most excellent. It is not necessary that he return to his halls of learning in order to acquire knowledge of the advance that is being made in the employment of physical measures in the treatment of disease, in fact his beloved alma mater would probably have little to tell him of such matters, but other streams of knowledge flow free, fast and deep, and other channels invite him.

The medical journals of to-day, progressive in the best sense of the term, supply the lack of the schools, and contain many

articles upon the treatment of disease by physical methods, physiotherapy; indeed, so fully recognized has the importance of this subject become that many journals of no mean proportions devote themselves entirely to its consideration. The more pretentious literature of books is likewise available, and much that is excellent has been published. Societies dealing solely with physiotherapy have been founded in many lands, and it has already attained the dignity of an International Congress.

Although few schools of medicine make any serious attempt to cope with the situation in the regular course of training, post-graduate faculties have been established in many places where instruction in physiotherapy may be obtained.

As a result of this short-sighted policy on the part of the schools the quacks charlatans and empirics have a vast promising and fertile field left practically to themselves, where they may work the sweet pleasure of their wills unlet and unhindered by the law, fearless of prosecution, because they claim that their methods cannot be considered as either medicine or surgery since they are not taught in the regular schools.

Doubtless in time this condition of affairs will right itself; the colleges will give lectures upon the subject and suitable legislation will be enacted.

Among the more important physical agents which are at our service as adjuvants to medicine it will suffice to instance a few. Thus, under electrotherapy, we have electricity in its varied forms such as galvanism, faradism, franklinism, sinusoidal currents, currents of high frequency. Under phototherapy we have the closely allied measure, light of various intensities and character, utilizing different portions of the spectrum visible and invisible, derived from varied sources, solar, arc, incandescent. Under radiotherapy we have the X-rays and kindred rays. Under thermotherapy we have heat dry and moist. Under hydrotherapy we have water in its various uses internal and external, plain or medicated. Under cinesitherapy we have gymnastics, movements of various sorts, massage, mechanical methods, including vibration and other mechanical measures.

This does not exhaust the list of physical agents we may summon to our assistance, but it will give some idea of the extent thereof.

It is not to be expected that the general practitioner shall be an adept in the use of all these agents, and equally expert with each, but it is well that he should have some general knowledge of the main indications for their employment, so that when drugs fail him he may know of other allies to assist him in his battle. The employment of physical measures may well be left to those who devote their entire attention to physiotherapy.

There are many reasons for this division of labor. For instance, the various procedures consume more time than the busy general practitioner can spare from outside work, while the apparatus itself demands time and care in keeping it in order, and its use calls for special skill which a busy general practitioner has not time to acquire; moreover, the apparatus is expensive and unremunerative if only occasionally used.

On the other hand, the physician who devotes his entire attention to physiotherapy will not have his time taken up with outside visits, and will be able to confine his attention entirely to office work; it will not be possible for him to attend as many patients as his confrere, therefore, he will be in a position to give each more individual attention.

This delimitation of their respective fields will not only prove mutually satisfactory, but the patient likewise will reap the benefit, and when this situation is generally recognized and acted upon it will be better for all concerned.

The general medical practitioner of to-day rarely attempts amputation of limbs, unless so situated that the services of a surgeon are unavailable; he will be wise if he leaves the employment of electricity, the X-ray, mechanical vibration and all the other varieties of physiotherapy to those who devote their entire time to carrying out these methods.

As an instance of the utility of physiotherapy may be cited one of its developments to which comparatively little attention has been paid in this country hitherto, and yet one of undoubted value in suitable selected cases, but by no means the panacea some of its votaries would have us believe.

Mechanical vibration is referred to and it is preferably selected from the list on account of the unfamiliarity of the general practitioner with it.

In employing heat, light or electricity as curative agents we are utilizing vibrations of very great rapidity, but in the case of mechanical vibrations we are dealing with vibrations much grosser in character, but vibrations to which the tissues may in certain cases be more responsive on this very account.

While treatment by mechanical vibration, as at present carried out, is comparatively new, the principle upon which it is based is centuries old, for it is a direct lineal descendant of the rubbing of the ancients, a practice dating back to time immemorial and associated with gymnastics and other exercise.

Kurre W. Ostrom, in "Massage and the Original Swedish Movements," claims that "manual treatment for disease has, to a certain extent, existed since the creation. Man had, by instinct, acquired the art of manipulation long before Nature yielded her secrets in medicine. . . . Amiot and Dally

speak of a perfect system of gymnastics among the Chinese three thousand years before the Christian era. They maintained that gymnastics, by preventing stagnation, produced an even and harmonious movement of the fluids of the human body, which is necessary to health. Not only did they use gymnastics to preserve health, but they also had a thorough knowledge of their therapeutical effects. . . . The priests of Egypt used some manipulation in the form of kneading and friction for rheumatic pains, neuralgias and swellings. The Hindoos, also, had some knowledge of their therapeutical importance. . . . Even the Persians used a few movements for different affections. The Greeks were the first to recognize gymnastics as an institution . . . the philosophers and the physicians recommended manual treatment. . . . Although the Romans imitated the Greeks to some extent, they rather preferred calisthenics; yet the manual method was more extensively practiced in Rome under the Emperors than it had hitherto been by any other nation. . . . In the fifteenth and sixteenth centuries well-known physicians recommended gymnastics. . . . The Swede, P. H. Ling (1776-1839), and his predecessors erected the first scientific system . . . making the movement treatment a perfectly scientific remedy worthy of the confidence of every educated man. . . . Dr. Mezger, of Amsterdam, and his two pupils, the Swedish physicians, Bergham and Helleday, were amongst the first to apply the Massage Treatment scientifically. Their method is now used throughout Europe."

Hartvig Nissen, in "Swedish Movement and Massage Treatment," says: "It is a known fact that bodily exercise was used as a curative agent in the earliest days. Aesculapius, Apollo's descendant, is said to have been the inventor of the art of gymnastics. Medea procured health and youth by gymnastics. It was four hundred to five hundred years before Christ that Iccus, and later Herodicus, reduced bodily exercise to a system, and Herodicus made it a branch of medical science to preserve the health and cure diseases by the use of gymnastics, and among his many pupils was the famous Hippocrates, Diocles, Praxagoras, Herophilus, Aesclepiades, Athenæus, Celsus, and Galen recommended 'movement treatment,' and gave rules for it. Mercurialis wrote in the sixteenth century a book, 'De Arte Gymnastica,' or the science of bodily exercise, . . . and pointed out the use of the different movements in different diseases, and also gave rules for their application in special cases. Thomas Fuller, an English physician, published in 1704, 'Medicina Gymnastica,' treating of the power of exercise in preserving health and curing disease. Clement J. Tissot, a French physician, who several times gained the prize of the Academie Royale de Chirurgie for

his lectures, published in Paris, 1781, 'Gymnastique Médicinale.' . . . As Herodicus observed the curative effects of gymnastics on his own delicate health, and thereby was brought to use movements in therapy, so did the Swede, Pehr Henrik Ling, in the beginning of this century, study the movement treatment because he had cured himself of rheumatism in the arm by gentle percussions. Ling formerly had been only a fencing-master and instructor in gymnastics; but afterward, studying anatomy and physiology, and the influence of the movement and manipulations in different chronic diseases, he founded a system of gymnastics corresponding with the knowledge of physiology, which is universally known as 'The Ling System,' or the 'Swedish Movement Treatment,' . . . and in 1813 the 'Royal Gymnastic Central Institute' was established in Stockholm at the expense and under the supervision of the Swedish Government, and Ling was its first president."

William Murrel, in "Masso-therapeutics, or Massage as a Mode of Treatment," says: "In a primitive form massage was known both to the Greeks and Romans, who resorted to it, especially after the bath, a custom which; under the name of 'shampooing,' still prevails amongst Oriental nations. After the struggles of the circus it was employed to dissipate the resulting contusions and extravasations, and to restore pliability to the bruised and stiffened joints. Homer tells us that beautiful women rubbed and annointed war-worn heroes to rest and refresh them after the toil and heat of the battle. We all know the story of the Emperor Hadrian, who one day seeing an old soldier rubbing himself against the marble at the public baths, stopped him and inquired why he did so. The veteran answered: 'Because I have no slave to rub me,' whereupon the Emperor, pitying his condition, gave him two slaves and enough to keep them. On the following day when the Emperor made his appearance a number of old men commenced rubbing themselves against the wall, hoping to have similar good fortune, but the Emperor, divining their intention, directed them 'to rub one another.' Hippocrates says: 'A physician must be experienced in many things, but absurdly also in rubbing, for things that have the same name have not always the same effect. For rubbing can bind a joint that is too loose, and loosen a joint which is too tight.' And he adds, 'rubbing can bind and loosen, can make flesh, and cause parts to waste. Hard rubbing binds, soft rubbing loosens, much rubbing causes parts to waste, moderate rubbing makes them grow.' Celsus, too, suggests the use of friction for the removal of deposits in the tissues, and especially for the relief of pain. Amongst the Chinese, written allusions will be found dating back to a period three thousand years before the Christian era, and their oral traditions

are of still greater antiquity. The Chinese manuscript, Kong Fau, the date of which is 3,000 B.C., seems to have contained detailed accounts of these operations. Closely allied in their nature and mode of action are the *sarchuna* of the Persians, the *ἀραρπις* of the Greeks, and the *friction* of the Romans." Murrell likewise tells us that the natives of Australia, Africa, Sandwich Islands, Russia, Siberia and Lapland carry out various methods of massage. While Murrell concedes that for much of our knowledge of modern massage we are indebted to Mezger, of Amsterdam, whose thesis was published in 1868, it is to Van Mosengeil we must look for an accurate and scientific description of the subject (1876).

Arnold Snow, in "Mechanical Vibration and Its Therapeutic Application," also gives us much interesting information of the early history of massage and its forerunners and records: "It is believed that the Susruta, of the Hindoos, used also by the Brahmins, is the oldest work on the subject. It was probably followed later by the Chinese book, 'Cong-Fou of the Tao-See,' which was written hundreds of years before Christ. Some believe that the Greeks probably got their knowledge from the Hindoos and Chinese." Snow alludes likewise quite extensively to the mechanical precursors of vibration as practiced at the present day, mentioning among others Zander's mechanical motion devices of the middle of the nineteenth century, and later those of Taylor and Kellogg, and many others, and takes us down to the present day with its multifarious wealth of apparatus, bewildering in its plenitude.

Many other writers might be cited, for the literature on massage and kindred methods is by no means limited, but enough has been quoted to show that treatment of such character has been in use since the remote ages, that it has been confined to no one nation or tribe, but has been well-nigh universal, that it must be of some practical value or it would not have survived; and it is all vibration in one form or another.

Many attempts have been made to evolve apparatus that would carry out the technique of scientific massage, and be a substitute for massage, the movement cure and allied forms of treatment, but be also an improvement upon these methods and attain therapeutic results impossible otherwise, and much ingenuity has been displayed in this direction, and as a result, and a most satisfactory one, we have the vibrator executing mechanically and under perfect control and regulation movements impossible with the human hand unaided.

It remained for the late lamented Maurice F. Pilgrim, of New York, to place the subject of Mechanical Vibration in the position to which it was fully entitled, and to establish it firmly

upon a rational scientific basis by his work, "Mechanical Vibratory Stimulation," published in 1903; a modest and unassuming volume, but none the less an epoch-making one, and the subject at once assumed a new dignity from the masterful presentation of unanswerable arguments, based not upon theories, but upon solid facts set forth in acknowledged authoritative standard works written by such authors as Landois and Stirling, Kirke and Foster, and facts further confirmed by actual practical experience. The subject at once assumed a new importance and great interest was excited thereby. In fact, this work heralded the birth of a practically new therapy.

To give some idea of the scope of vibration therapy a few paragraphs may be quoted from Pilgrim's work: "Treatment by mechanical vibratory stimulation has been found by practical experience to be capable of: (1) Increasing the volume of the blood and lymph flow to a given area or organ; (2) Increasing nutrition; (3) Improving the respiratory process and functions; (4) Stimulating secretion; (5) Improving muscular and general metabolism, and increasing the production of animal heat; (6) Stimulating the excretory organs and assisting the functions of elimination; (7) Softening and relieving muscular contractures; (8) Relieving engorgement and congestion; (9) Facilitating the removal through the natural channels of the lymphatics, of tumors, exudates and other products of inflammation; relieving varicosities, and dissipating eruptions; (10) Inhibiting and relieving pain." Pilgrim disclaims any intention of lauding this treatment as a cure-all, but maintains that "for the purpose of effecting the changes above enumerated, there are no physical therapeutic agents within the writer's experience or knowledge that will render as effective service along these lines, with as few disappointments, as mechanical stimulation properly employed.

. . . The general theory upon which this treatment is based is that all the functions and organs of the body are controlled by certain nerves or nerve centres, located principally in the spinal cord, and that in the course of disease, if these centres are reached and treated, restoration to normal actions may be expected in most cases to take place."

This claim of Pilgrim's can be substantiated by any one who has devoted careful attention to the details of treatment by mechanical vibration; it is no vain boast, and in many very obstinate affections vibration will be found one of the most useful measures within our reach, but it must be properly carried out and used in no mere haphazard fashion.

It will be quite impossible in the limits of a paper such as this to attempt to set forth all the conditions in which we may

count upon the assistance of mechanical vibration and brief reference to but a few must suffice.

In many forms of rheumatism it is of inestimable value, not only for the relief of pain and stiffness, but also in promoting the elimination of uric acid, hastening the absorption of effusion about joints and improving nutrition. In sciatica it is also of great use, and in rheumatoid arthritis it is a valued adjunct.

In chronic constipation, particularly when due to intestinal atony, it is likewise of great assistance, and is an admirable adjunct to electricity and suitable dietary.

In hemorrhoids internal or external its remedial action is frequently manifested quite promptly.

In many paralyses it is of great assistance, and its use affords much comfort, while in chorea it is one of the most valued remedies we possess.

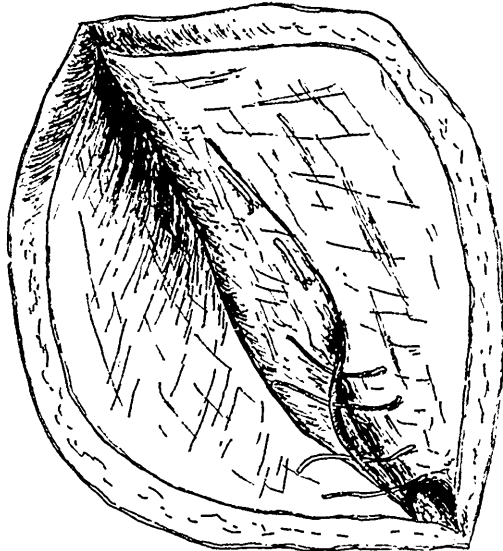
In parenchymatous goitre it is often of considerable utility used in conjunction with electricity, and in many other conditions it is of undoubted utility and well worthy of our confidence.

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COMBINATION OPERATION FOR THE CURE OF INGUINAL HERNIA.*

BY F. N. G. STARR, M.B. (TOR.),
Associate-Professor of Clinical Surgery, University of Toronto.

Mr. President and Gentlemen,—The subject of Inguinal Hernia and its radical cure is always interesting, and one over which there has been much controversy. While the number of operations is legion, it seems there are but two that are generally practised, namely, Kocher's and Bassini's. In the former the method of



dealing with the sac is certainly ideal, for it entirely obliterates the hernial protrusion and draws the peritoneum, in the neighborhood of the internal abdominal ring, upwards and fixes it in a direction opposite to the course of the spermatic cord. Kocher lays a good deal of stress on this point and claims that the "descent of a sac in the direction of the cord is rendered impossible."[†] One has but to do a few of these operations to learn that "all things are possible," for one will frequently get recurrence, though Kocher[‡] publishes statistics gracefully granting to his own operation 100 per cent. of permanent cures, Bassini's (from only 7 cases) 37 per cent., McEwen's 66 per cent., and Kocher's modified by Landerer 80 per cent. In the face of such statistics one almost trembles to suggest what he considers a better method of dealing with the wall than that advocated by Kocher; however, to my mind, I think

* Read at a meeting of the Canadian Medical Association, Halifax, N.S., August, 1905.

† Kocher's *Operative Surgery*, 4th edition, p. 239.

‡ Kocher's *Operative Surgery*, 4th edition, p. 240.

that in Bassini's method we have a safer and better way of closing the canal, and I hope before I conclude to be able to demonstrate a still better method for selected cases. Coley and Bull,* of the New York Hospital for Ruptured and Crippled, who have had a very large experience with Bassini's method, report 450 cases in adults with seven relapses, and 800 in children with eight relapses.

It seems to me reasonable that a surgeon in search of the best might readily combine the good points in each of these operations and thus approach more nearly the ideal.

An incision is made over and parallel to the inguinal canal but extending beyond it above and below.

The superficial epigastric artery is divided and twisted, and the aponeurosis of the external oblique is exposed freely. The intercolumnar fascia, the lower fibres of the internal oblique (cremaster) and the infundibuliform fascia together with the aponeurosis are divided, thus exposing the whole of the inguinal canal. The divided edges of the aponeurosis may be grasped by forceps and this structure separated freely from the underlying strata: the lower edge of the internal oblique, the transversalis, and the conjoined tendon are then defined and separated by the finger from the peritoneum. Poupart's ligament, by the aid of the finger, is also fully defined. The sac is then isolated and freed as high up as required, some traction at the same time being used. It is now opened, carefully cleared of its contents, and is then seized at its fundus with long narrow curved forceps and invaginated backwards through the inguinal canal up into the abdominal cavity. "The point of the forceps is then forced against the abdominal wall, which is made to project just external to the internal abdominal ring. An incision one third c.m. long is made through the aponeurosis and muscles down to the parietal peritoneum, which, together with the invaginated hernial sac, is pushed through the opening. The parietal peritoneum is taken up with dissecting forceps and incised and the edges are grasped with artery forceps to prevent them from retracting. The whole length of the invaginated sac is forcibly pulled out;"† the empty forceps are taken out at the same time. The base of the sac is crushed with a pair of pressure forceps, transfixed with a chromic catgut suture, and the two halves, together with the parietal peritoneum, are tied. The sac is cut off close to the ligatures, the stump pushed back under the fascia and the same suture is used to close the opening in the aponeurosis of the external oblique.

The lower edges of the internal oblique, the transversalis and the conjoined tendon are then united to the deep part of Poupart's ligament by means of a series of Mattress sutures of chromic catgut, care being taken that these sutures are not tied so tight that

* *Progressive Medicine*, June, 1905.

† *Kocher's Operative Surgery*, 4th edition, p. 213.

the vitality of the parts be interfered with, just enough room is left at the inner end to allow the cord to emerge. In this way the cord is left undisturbed in its bed, which I consider an important precaution, for it seems to me that the less handling there is of the cord the less likelihood there is of unfortunate complications. There are certain cases of long standing in which there is a considerable redundancy of the aponeurosis, and in these the method of Bassini, namely, finishing the operation by suture, is hardly sufficient to ensure the integrity of the abdominal wall. It is in such cases that I commend to your attention the following method, namely, that the upper margin of the divided aponeurosis be sutured with a continuous chromic catgut suture to the superficial part of Poupart's ligament, beginning the running suture at the inner extremity and then where it terminates at the outer angle, by making a fixation cross the same running suture may be used to fix the lower divided edge of the aponeurosis, to the aponeurosis, above the level of the inguinal canal, and make the final fixation of that suture one half to one inch and a half above the external ring, its point, of course, depending upon the amount of redundancy of the aponeurosis. (See fig.) While I would insist on this as being absolutely necessary in all long-standing cases, yet a certain amount of overlapping of the aponeurosis may be secured in all cases and thus add materially to the strength of the abdominal wall. One must, of course, see to it that the cord is not unduly compressed, otherwise there may be swelling or more serious damage to the testicle. The operation is then concluded by a subcutaneous stitch of silkworm gut or heavy horse-hair, including in its bite the deep fascia as well as some fat, and by a subcuticular suture of horsehair, the ends emerging about half an inch above and below the extremity of the incision, and tied over a small roll of acetanild or iodoform gauze. These stitches are removed on the 9th or 10th day.

I have done this operation a number of times already and it has seemed to me rational and has given excellent results so far, and this is more than I can say of either Kocher's or Bassini's or any other operation in my hands. It is true the hands may be somewhat to blame, but I am prone to ask the method to share some of the responsibility.

Note: Since presenting this paper to the Canadian Medical Association I have discussed the operation with my senior colleague, Dr. Geo. A. Peters, and find that he has been doing practically the same operation for a number of years, while I have done it for not more than two years. The drawing was made for me by W. E. Gallie, M.B. (Toronto).

112 College St.

Selections, Abstracts, Etc.

CELESTINS—GRANDE-GRILLE—HOPITAL SPRINGS.

No natural water has ever been made the subject of such exhaustive clinical study as that of the Vichy Springs, and it owes its reputation, not to a simple popularity due to its pleasant taste, but to a fame resulting from the crucial test of centuries of clinical observation.

Like other mineral waters, their activity is somewhat greater at the spring than when taken in bottled form. Yet this is scarcely a disadvantage, since in many cases it allows of a milder, more prolonged effect, which is especially serviceable in chronic conditions.

It has been noted that the three springs, Celestins, Grande-Grille and Hopital, are very similar in their chemical composition. In practice, it is found that the water of Celestins is especially indicated in disorders of the kidneys, and such as depend upon the uric acid diathesis; rheumatism, gout, gravel, and cutaneous lesions, such as eczema, etc. The Grand-Grille water is deemed to be especially efficacious in stomach and liver disorders, while the Hopital spring is useful in the same way, but it is somewhat milder and slower in its action than either of the others.

Practically it may be said that the water of the Celestins spring meets every indication for the employment of Vichy Water. It has a mildly diuretic action of great power, and its action upon the liver and stomach is excellent. By its continuous use the blood is rendered more alkaline, deposits of uric acid in the form of sodic urates no longer take place, since the acid becomes promptly changed into urea, which is rapidly eliminated. The bile becomes diluted, and calculi are no longer formed in the gall-bladder. Those which may be present are disintegrated through the solution, in a strongly alkaline medium, of the mucus which holds the various parts together, and the fragments are discharged through the common bile duct into the intestinal tract.

In chronic hepatic disorders there is secured a greater flow of bile, and the improvement in gastric and intestinal digestion, due to the alkaline treatment, relieves the liver of a large part of the work previously given to it. In cases of hepatic sluggishness, attended with painful and slow digestion, the effects are often nothing short of marvellous.

In gastric and intestinal indigestion the use of Vichy secures

a freer action of the bowels; digestion becomes more perfect, and the products of this digestion reach the blood in a better prepared condition. This relieves the liver and kidneys, which no longer have to deal with so many products of imperfect metabolism, and therefore we rapidly see an improvement in the general health which is quite surprising in character.

A very large number of the girls and young women for whom we prescribe iron owe the poverty of their blood to gastric and intestinal sluggishness, and the great majority of cases of anemia and chlorosis are therefore much improved by the Vichy treatment.

In gastric derangements due to dietetic errors, and in those in which the abuse of alcohol may be incriminated, the Vichy Waters are of unquestionable efficacy.

If dyspepsia is of the decided acid variety, the Vichy Waters naturally act as antacids, and as such are clearly indicated. In this form of dyspepsia we commonly find that those who are content with prescribing bicarbonate of soda are disappointed in regard to the permanency of the effects obtained. As has been said by Bartholow: "While the immediate result is good, the after-effect is to increase the production of acid. Those who habitually take sodium bicarbonate for acid indigestion suffer severely from acidity." If the alkaline treatment is limited to the use of Vichy Water, no such unfortunate result can occur. Medication by the use of the alkalies themselves must be carefully dosed as to amount and time of administration. Bicarbonate given before meals increases acidity; given after meals it lessens acidity by the chemical neutralization of a part of the acid of the gastric juice, but while it acts in this manner it fails to afford the multiple results achieved by the Vichy Waters, due to the dosage accomplished by nature itself. These waters so promote oxidation in the system, and have such a general effect in improving nutrition, that they finally eliminate the causes themselves of the distributed digestive processes.

A Few Physiological Facts.—A. Somnoforme can be administered equally well to children as to adults, or old people. B. For children and anemic individuals Somnoforme is an ideal anæsthetic because of the rapidity of its action and the length of narcosis obtained which, when Nitrous Oxide is employed, is usually of very brief duration with these classes of patients. C. Strong, robust men require a larger dose of Somnoforme than do other classes of patients. The same applies to alcoholics. D. With Somnoforme the anæsthesia deepens after the face piece has been removed. E. Under Somnoforme the pulse become slightly accelerated and strengthened. F. The reason of the safety of Somnoforme is because of its exceedingly rapid absorption, and equally rapid elimination from the system.

other celebrated experimentalists, thus drawing us to the following conclusions:

1. Citrophen is an excellent antipyretic.
2. Citrophen is an excellent antineuralgic.
3. Citrophen is harmless when given in large doses.
4. Citrophen is completely eliminated with urine.
5. Citrophen is to be preferred for its agreeable taste of lemon.
6. Citrophen greatly improves the appetite.
7. Citrophen is preferable to other medicines for rheumatism, neuralgia, sciatica, typhoid, pneumonia and influenza.

Technic in the Use of Medicine.—We do not find articles in the journals telling how the writer employs in all operative procedures Killgerm's "compound antiseptic and tissue vitalizer," but for each step of his work the surgeon employs one or another special agent—one to prepare the instruments, another for the skin, a third for his hands, etc., etc. Simple and well-known agencies are alone utilized, things whose powers are sure and single, unerring, never doubtful or variable. What exactness, what precision, what certainty, are required. Some of us believe that a similar exactness of technic would be a good and desirable thing in the use of internal medicines. We think that such elaborate care and such nicety of application would bring correspondingly precise results. Moreover they believe that this can be accomplished by the observance of a few simple rules: Know exactly what is the matter with your patient. Know exactly what medicine will restore normal conditions. Give of the right medicine exactly enough to restore normal conditions, and then stop it.—*Editorial, Am. Jour. of Clin. Med.*

SOMETHING ABOUT THE WORLD'S GREAT FRATERNAL ASSURANCE SOCIETY.

AMONG the institutions established to assist men and women to provide against the contingencies of life none have proved more generally helpful than that whose name appears above. It came upon the stage of fraternal effort at a time when the range of the usefulness of those which preceded it had apparently reached a limit without satisfying the practical trend of fraternal instincts and the demands of the age. Designed to meet conditions in which the operations of other fraternal agencies were restricted or altogether lacking in effectiveness, and aiming to systematize and give definiteness to the work of providing by fraternal methods against death as well as sickness and disablement it secured at once a popularity that has remained with it ever since; while the case with

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which its undertakings were planned and the fidelity with which they have always been carried out have won for it a confidence given to but few similar institutions.

The plan upon which the I.O.F. operates was adopted in 1881, when the Hon. Dr. Oronhyatekha became the head and leader of the Society; and the results accomplished by it during the quarter of a century it has been on trial have more than met the expectations of its originator and demonstrated its value and effectiveness as applied to fraternal assurance. By means of carefully computed constant or level premiums (much lower than those charged by the regular insurance companies), payable at fixed and regularly recurring periods it provides a definite income for the payment of all legitimate insurance claims immediately upon proof and at the same time accumulates a fund to offset the increasing death rate of old age. That fund, like the membership, has grown year by year until it now amounts to over \$10,400,000, the Society having during its accumulation paid out upwards of \$20,250,000 for life assurance, disability, sickness, and other benefits, besides providing free medical attendance, nursing during illness, care of families and other relief the value of which cannot be estimated in dollars and cents, as well as fraternal and social privileges not otherwise obtainable. In addition to all these the necessarily large expenses of introducing the Society into the several countries in which it is operating were met, so that the achievements of Independent Forestry are in every way remarkable.

The following table will indicate at a glance the growth of the premium yearly income, the annual payments for benefits, the accumulation of funds and the membership under that system since the Society was reorganized in 1881:—

Year.	Premium Income.	Benefits Paid.	Accumulated Funds.	Membership.
1881	\$ 5,123.38	\$ 1,300.00	\$ 4,568.55	1,019
1885	35,712.71	26,576.99	29,802.42	3,642
1890	284,333.71	181,846.79	283,967.20	24,604
1895	1,119,508.42	685,000.18	1,560,373.46	86,521
1900	2,399,683.01	1,545,145.64	4,483,364.44	180,717
1905	3,263,984.69	2,191,413.48	9,709,583.83	233,293
1906 (Oct. 1)			10,388,914.15	245,000

The insurance and other benefits paid by the Society since the 1st of January, 1906, amount to \$1,758,170.65, divided as follows:

For death claims.....	\$1,447,574.37
For total disability claims.....	82,029.01
For old age and expectation of life claims.....	56,489.84
For sickness claims.....	160,698.36
For funeral claims.....	11,379.07

These figures taken together represent a payment in excess of \$7,480 for every working day during the period covered, while added to the total of the previous disbursements for the benefits

provided by the Society that already magnificent sum was increased to \$20,250,078.27 on the 1st of October, 1906. It requires some effort of imagination to realize what the distribution of this vast sum must have meant to the beneficiaries who received it, but having mastered that, one has no difficulty in excusing the speaker who described the Foresters as "scattering golden blessings" nor in appreciating the numerous expressions of gratitude that are constantly reaching the Head Office from members who have been helped during illness and disability and from widows and orphans to whom the insurance benefits provided by the loving thoughtfulness of departed bread winners came indeed as blessings.

In addition to its other benefactions, the Independent Order of Foresters established recently at Foresters' Island, near the town of Deseronto, an institution known as the Foresters' Orphans' Home. The stately edifice within which its operations are carried on was planned and designed by the Hon. Dr. Oronhyatekha and was erected on a site donated by him for its occupancy. It is a splendid four-storey structure, with a frontage of 150 feet and a depth of 166 feet, including the wings. It has accommodation for about 250 children, including dining rooms, class rooms, work shops, and a handsome and capacious convocation hall, living apartments and offices of the superintendent and other officers, etc. The dormitories are large and airy, and dining halls and class rooms ample and cheerful, the recreation quarters in every way adapted for the purpose. Quite a number of orphan children are now domiciled in this Home, and with others to come will there be fed and clothed, nurtured and cared for, as nearly as possible as they would be in a well-regulated home, and in addition be given such thorough and up-to-date education as will qualify them to engage in the practical duties of life and of good citizenship with advantage to themselves and to the countries of which they may become citizens. The superintendence of the Home has been placed in the hands of J. C. Morgan, M.A., who is favorably known as for several years senior Inspector of Public Schools for Simcoe County, and is a brother of His Honor Judge Morgan, of Toronto.

The Head Office of the Society is at the Foresters' Temple Building, Richmond and Bay Streets, Toronto, a magnificent twelve storey fireproof building erected and owned by the I.O.F.; and branch offices are maintained at Port Huron, Mich., at London, England, and at Sydney, Australia. The Executive Council which manages the business of the Order in the interim between Supreme Court Sessions, consists of the following well-known gentlemen: Hon. Dr. Oronhyatekha, J.P., S.C.R., Toronto; Victor Morin, B.A., N.P., P.S.C.R., Montreal; Joseph D. Clark, S.V.C.R., Dayton, Ohio; Robert Mathison, M.A.S.S., Toronto; Henry A. Collins, S.T., Toronto; Thomas Millman, M.D., M.R.C.S.E., S.P., Toronto; E. G. Stevenson, S.C., Detroit, Mich.

THE TREATMENT OF BRIGHT'S DISEASE.

If we will consider Renault's idea, that the kidney is not a filter, but a gland of secretion, as well as excretion, and that this secretion passes into the blood, where its action brings about such changes that the kidney is better able to eliminate the toxins, then will we get an idea of the action of nephritin, the unchanged primary elements of the cells of the cortex and the convoluted tubules of the kidneys.

This idea has been worked out exhaustively, but in a crude way, for three years in the hospitals of France, where they have been making daily macerations of fresh kidneys and treating various cases of nephritis with remarkable results.

For some time we have been trying to produce a product that could be used successfully by physicians in cases of nephritis, overcoming the nausea and repugnance, as well as the gastric irritation, which usually accompanies crude products, and also secure a product of a definite standard, so that the dose can be graduated according to the requirements of each individual case.

Taking Renault's macerations as a standard, we made many experiments, the result showing that glycerine extracts were extremely weak, desiccated kidneys showed that the primary substances were injured by the heat and no favorable results obtained, solutions, extracted by normal saline solution, required alcohol to keep them, which is irritating, other extracts showed no value, and no active principles could be precipitated that would give the results as shown in France. Nephritin alone maintained a definite action throughout all these experiments, and if we still keep Renault's macerations as a standard, nephritin is found to be fifty times as potent, or in other words, ten tablets of nephritin equal the maceration of one pig's kidney.

Nephritin is made from the fresh pig's kidney, uninjured by any preservatives, is perfectly stable and does not irritate the stomach: laboratory and clinical tests have confirmed the remarkable results by this method abroad.

For the tests, cases have not been picked, but were taken as they came.

A case of albuminuria in a whisky drinker. Sp. gr. 1.011, urea 0.5 per cent., albumin 1 gm. per liter, sediment showed hyaline casts in abundance. Given 4 tablets four times a day. On the third day sp. gr. 1.022, urea 2 per cent., albumin 0.75 gm. per liter. Careful examination of the sediment failed to show casts. He is showing rapid improvement without change of diet.

Another case showed no lesion of the kidney. Patient complained of languor, pain in back, tired easily. Urine amount 1947

cc. in 24 hours, sp. gr. 1.012, urea 0.8 per cent., albumin absent. Given 3 tablets every three hours. After the first day he noted an immediate increase of appetite and a feeling of well being. Urine in 5 days increased to 3012 cc. in 24 hours, sp. gr. 1.020, urea 2 per cent., albumin absent.

A number of other well-marked cases are undergoing this treatment with excellent results and in course of time will be reported upon. The results so far, however, have proven its great value and justify our hope and expectation to have found a remedy suitable, at least as an adjunct, in almost every case of nephritis, be it acute or chronic, primary or secondary, but we believe that continued treatment should be carried over an extended period.

DOSE: In acute cases of nephritis, five to ten tablets or more three times a day or oftener, sub-acute cases, three times a day; chronic cases, two to five tablets three times a day; and, as a prophylactic in cases of scarlet fever and where there is danger of acute nephritis starting, one to three tablets three times a day according to age.

Muiracithin as an Aphrodisiac.—A short time ago Prof. Nevinsky, of Innsbruck, carried out a number of experiments on animals, which demonstrate, on the one hand, the absolute harmlessness and non-toxicity of Muiracithin, and, on the other, the influence of the preparation upon the sexual organs. Nevinsky gave to rabbits up to fifty pills, and to dogs up to seventy pills, without any change in the general condition of the animals being observed; but he proved an increased turgidity of the testicles and an increased emission of the semen. After the animals were killed no change in the kidneys nor in any other organ could be detected. The urine contained neither albumen, nor blood, nor tube-casts.

ANTAGONISTIC ACTION OF VERONAL AND MORPHINE.

SHORTLY after the introduction of veronal, Wolfram, of Erfurt, observed that the very disagreeable after-effects following an injection of morphine were obviated by first giving a dose of veronal. Since then he has repeatedly been able to confirm this observation.

The undesirable symptoms appearing after morphine, if given subcutaneously, are well known: nausea, stupor, vertigo, loss of appetite, cessation of intestinal peristalsis, and, quite often, persistent and severe hemorrhoidal pains. Owing to these after-effects, many patients suffering from neuralgia, gout or tabes would rather endure agonizing pains than have recourse to morphine, the more

so since every conscientious family physician will warn against the repeated use of the injections.

If a dose of veronal is given by mouth half an hour before the injection of morphine the disagreeable symptoms noted will not appear, with the exception of intestinal paresis, which occasionally persists. The relation of veronal to morphine is as 0.5 to 0.03 Gm.; that is, a dose of 0.5 Gm. (8 grn.) of veronal will antagonize the after-effects of 0.03 Gm. ($\frac{1}{2}$ grn.) of morphine. During the course of two years the author has been able to prove this fact over and over again, with very intelligent patients as well as himself.

The anodyne action of morphine is in no wise diminished. While, ordinarily, morphine sleep may be delayed for three to four hours, a quiet sleep will set in very soon if veronal is given.

The author had two patients who required from 90 to 120 grn. of morphine yearly. According to directions, every injection of morphine was preceded by a dose of veronal, and up to the present these patients have not acquired the morphine habit.

Since veronal is thus able to prevent morphinism, the author thinks it is probably also destined to play a rôle in the withdrawal of morphine. As far as he knows, no reference is to be found in medical literature to this use of veronal, but trials are probably under way in the various sanitarium.

He also believes that veronal may possibly be a reliable antidote for morphine. A case has come under his observation recently which would point in this direction, and he promises to report it. *Aerztl. Mitteilungen*, July, 1905.

"Apenta" Water—Its Uses and Applications.—1. For the relief of habitual constipation, and as a regular aperient which may be trusted for its constancy of composition and its uniformly reliable and gentle action. 2. For the prevention and cure of Obesity, as established in Prof. Gerhardt's Clinic in Berlin. 3. As a gentle laxative in pregnancy and the puerperal state, and as a preparation for surgical operations. 4. For "bilious attacks," congestion of the liver and defective secretion of bile. 5. For the prevention and cure of gall stones. 6. As a stimulant to healthy nutrition and therefore indirectly as a tonic, by stimulating the digestive functions, increasing peristaltic action, relieving the system of waste material and generally promoting normal nutritive changes. 7. As a preventive of attacks of gout by stimulating the activity of the liver and intestinal glands, and furthering the elimination of uric acid.

Iodine Petrogen (5 and 10 per cent.)—While Iodine is a most valuable medicament for external use, its staining of the skin and lack of absorption through the integument has greatly restricted its field of therapeutic usefulness. These objections, however, are

overcome by Iodine-Petrogen, as it is not only immediately absorbed into the pathologic tissues, thus exerting its beneficial, alterative and absorbent properties, but causes no permanent stain upon the surface, and any of the basic material of the Petrogen not absorbed may easily be removed with soap and water. As Iodine-Petrogen is non-irritating, it is as well adapted for internal administration as external application, and may be employed in many forms of systemic disease in which the general effect of the iodine is desired. Applied locally, it has been found useful in the treatment of muscular rheumatism, glandular swelling, old syphilitic nodules, rheumatic swelling, stiff joints, bruises, and is indicated in the treatment of diseases of the respiratory tract and auditory canal, such as atrophic and hypertrophic rhinitis, stomatitis, pharyngitis, otitis and otalgia. Iodine-Petrogen has been employed, with most gratifying results, in the treatment of pleurisy and pneumonia. To prove most effective, *it should always be applied by the hand*, being rubbed in thoroughly and until entirely absorbed, two or three times each day. The frequency of its application can be determined intelligently only after a careful consideration of the conditions by the attending physician.

Transplantation * of Non-Malignant Tumors.—R. Neumann (*Zeitschrift f. klinische Medizin*, Berlin) reviews the history of transplantation of living tissue. The transplanted elements display only a limited growth as a rule. Even the new growth of fetal tissue elements is checked. Scraps of fetal cartilage on a foreign soil follow their organ-forming tendency, but cease to grow when they have attained maturity. In some instances on record the transplanted tissue caused the production of dermoid cysts, but they remained encapsulated. Transplantation on a foreign soil has an unmistakable inhibiting effect on the proliferation of the transplanted tissue. The inhibiting effect is greater the higher the vital qualities of the soil. Transplantation on an atrophic soil allows more prolific growth. The success in transplanting cancerous tumors on mice was obtained only on animals of the same species. Even the slightest racial difference was enough to prevent the proliferation of the transplanted elements. It has proved impossible to transplant the Jensen mouse tumors from Copenhagen mice on mice in the Berlin Cancer Research Institute, although they belong to the same species. Lanz has been most successful with transplantation of non-malignant tumors. On the whole, Neumann concludes, transplanted non-malignant tissue is capable of a certain moderate growth, but sooner or later it retrogresses as a rule. In not a single instance has it been found possible to cause the development of an affection with malignant characteristics from transplantation of non-malignant tissue.

The Canadian Journal of Medicine and Surgery

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Advertisements to insure insertion in the issue of any month, should be sent not later than the fifth of the preceding month. London, Eng. Representatives: W. Hamilton Hill, Thaxet House, 231 Strand, W.C. Agents for Germany, Saarbach's News Exchange, Mainz, Germany.

VOL. XX.

TORONTO, NOVEMBER, 1906.

NO. 5.

Editorials.

WHOLE MILK, SKIM MILK, BUTTERMILK AND CREAM, 1906.

BULLETIN No. 121. Whole Milk, Skim Milk, Buttermilk and Cream, 1906, published by the Inland Revenue Department, Ottawa, contains detailed analyses of milks sold throughout the Dominion. Owing to the general consumption of milk as food, this report is of great interest to the general public; on account of the labor and scientific skill entailed in its preparation, it deserves and should receive the careful study of physicians.

After allowing for necessary corrections, the chief analyst, Dr.

MacFarlane reports on 319 samples of whole milk, of which 45 were adulterated, 85 doubtful, and 189 genuine.

He says "According to the statement the whole milks collected this year contained the following percentages:—

Of genuine samples	59.2 per cent.
Of doubtful samples	26.7 per cent.
Of adulterated samples	14.1 per cent.
	100 per cent.

The percentage of adulterated milks is higher than it had been in the following years: viz., 1895, 1897, 1898, 1901, 1903.

Skim milk has disappeared from the Canadian market, there being only one sample of it described in the report—No. 27421 from Nova Scotia.

Buttermilk is sold in Canada. 5 samples were obtained by the collectors of the department, the butter fat of which ranged from 0.05 to 0.80 per cent.

A study of this bulletin shows, among other matters, that the proportion of butter fat in the samples of milk analysed is a widely varying quantity in different parts of Canada. For instance, sample of whole milk 24162, taken from large can going out to customers, furnished by a dealer in Sussex, King's Co., N.B., shows, from an analysis of one portion 6.80 per cent. B. F.; from an analysis of a second portion 4.62 per cent. B. F.; from a third analysis 4.61 B. F. Average 5.71 per cent. Sample of whole milk, 24163, taken from large can going out to customers, furnished by a dealer at Sussex, King's Co., N.B., from an analysis of one part shows 9.81 per cent. B. F.; from an analysis of the second part 9.52 per cent. B. F.; from a third analysis 9.48 per cent. B. F. Average 9.66 per cent. B. F. The analysts say that specimens 24162 and 24163 were "partly cream." They were sold, however, as whole milk. Sample of whole milk, 24167, furnished by a dealer at Sussex, King's Co., N.B., and taken from can in delivery wagon on street, showed from an analysis of one portion 5.23 per cent. B. F.; from an analysis of the second portion by another analyst 5.02 per cent. B. F.; from a third analysis 4.96 per cent. B. F. Average 5.07 per cent. At Sussex the milk is not bottled; it is retailed from the can at 5 cents a quart.

Then, of 31 samples of whole milk collected in New Brunswick, 24 are pronounced unadulterated; 1, below average in fat, with 3.40 per cent. B. F.; 1, probably watered, with 3.29 per cent. B. F.; 1, probably watered, with 3.39 per cent. B. F.; 1, below average in solids not fat, but with 4.44 per cent. B. F.; 1, below average in fat,

with 2.99 per cent. B. F.; 1, doubtful, with an average of 3.26 per cent. B. F.; 1, below average in solids not fat, though the average B. F. is 6 per cent. Certainly the skimming of whole milk can be but little practised in New Brunswick. How is it in Toronto. Of the 34 samples of whole milk collected in Toronto, only 5 samples reached the standard average percentage of B. F., viz., 3.75 per cent. The skimming and watering of milk must, therefore, have been freely practised by producers or retailers who supplied the Toronto market, or by both of them. How is it in Montreal? Of the 30 samples of whole milk collected in that city, the analysts pronounce 15 genuine; 3, watered; 3, partly skimmed; 7, low in solids, not fat. However, to probe the matter further in only 3 samples of Montreal whole milk, which are pronounced genuine by the analysts, does the B. F. average come up to, or exceed, 3.75 per cent.

In Toronto, the price of bottled whole milk is 6.66 cents a quart, 15 quarts for a dollar. The following data, supplied by Mr. Potter, City Dairy, Toronto, will help to elucidate the cost of whole milk to the retailer and the profit:—

Price paid producer for 8 gallon can of milk, freight and cartage paid by producer	\$1.30
Railway freight for 40 miles to Union Station, Toronto	\$0.15.00
Cartage from Union Station to City Dairy ..	0.02.50
Total reduction on price paid per can...	0.17.50
Net value of 8 gallon can to producer	\$1.12.50
Net value of milk, per gallon, to producer	0.14.62
Cost of milk to dealer, per gallon	0.16.25
Retail price of milk, per gallon, to consumer	0.26.66
Profit by milk retailer, per gallon	0.10.39
Profit by milk retailer, per quart	0.02.59

As the Toronto milk retailer pays 0.16.25 a gallon for milk, he should retail it at the rate of \$0.32.50 per gallon, or about 8 cents a quart, in order to get a fair profit, especially if he goes to the expense of bottling the milk. In all probability, the retail price of whole milk will be advanced in Toronto this winter, by one cent per quart, by the Retail Milk Dealers' Association.

It is to be hoped, that, with an increase in the retail price of bottled milk sold in Toronto, the quality of the article will leave nothing to be desired, even by the most painstaking analyst. Should this hope prove delusive, an opening of hearts and minds may, some day, reveal to us whether a low percentage of B. F. in our daily milk is due to poor breeding, or low feeding of the milch cows of our dairies, or to the high profits of the milk dealers. J. J. C.

INAUGURAL ADDRESS BY SIR A. E. WRIGHT, AT THE
OPENING OF THE TWENTIETH SESSION OF THE
MEDICAL FACULTY OF THE UNIVERSITY
OF TORONTO.

THE inaugural address at the opening of the Twentieth Session of the Medical Faculty of the University of Toronto, was delivered on October 3rd, at 8.30 p.m., in the University Gymnasium, by Sir Almroth E. Wright, M.D. (Dublin), F.R.S., etc. Dr. Reeve, Dean of the Medical Faculty, introduced the lecturer, the subject of whose discourse was "The Opsonic Theory and Therapeutic Inoculation with Bacterial Vaccines." Dr. Wright spoke depreciatively of the actual value of ordinary medication in disease. Instead of curing a disease, the physician, in many cases, merely assisted, as an intelligent spectator, the cure being really effected through the *vis medicatrix naturæ*; instead of rescuing a victim from the swollen river, the physician, too often, merely looked on at his struggles from the river's bank. He instanced typhoid fever and furunculosis. The opsonic treatment, he said, has begun to systematize attacks on various bacterial diseases, and the work goes on apace, remarkable cures having been effected by its application. The word opsonic is derived from the Greek verb *οψωνο*, I prepare to feed. In explanation of the meaning of this term the lecturer showed that the theory of phagocytosis is insufficient to account for the victory obtained in the blood over bacterial infections. It is true that leucocytes engulf bacteria, as the ameba does its food, and having absorbed them carries them to the liver and the spleen there to be got rid of; but there are bodies in the serum of the blood called opsonins, which do battle with the bacteria and the white blood cells are merely scavengers, which carry off the bacteria, after they have been worsted by the opsonins. Hence the conclusion, that, in fighting bacterial disease, we must especially strive to strengthen the opsonins.

The "Opsonic Index" shows by figures the resisting power of an individual as against bacilli. Suppose, for example, that in a healthy subject each white corpuscle is found to englobe eight bacilli; in another individual who is consumptive, the number caught falls to four, and in a third, to two; their opsonic indices would be, respectively, 1, 0.5, 0.25; eight being the normal.

In proportion to the power of resisting disease is the chance of recovery. The white blood corpuscles ought to eat up the bacilli; but they are not always hungry and they may be satiated. Dr. Wright's plan is to give them a vaccine, which, when injected into the patient's blood, causes the pouring out into it of a substance which enters into chemical combination with the bacilli rendering them not only digestible but appetizing. The material produced as the result of this mode of stimulation is called "opsonin." In certain individuals, the natural protective substance against a certain form of bacterial invasion is large in amount and such individuals do not suffer from this form of invasion. Their power of resistance suffices to overcome this bacterium, viz., the staphylococcus and prevents it from taking hold. In others the power of resistance is low, and, if attacked by staphylococic infection, such individuals offer but slight resistance to the invader. In this localized class of infections, viz., furunculosis, the machinery of immunization is not called into play.

There is another class of bacterial infections, in which the machinery of immunization is called into play. In this latter category the protective powers of the blood are continually fluctuating—being at one time higher and at another lower than the normal. These two classes of bacterial infection must be treated on entirely different principles. The lecturer did not discuss these different forms of opsonic therapy.

Speaking generally opsonic treatment of bacterial disease meant: (1) The discovery of the offending microbe, (2) The preparation of a sterilized vaccine, similar to the bacterium discovered in the patient's blood, (3) Hypodermic inoculation of the patient with an attenuated form of this vaccine.

The events which occur in the blood of an individual after the inoculation of a bacterial vaccine are a negative phase, a positive phase and a return to a condition of equilibrium—coincidentally pyrexia and the pulse also fall. Charts were exhibited exemplifying observations of this kind which had been made in cases of typhoid fever, septicæmia, and staphylococcus infection. By tracings on these charts, it was shown that reinoculation raised the resisting power of the inoculated individual above the normal.

General mention was made of bacterial diseases, which had been cured by the employment of opsonic treatment. The diseases men-

tioned were typhoid fever, staphylococccic infection and septicaemia. In Malta fever this treatment had been quite successful.

The fringe of the subject had only been touched. In countless diseases the opsonic method would be: (1) Discovery of the bacterial cause of a disease; (2) Preparation of a suitable vaccine; (3) Hypodermic introduction of this vaccine, on one or several occasions, until the power of resistance of the patient had been elevated to, or above, the normal. The medical profession, the lecturer thought, would take hold of this new method and, during the next few years, cures of hitherto hopeless cases might be confidently expected.

"The Opsonic Index" is a hard piece of pabulum to present to the leucocytes of novices, and it will be necessary to stimulate the blood sera of the medical practitioners of Toronto, on more than one occasion, before the intricacies of this difficult subject are even half understood. It is certainly a fascinating theme for a lecture, and its protagonist, Sir Almroth E. Wright, is a very fluent and attractive speaker. To him one is moved to say, as Falstaff says to Poins, "Well, mayst thou have the spirit of persuasion." All the same, a good deal of water will flow under the bridges of the River Don before the Toronto medicos settle down to study the opsonic indices of their patients.

J. J. C.

OPEN MEETING OF THE TORONTO MEDICAL SOCIETY.

THE first meeting of the Toronto Medical Society, for the season 1906-7, held in the New Medical Building, on October 4th, at 8:30 p.m., was attended by an audience of about one hundred persons.

The President, Dr. Rudolf, gave a short opening address, which was well received.

Sir Almroth E. Wright, lectured on "Factors in Coagulability of the Blood and their Practical Significance." The lecturer plunged at once in medias res, stating that he had little faith in text books on physiology, and had not read one in fifteen years. In his opinion, the theories advanced by physiologists to explain the cause of the coagulation of the blood, fibrin ferment, etc., were baseless. He had spent some thousands of hours trying to verify these theories, but in vain. He preferred to investigate the phenomena of the time required to enable coagulation to occur, and had used capil-

ary tubes to measure accurately the exact time required in this operation. He found, that normal blood coagulated in $1\frac{1}{4}$ minutes. The blood of some individuals coagulated rapidly, and such blood was viscid. The blood of other individuals coagulated slowly, and such blood was thin and very fluid. The presence of lime salts in blood increased its viscosity and might explain its coagulation. The presence of citric acid, or of lemon juice, in blood decreased its viscosity and added to its fluidity.

The lecturer made an application of the theory of the coagulation of blood by lime salts to the custom of feeding typhoid fever patients (milk.

Thrombosis in typhoid fever is due to the weak circulation of the patient and an increasing viscosity of his blood, more particularly after the fever has abated, at the beginning of convalescence. A diet of milk, which was rich in lime salts was calculated to increase the tendency to thrombosis. Hives, chilblains and serous edema result from the opposite condition—too great fluidity of the blood. Deficient coagulation of blood was a cause of hemophilia. Treatment of hemophilia by hypodermic injections of a 5 per cent. solution of lactate of lime had proved satisfactory, in his hands; a 10 per cent. solution of this lime salt had proved to be too strong. The lecturer had found that a fruit diet causes urticaria, by increasing the fluidity of the blood and lessening the quantity of lime in the circulation. Cases were cited to illustrate the application of the lecturer's views.

A German lady who had been operated on for fibroma uteri had, after the operation, a large open wound in the abdomen which refused to heal. Dr. Wright examined her blood and, finding that its viscosity was above the normal, ordered her to take two drachms of citric acid every 3 hours. The result was that the lady's wound healed kindly, in a short time.

A gentleman, as the outcome of a swelling on the face and lower part of the neck, had been treated by a surgeon. The swelling was lanced, but pus did not appear in the opening. Increased swelling of the subcutaneous cellular tissue of the face and neck supervened, and several incisions were subsequently made, but no healing took place. The attending surgeon's prognosis was unfavorable and his diagnosis was that it was a case of Ludwig's Angina. Dr. Wright, after an examination of the patient's blood, which proved to be very viscid, ordered him to take two drachms of citric

acid every 2 hours. The result was a rapid cure. The fluids of the blood speedily appeared in the dry, beef-like tissues of the patient's face and neck, and repair went on apace. Antiseptics had been used by the attending surgeons in both these cases; but healing of the wounds had not taken place. The viscid condition of the blood had kept the wounded tissues of these patients in a dry, congested state, unfavorable to healing. When, owing to the action of citric acid in diminishing viscosity of the blood, a free pouring forth of the fluids of the blood into the wounded tissues took place, granulation and healing speedily followed.

Dr. McPhedran, seconded by Dean Reeve, moved that a cordial vote of thanks be tendered to the President, Dr. Rudolf, and also to the distinguished lecturer, Sir Almroth E. Wright.—Carried unanimously.

J. J. C.

THE RECENT UNIVERSITY SENATE ELECTIONS.

THE names of the medical representatives recently elected to the Senate of the University of Toronto, are:

H. J. Hamilton, M.B., Toronto, 1175.

C. J. O. Hastings, M.D., Toronto, 826.

W. H. Harris, M.D., Toronto, 708.

Wm. Burt, M.B., Paris, 625.

It seems strange, indeed, to write new names where old, familiar ones have so long stood, but the powers that be have decided, that former members of the Faculty are ineligible for re-election. The adoption of this measure is both regrettable and admirable. During the old regime the medical men of Toronto were represented by men of dignity and ever growing experience.

Under the new order of things the profession are to be represented by those whose remarks may frequently be prefaced by "Unaccustomed as I am." Members of the popular younger set, who have perchance the "long, long thoughts" of youth, but who are lacking in that equipoise of judgment that only the brains packed in ice and the nerve of steel to maintain opinions formed by years of weighing the pros and cons, can give, nature's just reward for the unrequited hours spent in conclave. While congratulating the new members of the Senate, let us not expect too much

from them; they are skilful physicians, men who are good friends and neighbors, but they are, "even as you and I," just

"A bone, a rag, and a hank of hair."

(With regrets to H. J. H. that he was omitted in the poem)

None of the medical Senators elect have been distinguished in the past for either brilliancy, energy, or originality, but they can at least "make good" with the one quality, with which we have heard they are endowed—common sense. After all the lessons are said, and the books closed over, perhaps that commodity is one of the most needed possessions in this old waltzing around world.

W. A. Y.

"Epistaxis, Prophylaxis,
Coughs, Colds and Rales,
Varsity Meds.
Varsity Meds.
Varsity Medicals.
Torcular Horopholi,
Val Sal Va,
Varsity Meds.
Varsity Meds.
Rah, Rah, Rah."

"Temptation waits for all, and ills will come,
But some go out and ask the devil home."

Over the Campus came a fearful and wonderful looking mass of struggling, fighting, yelling humanity, and we envied the Man in Mars his better view. Presently the mass swerved, then sprinted towards the Science building, rolled the human ball over, and yet a little while and it became a part of the dust and noise of the street called College. Portions of an old fence or two were added to the general melee, as a sort of armour, we suppose. In about half an hour the mass began to separate and take on individual form, and our eyes beheld nothing less alarming than the faces of the boys whom we all gladly welcome back to this University town. A bit fresh, fed too many oats all summer perhaps, full of life and coltishness, just spoiling for a scrap of some kind, and not a cop in sight that day, but one lone figure standing on the steps of the Technical School, a sight for the gods, utterly powerless before such a mob and from his vantage ground evidently enjoying the fight as only a Paddy can.

Law and order, of course, ought to govern the fun and frolic of the students, just as it governs the rest of the town dwellers; while in Toronto, the students are citizens, and, even though only boys grown tall, they are "the beginnings of men," and certainly would resent, in our social life, if they were not respected as such. If they desire such recognition, let them remember the "so far" limit to fun and the "no farther" that would ever be the armament of a gentleman.

Much has been said, and well said recently, in our newspapers about the expense of our University and its colleges both to the Government, and to the parents of the students, many of whom are not rich in money and have to economise to send "the boy to college in the city," and that it is necessary for the students to apply themselves more closely to their studies and not waste so much of their time in fun and foolery. On the other hand, do not let us grudge the boys their day, we had ours and the memory of it lingers, and, while the professors must maintain the dignity of their position, let them try as best they may to make earnest students, but certainly not prunes and prism prigs, out of the hope and heart of our land—our students.

" Knowledge is gold to him, who can discern,
That he loves to know, must love to learn."

October Ninth.

W. A. Y.

"TO SEE OURSELVES AS OTHERS SEE US."

In an article entitled "Canada" (devoted to The British Medical Association meeting in Toronto) in a recent number of the British Medical Journal, we noted the following sentence: "In such a large meeting, with its diversified interests, with a new and inexperienced management, there have been difficulties and hitches but in all essential particulars the arrangements were suitable and satisfactory." Thanks awfully, old chap. The Canucks are indeed grateful for the "faint praise that damns." W. A. Y.

EDITORIAL NOTES.

Cyanopathy or Morbus Caruleus.—On Cyanopathy, Dr. Jaime Ferreira, Lisbon, writes an interesting paper, published in *La Presse Médicale*, 5 Septembre, 1906. He says, "The auricles are incompletely partitioned off at the birth of a child. The foramen of Botal, seen from the right auricle, represents a muscular ring—called the ring of Vieussens; from the left auricle it looks like a sort of net-like tissue (Weill), which presses against the deepest part of the ring. At birth, this tissue may be either adherent to the fleshy part of the ring or free from it; but it presses strongly against the ring, when pressure in the left auricle is superior to pressure in the right one. When the predominant pressure is from the right auricle to the left one, Botal's membrane allows the blood of the infant to flow afresh from right to left as it did during foetal life." He says, further, that if the circulation of the infant is disturbed from any cause, the excessive pressure in the right auricle fatigues it and allows it to become distended with blood, and the infant is born with the well-known symptoms of cyanopathy, the permeability of the auricles persisting for a longer or shorter period. He also states, that, by practising percussion over the cardiac area of the infant, he has succeeded in demonstrating dilatation of the right auricle. Autopsies he has made also revealed the same state of dilatation. In some autopsies, the foramen of Botal was only apparently closed and a probe could be easily passed through it from one auricle to the other. Examination of the blood in cases of cyanopathy shows an excessive degree of hyperglobinuria (excess of the red-blood corpuscles). In his opinion, blue asphyxia is but an acute stage of cyanopathy. From a consideration of the clinical facts observed, he concludes, that the obstetrician should not restrict his efforts to exciting respiratory movements in the infant (mouth to mouth breathing and other means), but should endeavor to stimulate the myocardium of the patient. On several occasions, he has saved the lives of infants by resorting to this treatment. The hypodermic injection of camphorated oil has also proved useful in his hands. In such cases, the following formula is recommended:—

Camphor.	0.30 centige.
Sterilized olive oil.	30 grammer.

Sig. Inject 1-2 cubic centimetres. He also uses the artificial car-

bonic acid bath (Mougeot's formula), with good results, the bath acting as a tonic to the myocardium. Massage of the precordial region by tapotement, (a form of percussion), is also said to be useful, the excitation produced in the precordial region by this procedure forcing the myocardium to contract more energetically.

The Prevention of Venereal Diseases.—So many measures to prevent the spread of venereal diseases have been recommended and abandoned, that physicians are sceptical as to the value to be attached to any of them. Military and naval surgeons, however, continue to direct their efforts towards the prophylaxis of venereal diseases and occasionally with gratifying results. In *Annali di Medicina Navale, Febbrajo, 1906*, Surgeon-Captain Luzzati, of the Umbria, (Italian fleet), reports that he had successfully adopted the following system of prophylaxis. If any sailors had had connection with suspected women, during shore leave, they were requested to present themselves at the infirmary, after returning to the ship. A solution of mercuric chloride 1-1,000 was applied on a dressing, to the penis of each man, the dressing to be kept in place till the next morning. In case of special susceptibility to mercury, the strength of the mercuric chloride solution was reduced to 1-2,000. Dr. Luzzati states that out of 532 persons who, during 1905, took these precautions only 3 were contaminated, a percentage of 0.6; out of 20 cases of venereal disease in sailors coming under treatment 17 had neglected to submit to the preventive treatment. The following fact, in Dr. Luzzati's opinion, actually is as valuable as an experiment. Three sailors belonging to the ship had had, at different times, sexual relations with the same woman; one sailor was contaminated (chancre of the frænum), the other two sailors escaped; the sailors who did not catch the venereal had resorted to the preventive treatment described above, the sailor who got the chancre had not done so.

Adulterations of Maple Syrup and Maple Sugar in Canada. Bulletin No. 120 shows the analyses made of maple syrups and maple sugars collected March, 1906 (first collection) and, also, the analyses of samples of maple syrups and maple sugars obtained in the months of May and June, 1906. Of the first collection 85 samples of maple syrups were analysed, 53 were adulterated; in 8 the adulteration was declared; in 2 it was doubtful; 22 samples were genuine. Of maple sugars 22 samples were anal-

ysed; 12 were adulterated; in 3 it was doubtful; 11 were genuine. From the foregoing it will be seen that 85 samples of syrup and 26 of sugar, 111 in all, were collected, and that of these, 65 or 58.5 per cent. were found to be adulterated. Classifying the samples in the same way as for the first collection, the second lot showed, that, out of 171 samples of maple syrup examined 57 were adulterated; in 9 the adulteration was declared; in 17, it was doubtful; 88 were genuine. Of 52 maple sugars analysed 7 were adulterated; in 1 the adulteration was declared; 44 were genuine. These two last statements show that 171 samples of maple syrup and 52 of maple sugar were obtained in the second collection, 223 in all, 57 syrups and 7 sugars being found to be adulterated, which is equal to 28.7 per cent., a number comparing favorably with that obtained in the first collection, viz., 58.5 per cent. It is stated by the chief analyst, that sugar from the cane, which is mostly added in the shape of refined granulated sugar, is the most common adulterant; but molasses may also have been used.

Intestinal Poisons.—In a thesis published recently at Paris, Dr. A. LePlay gives the results of several years of work devoted to the study of intestinal poisons. The thesis covers 142 pages and we shall simply cull from a resumé of it which appears in *La Presse Médicale*, September 1st, 1906, a few salient observations. In chapter V. he shows the biological troubles which he had discovered, in the deepest portions of the tissues. He describes the humoral modifications, the changes occurring in the nutritive processes. In order to penetrate into the extremest depth of these complex phenomena, he tried chemical analysis, and, as results, found that the hurtful principles in intestinal poisons may be divided into two classes: (1) substances soluble in alcohol; (2) substances insoluble in alcohol. Of these the insoluble ones are more morbidic in their effects than the others. This analysis also enabled the author to establish the fact, that the maximum of intestinal toxicity is met with in the ileo-cæcal region. The same method of investigation being applied to the microbic flora of the intestine, he discovered, that the greatest number of putrid microbic ferments multiply in the same region. In this region, also, the reabsorption of the greatest number of the hurtful watery products of the fœces takes place. As far down the intestine as the ileo-cæcal valve, the intestinal contents are liquid;

beyond the valve the fœces rapidly become dry, so rapidly indeed, that, before arriving at the rectum, the fœces lose from 25 to 50 per cent. of their water. In chapter VI. the author deals with the genesis of the disorders studied. This study relates to the intestinal contents and also to the walls of the intestine, contents and walls being studied in different stages and at different levels. The structure of the intestinal mucous membrane and the arrangement of its epithelia are not the same in all parts of the intestine. Towards the end of the small intestine and the beginning of the colon, the glandular nature of the epithelial cells and the abundance of the lymphoid tissues appear best suited to produce changes in the substances, traversing the walls of the intestines during the slow exodus from the intestine to the circulation. In the intestinal walls, two physiological elements of the tissues are endowed with the power of exercising an antitoxic function of defence; epithelium provided with real physiological activity and lymphatic cells. The author shows the importance of the mechanism of defence, which the digestive apparatus opposes to the action of the toxic products formed in the intestines, because disease is not always the result of abnormal or hyperactive agents, but often the consequence of a reduction or a lessening of the defences, which should be opposed to such agents.

Alcoholism in Canada.—A report giving a resumé of the more striking details of alcoholism in Canada was presented, by Dr. G. Bourgeois, to the Congress of French-speaking physicians at Three Rivers (June, 1906). Among other data, tables were given, showing the relative proportions of "bars" in Ontario, Quebec and New Brunswick. They were as follows:—

Province.	Bar.	Proportion of Population.
Ontario	1	351.38
Quebec	1	1045.81
New Brunswick	1	1898

An important paper was presented by Dr. Triboulet, Paris, on "Alcohol as the Grand Causal Influence of Tuberculosis." Other papers on various aspects of the question of alcohol were read by Drs. Sirois, Sainte-Marie, Chagnon and Valin. After the discussion raised by these papers had been finished, the following resolutions were adopted by the Congress: "(1) The surest way to do away with alcoholism in Canada would be to pass a law prohibiting the

manufacture and sale of all distilled alcoholic liquids in the Dominion of Canada, save for therapeutic and industrial purposes. (2) If for political or other reasons, this proposal cannot be realized, it is desirable that the Provincial Government should undertake to carry on the liquor traffic. (3) Should the Provincial Government refuse to take over the liquor traffic, a charter should be granted to a private company, which would take charge of the liquor traffic of the Province, on the express understanding, that the company was to pay to its shareholders only a fixed dividend of a moderate amount, and that the surplus profits were to be devoted to charitable, philanthropic or other purposes, to be designated by the Government. (4) Should none of these proposals be accepted, the Congress recommends to the Legislature to amend the Liquor License Act, by limiting the rights and privileges of municipal counsels, in such a way as to permit them to grant only one liquor license per 1,000 of population." There is plenty of reason for the attitude taken by the French-speaking physicians of Quebec on the question of alcohol in that Province. That bars are three times more numerous, in proportion to the population, in Ontario than in Quebec, may be true; but it would be a non sequitur to declare that they are not too numerous in Montreal, or that excessive drinking does not produce its harvest of death in Quebec as well as in Ontario. For instance, in a special despatch to *The Globe*, the following appears: "Montreal, October 1, '06. Coroner McMahon reports that within the last few days three sudden deaths occurred as a direct result of excessive use of alcohol." Details follow, giving the names and residences of the victims of alcohol, with some of the circumstances attending their deaths. The first resolution adopted by the Congress of French-speaking physicians, at Three Rivers, is radical, but is worthy of the adoption of every physician practising in Canada.

J. J. C.

PERSONALS.

Dr. and Mrs. Goldwin Howland, have returned from England.

Dr. Frank P. Cowan died at the Western Hospital, Toronto, on October 17th.

Dr. W. H. Pepler has removed his office from the corner John and Adelaide Streets to 600 Spadina Avenue.

Dr. Chas. Temple has removed from Spadina Ave. to the new residence built by him on Palmerston Boulevard.

Dr. J. S. Hart, of Parkdale, has come forward as a candidate for election for West Toronto, for the Medical Council.

Dr. H. P. H. Galloway, of Winnipeg (late of Toronto), has been appointed lecturer on Orthopedic Surgery in Manitoba Medical College.

Dr. D. Clark, ex-Superintendent of Toronto Asylum, was made an honorary member of the American Psychological Association at its annual meeting held recently in Boston.

The representatives elected from the Medical Faculty of the University of Toronto to the Senate are Mr. I. H. Cameron; Drs. J. F. W. Ross, G. A. Bingham, Gibb Wishart, and W. P. Caven.

Dr. Brefney O'Reilly returned to Toronto the first week in October, after several years spent abroad in study and travelling in many lands. He has settled at the family residence 54 College Street, and has taken up practice there. We heartily wish him great success.

Dr. Albert A. Macdonald, who for four years has ably represented West Toronto in the Medical Council, is again in the field for election. Dr. Macdonald is at present residing with his brother-in-law, Mr. Alfred Beardmore, in St. George St., until his new residence is completely finished.

Dr. BRUCE RIORDAN has announced that he is "out" for election to the Medical Council as representative for West Toronto. The fight will, therefore, be a three-cornered one between Dr. A. A. Macdonald, Dr. Hart, of Parkdale, and Dr. Riordan.

Obituary

DEATH OF DR. JOHN MATTHEW LEFEVRE.

ON September 15th, 1906, at his residence, 1,300 Georgia Street, Vancouver, B.C., John Matthew Lefevre, M.D., M.R.S.C., Eng., in his 53rd year.

DEATH OF DR. JAS. STEWART, OF MONTREAL.

DR. James Stewart, who was one of the most eminent physicians in Canada, died at his home in Montreal, on Oct. 6th, following a recent stroke of paralysis.

He was well known in various parts of Ontario, particularly in Huron county, where he practised in both Varna and Brucefield.

For some time he was head physician at Montreal General Hospital, and at the opening of the Royal Victoria Hospital became prominently identified with that institution.

DEATH OF DR. MINERVA M. GREENAWAY, TORONTO.

THE death, on Sept. 27th, at St. Michael's Hospital (where she had been for ten days suffering from a severe attack of typhoid fever), of Dr. Minerva M. Greenaway, removes one of the most accomplished and beloved lady doctors of the Dominion. The circumstances of her passing away are particularly sad, for it was only two weeks before that she returned to Toronto, after patiently nursing at her home in Tottenham her father and two sisters, who were suffering from the same disease, to which she herself succumbed, the father's illness proving fatal in spite of the careful attention of Dr. Greenaway.

The deceased lady was a graduate of the Women's Medical College in 1899, and took first-class honors at Trinity University. She afterwards took a post-graduate course for one year at a West Philadelphia Hospital. For the past five years she has carried on a successful practice in Toronto. Dr. Greenaway was a lecturer on the diseases of children at the Women's Medical College, Secretary of the Alumnae Association and lecturer to the nurses at the Orthopedic Hospital.

News of the Month.

THE NEW ONTARIO PROVINCIAL BOARD OF HEALTH.

THE composition of the new Provincial Board of Health was announced recently. It is as follows:—

Dr. Charles Sheard, Medical Health Officer of the city of Toronto, who, it is understood, will be chairman.

Dr. Milton I. Beeman, of Newburgh, who has acted as Medical Health Officer for various municipalities in his district.

Dr. John W. S. McCullough, of Alliston, one of the Board of Examiners of the Ontario Medical Council.

Dr. C. Bernard Coughlin, of Peterborough.

Dr. W. J. Robinson, of Guelph, Medical Health Officer of that city.

Dr. W. R. Hall, Medical Health Officer, of Chatham.

Dr. C. A. Hodgetts, the permanent secretary, will, of course, continue in that capacity with the new board. The term of the members—outside of the secretary—is three years. The board holds regular quarterly meetings and special meetings when occasion demands it. The old board passed out of existence on August 21 of this year, and none of its members were reappointed.

The American International Tuberculosis Congress.—

Notices have been sent to many physicians throughout the United States, and are appearing in the medical and public press regarding an "American International Tuberculosis Congress," to be held in New York City, November 14 to 16 next, and an association known as "The American Anti-Tuberculosis League," which is to meet in Atlantic City next June at the time of the meeting of the American Medical Association. It should be stated that the gathering in New York next November and the one in Atlantic City next June have no connection whatever with the International Congress on Tuberculosis, authorized at the last session in Paris in 1905, which will hold its meeting in Washington in 1908, under the auspices of the National Association for the Study and Prevention of Tuberculosis. (Prof. Adami, of Montreal, wishes it stated that he is not a member of this association, nor has he any connection with it.)

The Physician's Library.

A *Manual of Medicine*. By THOMAS KIRKPATRICK MONRO, M.A., M.D., Examiner to the Faculty of Physicians and Surgeons, Glasgow; Professor of Medicine in St. Mungo's College, etc., etc. Second Edition. 1906. London: Bailliere, Tindall & Cox. Canadian Agents: Carveth & Co. Price, \$4.00.

Monro's *Manual of Medicine* occupies a place between a short treatise and a large text-book. The matter is brought well up to date, is presented in a clever and forcible style, and is not choked up with too much detail. The present edition is handsomely gotten up, well bound, and covers the whole range of general medicine, including a very good section on diseases of the skin. Among the infectious diseases a short account of the diseases more common to the tropics is given, including Beri-Beri, Dengue, Weil's Disease, Yellow Fever, The Plague, Trypanosmiasis, etc. This chapter can be read in a very short time, and contains much that is instructive. The section on diseases of the nervous system is exceptionally complete and clearly written. The treatment of disease throughout is conservative, but due mention is made of all modern methods. The book would be very useful to students in the final years and young practitioners.

E. A. M'G.

Indications for Operation in Disease of the Internal Organs. By PROF. HERMANN SCHLESINGER, M.D., Extraordinary Professor of Medicine in the University of Vienna. Authorized English Translation by Keith W. Monsarrat, M.B., F.R.S.C., Ed. Surgeon to the Northern Hospital, Liverpool. Bristol: John Wright & Co. London: Simpkins, Marshall, Hamilton, Kent & Co., Limited. 1906.

The author of the book, Professor Schlesinger, University of Vienna, states, that he was induced to write it by the fact that practitioners have frequently expressed to him a desire to possess some concise work, which would serve as a guide in determining the necessity for surgical intervention in diseases of the internal organs. He has written, therefore, essentially for the practitioner. In Canada, and in the United States most regular physicians are general practitioners, so that this work should be useful particularly to men not in hospital practice, in order to enable them to form an independent opinion as to the advisability of an operation in a case of internal lesion.

The author treats the diseases of the various organs of the human body in 456 pages. In Appendix I, he gives the indications for the Induction of Premature Labor, pp. 459-472.

In Appendix II, he treats of Operations on Diabetics, pp. 473-476.

In Appendix III, he treats of the General Influence of Operations on the Body, pp. 477-490.

There is a full index, pp. 491-498. The English translation by Dr. Monsarret, Surgeon to the Northern Hospital, Liverpool, is well done.

J. J. C.

Anesthetics. A practical handbook, by J. BLUMFIELD, M.D. Cantab, Senior Anesthetist to St. George's Hospital, etc. London: Bailliere, Tindall & Cox, publishers. 1906.

This handbook, which belongs to the "Medical Monograph Series," edited by David Walsh, M.D., deals very tersely with the "Nature and Action of the Common Anesthetics. Their chemical properties, the physiological points involved, the respiratory embarrassment, the various stages incident to anesthesia, the apparatus to be used, position of patient, methods of administrations, the merits and demerits of the different anesthetics, in brief all the factors that any one giving an anesthetic should be thoroughly familiar with, are discussed in an intelligent, practical and scientific manner, by an expert anesthetist.

J. H.

The Health-Care of the Baby. A Handbook for Mothers and Nurses. By LOUIS FISCHER, M.D. Author of "Infant Feeding in Health and Disease," "A Text-book on Diseases of Infancy and Childhood," Attending Physician to the Willard Parker and Riverside Hospitals; Former Instructor in Diseases of Children at the New York Post Graduate Medical School and Hospital, etc., etc. New York and London: Funk & Wagnalls Company. 1906.

This book is full of common sense. It does not go into the subject very deeply, but it goes into it in a way that will result in health to those children who are fortunate enough to have nurses that are familiar with this writer. It is a book full of suggestions which will be a comfort to every nurse and mother, and while it does not interfere in any way with what is considered proper medical treatment, wherever it is studied it will relieve the medical man in attendance from a great many of those little worries, which are simply the result of neglect on his part to give directions about things that he naturally considers the nurse and mother should understand. Every nurse should study this book, and a vast number will benefit by it.

A. J. J.

Gastric Surgery. The Hunterian Lectures delivered before the Royal College of Surgeons of England. February 19th, 21st and 23rd, 1906: By HERBERT J. PATERSON, M.A., M.B., B.C. (Cantab), F.R.C.S. (Eng.). London: Bailliere, Tindall & Cox. Canadian Agents, J. A. Carveth & Co., Toronto, Ont. Price, \$2.00.

Considering the rapid strides made in this branch of surgery it was a happy thought that caused Mr. Paterson to choose the subject of Gastric Surgery for the Hunterian Lectures.

The literature of the subject has been carefully gone into and a number of useful tables showing results are given.

The writer is glad to see that Murphy's button is condemned thus: "And is an appliance, in my judgment, altogether out of place inside the abdomen."

Evidently the author has had no experience with McGrath's elastic ligature in gastro jejunostomy, for no mention is made that there even was such a method. Perhaps it is as well for, to the writer, it seems that some of the objections to the Murphy button might well be urged also against the elastic ligature.

As the technique of Gastric Surgery advances, we feel certain that mechanical contrivances such as these will become more and more things of the past.

F. N. G. S.

The Influence of the Mind on the Body. By PAUL DUBOIS, M.D., Professor in the University of Berne, author of "The Psychic Treatment of Nervous Diseases." Translated from the Fifth French Edition by L. B. Gallatin. New York and London: Funk & Wagnalls Company. 1906.

Dr. Dubois is so widely and favorably known as a specialist in the treatment of diseases of the nervous system, particularly through suggestion, that whatever he writes will be accepted without question. Dr. Dubois does not exaggerate the value of psychic suggestion nor does he magnify it unduly. The book is interesting, and may be read not only by the profession but by many of the laity with the best possible results.

A. J. J.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D. Assisted by H. R. M. Landis, M.D. Vol. III. September 1, 1906. Philadelphia and New York: Lea Brothers & Co. Six dollars per annum.

This volume is devoted to reviews of recent literature on diseases of the thorax, including the lungs, heart and blood vessels; dermatology and syphilis; obstetrics, and diseases of the nervous system.

Pulmonary tuberculosis receives a fair share of attention. The greatest progress has been made along the lines of hygiene and

prevention, while there is little that is new in the way of treatment. In hemorrhage from the lungs such drugs as the tannins, adrenalin, digitalis, ergot, and lead are not recommended, but preference is given to morphia and the deep injection into the subcutaneous tissues of one to two grains of calcium chloride.

Ringworm and syphilis are considered fully along with other subjects in dermatology. Considerable attention is given to the specific organism of syphilis—the spirochæta pallida.

The section on obstetrics is very full. There are ample reviews of the literature of the toxæmia of pregnancy, eclampsia and its treatment, artificial dilatation of the cervix, in obstetrics, caesarian section and kindred subjects.

Many interesting topics are found under diseases of the nervous system. Some of these are tumors of the brain, cerebral localization, meningitis and neuritis.

All the sections are good and they contain much that is valuable, but the one devoted to obstetrics is above the average, and is full of interest from the beginning to end.

A. E.

The Practical Medicine Series, comprising ten volumes, on the year's progress in Medicine and Surgery. Under the general Editorial charge of GUSTAVUS P. HEAD, M.D., Professor of Laryngology and Rhinology, Chicago Post Graduate Medical School. Volume II. "General Surgery," Edited by JOHN B. MURPHY, A.M., M.D., LL.D., Professor of Surgery in Rush Medical College (in affiliation with the University of Chicago).

As the mere mention of a large number of cases treated surgically, even when they are pretty fully described, does not seem to produce as good results or be as satisfactory to the reader as it is to have a smaller number of articles written by thoroughly good authorities explained in every detail, the writer evidently feels that in matters of detail of surgical practice, that is in technical procedures, the practitioner of to-day should be fairly well versed, and he appreciates the fact that surgery is not now a mere matter of routine but that better results after operation are demanded. He recommends, particularly in abdominal surgery, very early operation, and proves that the greatest achievement in life saving results are from limited manipulation and the performance of the operation at the time that the patient is most able to bear the shock well.

The book is a *resume* of what must be classed up-to-date procedure, but it is more than that, as many of the subjects treated of are so thoroughly gone into and considered from every standpoint that the reader must feel that he has at least learned something of value if he only reads two or three pages.

In Vol. III we have a book treating of all these subjects together.

although it is difficult to see, except from a practitioner's standpoint, why diseases which require a thorough knowledge of optics should be classed with those of the deeper passages of the throat and nose. Ocular symptoms, noticed more particularly with regard to general diseases, occupy a large place in this book, and in that way the book itself becomes of practical value. Treatment is well taken up, and considerable space is devoted to it. Altogether the general practitioner has in this book a large class of material in a very convenient form easily read, and embodying, as all the books of this series do, the best opinions. A. J. J.

Eczema. A Consideration of its Course, Diagnosis, and Treatment, embracing many points of Practical Importance, and containing 146 Prescriptions, illustrating Dosage in Local Applications. By SAMUEL HORTON BROWN, M.D., Assistant Dermatologist, Philadelphia Hospital; Dermatologist, Southern Dispensary; Assistant Dermatologist, University Hospital Dispensary, etc. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street. 1906.

This may be considered an exhaustive treatise on this troublesome disease. The characteristic of the whole book is its dogmatism. Facts are presented with a determination that carries conviction. In many books on diseases of the skin treatment is so generalized that it loses much of its value; in this, on the contrary, explicit treatment as to the care of the various cases is laid down so that the reader will have no difficulty in grasping every detail of treatment that the writer recommends. The general practitioner, or even the specialist on diseases of the skin, with this book to refer to should find his knowledge of treatment up to date. A. J. J.

The Ear and its Diseases. A text book for students and physicians. By SETH SCOTT BISHOP, B.S., M.D., LL.D. Illustrated with twenty-seven colored lithographs and two hundred additional illustrations. F. A. Davis Company, publishers, Philadelphia. 1906.

The author has found it desirable to write a separate work dealing with the ear alone. In his recent book on Disease of the Nose, Throat and Ear, the aural part was necessarily curtailed considerably. This book is the result of many years of practice, and contains those ideas which the author, as a teacher, considers essential for both students and practitioners. The anatomy of the ear is very freely and clearly given, and is splendidly illustrated.

A great deal of unnecessary space is given to the fitting up and use of compressed air in aural practice. Undoubtedly it is of value and of great convenience, but not of sufficient practical use to deserve two chapters of a book. Some of the illustrations do not seem

to be called for. We think the cuts showing arrangement for a treatment room, a mastoid operation, operating room and accessories and several showing mastoid scars months after the operation, might very well have been left out. On the other hand the illustrations of both sections are excellent. The appendix contains a large number of formulae which always add to the practical value of a book. The work will be found of great practical value to the student and general practitioner.

P. G. G.

A Manual of Bacteriology. By HERBERT U. WILLIAMS, M.D., Professor of Pathology and Bacteriology, Medical Department University of Buffalo. Revised by R. Meade Bolton, M.D., expert Bureau of Animal Industry, Washington, D.C. 4th edition, revised and enlarged. Blakiston's Son & Co., Philadelphia.

That a new edition of this work has been called for in two years' time speaks well for its popularity, when one considers the number of text-books on the market. This edition has been revised by Dr. R. Meade Bolton, and special chapters upon disinfectants and antiseptics, and upon the preparation of ligatures, etc., for surgical purposes, have been contributed by Drs. T. B. Carpenter and Marshall Clinton respectively. The revision has been thorough, and the work will be found well up to date. The chapters on Bacterial Poisons and Immunity will be found clearly written and complete.

The Medical Annual Synoptical Index to Remedies and Diseases.

For the six years 1899 to 1904. Bristol: John Wright & Co., Stone Bridge. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. New York: E. B. Treat & Co. Calcutta: Thacker, Spink & Co. Melbourne, Sydney, Adelaide and Brisbane: G. Robertson & Co. Sydney: Angus & Robertson. Toronto: J. A. Carveth & Co.

Readers of the *Medical Annual* will find this little work a useful key when it is desirable to refer to some special article in any of the volumes from 1899 to 1904. It is a handy book for the desk or to carry in one's satchel, as it contains most of the facts likely to be looked for in everyday practice. Suggestions as to the latest methods of treatment, the actual formula of prescriptions, etc., are dealt with in the text.

J. J. C.

A New Edition of Morris' Anatomy.—For the first time in the history of the book American anatomists have been asked to contribute original articles and revise sections in a new edition of Morris' "Anatomy." By thus incorporating the results of recent investigations in American laboratories the book will have more of an international character, have a wider point-of-view,

and be of greater use to teachers and students. Professor J. Playfair McMurrich, of the University of Michigan, has assumed the American editorship and will himself contribute two articles. This edition of Morris will be, to large extent, a new book, modern in detail of both text and illustration, and in every respect representative of progressive methods and thought. The following is a list of American teachers who have been prevailed upon to assume this onerous task: J. Playfair McMurrich, A.M., Ph.D., Professor of Anatomy, University of Michigan; Charles R. Bardenheer, A.B., M.D., Professor of Anatomy in the University of Wisconsin; Florence R. Sabin, B.S., M.D., Associate Professor of Anatomy in the Johns Hopkins University; Irving Hardesty, A.B., Ph.D., Assistant Professor of Anatomy, University of California; G. Carl Huber, M.D., Professor of Histology and Embryology in the University of Michigan; R. J. Terry, A.B., M.D., Professor of Anatomy, Washington University, St. Louis; Abram T. Kerr, B.S., M.D., Professor of Anatomy, Cornell University.

Lectures on Midwifery for Midwives. By A. B. CALDER, M.B., M.R.S.C. Lecturer on Midwifery to London County Council, to St. Mary's Midwifery Training School, Fulham, to St. Clement's Maternity Home, Fulham, London: Baillière, Tindall & Cox, etc., 8 Henrietta Street, Covent Garden. Dublin: 16 Lincoln Place. 1906. Canada agents, J. A. Carveth Co., Ltd., Toronto.

These lectures have been published just in the exact words they were delivered to the class thereby "not hiding the wood by the trees," as additional detail might have done. They have been divided into fifteen lectures, commencing with the anatomy and physiology, and include such important subjects as asepsis, sepsis, infant feeding, etc., all written in a most lucid style, and should prove invaluable to the class for which they are intended, viz., maternity nurses.

W. H. P.

A Text Book of Human Physiology, by DR. ROBERT TIGERSTEDT, Professor of Physiology, in the University of Helsingfors, Finland. Translated from the third German edition and edited by John R. Murlin, A.M., Ph. D. With an introduction by Prof. Graham Lusk, Ph.D., F.R.S. New York and London: D. Appleton & Co. 1906.

Tigerstedt's physiology was first published in 1897, and ever since it has been the favorite text book of German students. Prof. Murlin has now placed it within the reach of all English speaking students.

The opening chapter is an excellent introduction along the lines of general physiology. It gives a description of the biological processes that occur in the humbler forms of living things, and seeks to illustrate these by a general examination of the vital phenomena

of cells. While all the chapters in the book are full and complete, these treating on metabolism, circulation, and the central nervous system are unusually so.

The work contains 305 illustrations, 63 of them being in colors. Many of these illustrations are original, and all of them are good. Students of physiology will find this a very satisfactory text book, and we feel sure that the English translation will be a success.

A. E.

Some of H. K. Lewis' publications.—The following comprise some of the latest works published by the well-known firm of H. K. Lewis, Gower St., London, England. "The Theory and Practice of Medicine." By FREDERICK T. ROBERTS, M.D., B.Sc., F.R.C.P. "Medical Electricity:" A Practical Handbook for Students and Practitioners. By H. LEWIS JONES, M.A., M.D., F.R.C.P. "Diseases of the Skin; their Description, Pathology, Diagnosis and Treatment." By H. RADCLIFFE-CROCKER, M.D., Lond., F.R.C.P. "Clinical Bacteriology and Hæmatology for Practitioners." By W. D'ESTE EMERY, M.D., B.Sc. "Medical Electricity." By H. LEWIS JONES, M.A., M.D., F.R.C.P. "Hygiene and Public Health." By LOUIS C. PARKES, M.D., D.P.H. and HENRY R. KENWOOD, M.B., D.P.H., F.C.S. "Diseases of Women." By ARTHUR H. N. LEWERS, M.D., Lond., F.R.C.P. "Dental Surgery." By ASHLEY W. BARRETT, M.B., M.R.C.S., L.D.S.E. "A Manual of Ophthalmic Practice." By C. HIGGINS, F.R.C.S.

Surgery, Its Theory and Practice. By WILLIAM JOHNSON WALSHAM, F.R.C.S. England; M.B. and C.M. Aberdeen; formerly Surgeon and Lecturer on Surgery, St. Barts Hospital, and Member of the Court of Examiners, Royal College of Surgeons of England. Ninth Edition, with 620 illustrations, including 24 skiagram plates by Walter George Spencer, M.S., M.B. (Lond.), F.R.C.S. England; Surgeon and Lecturer on Surgery to the Westminster Hospital; Examiner in Surgery, University of London. London: J. & A. Churchill, 7 Great Marlborough Street. 1906. Canadian Agents: J. A. Carveth & Co., Ltd., Toronto.

It is just three years since the last edition of this book came from the printers. About that date Mr. Walsham's death took place, due in some measure, at least, to the hard and consistent work he had done in getting his volume revised. It speaks well for any book, no matter what its subject is, that in but nineteen years it has to be practically re-written no less than eight times. We find this edition to be thoroughly revised, and in many parts quite new. Over one hundred and twenty-five new illustrations have been added, including some very valuable skiagrams of fracture cases.

The Ship-Surgeon Handbook. By A. VAVASOUR ELDER, M.R.C.S., L.R.C.P., Surgeon, Orient Steam Navigation Co., late Surgeon, British-India Steam Navigation Co. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1906. (All rights reserved.)

A useful guide to the uninitiated medico who is contemplating a voyage as ship surgeon.

The small volumes is replete with hints from cover to cover. It also makes interesting reading for the "land" surgeon, as some of the situations depicted are most amusing.

The intending ship surgeon should certainly take it along.

W. H. P.

The Healers. By MAARTEN'S MAARTENS. Toronto: The Copp, Clark Company, Limited.

A strange story, morbid, humorous, possibly scientifically handled, but of course doctors differ nowadays. The eccentric old Professor of Bacteriology and his wonderful Semicolon Bacillus, his bright son, a pupil and follower of Charcot, his psychic daughter-in-law, and the patient, a titled fool, a poor imbecile boy, with several other characters wonderfully well drawn, form the personelles of a remarkable and very interesting tale; and yet one almost wonders why it was written. A discussion of this novel on some "off night" at a medical society meeting would prove diverting.

W. A. Y.

Phlebitis and Thrombosis. The Hunterian lectures delivered before the Royal College of Surgeons of England, in March, 1906. By WARRINGTON HAWARD, F.R.C.S., Eng. Hunterian Professor of Surgery and Pathology in the Royal College of Surgeons of England; consulting surgeon to St. George's Hospital; president of the Royal Medical and Chirurgical Society. London: Baillière, Tindall and Cox, 8 Henrietta Street, Covent Garden. 1906. (All rights reserved.) Canada agents: J. A. Carvet's Ltd., Toronto.

The Hunterian lectures this year comprise a scholastic summary of the recent scientific research and investigations in these most common yet subtle conditions. They form highly nutritious and satisfying mental food.

The lectures are divided into three. The first taking up the cause, process, and varieties of thrombosis. The second, treats of other special kinds of phlebitis and thrombosis as varix, gouty, syphilitic. The third tells of thrombi of cerebral, etc., sinuses, mesenteric veins, gastric, portal, etc., the remote effects and treatment of these conditions.

W. H. P.

Elements of General Chemistry with Experiments, by JOHN H. LONG, M.S., Sc. D., Professor of Chemistry in the North-Western University Medical School. Fourth edition. Revised and enlarged. Illustrated. Philadelphia: P. Blakiston's, Son & Co. 1906. Price \$1.50.

This is a handy little volume designed to meet the requirements of medical students and others in the first year of a college course. Most of the exercises are simple and the experiments are arranged so that they may be performed with the aid of comparatively simple apparatus.

The text matter is condensed, but at the same time it fully covers the course for beginners.

A. E.

LITERARY NOTE.

A distinction of no mean degree has been conferred upon an American book, the joint authorship of Drs. J. MADISON TAYLOR and WILLIAM H. WELLS. The revised second edition of their treatise on "Diseases of Children," published by P. Blakiston's Son & Co., of Philadelphia, has been translated into Italian by Dr. Mario Flamini, of the Pediatric Clinic of Rome, with contributions by Professor Concetti and Dr. Valagussa. The translation has proved very popular abroad, and the occasion is one of felicitation, not only to the authors but to American medicine generally, inasmuch as the work was chosen as being adapted to clinical teaching in Italy. Few American books have attained such honor. Its success abroad is but a repetition of the favor which it enjoys here.