An Address

ON

HIGH BLOOD PRESSURE:
ITS ASSOCIATIONS, ADVANTAGES, AND
DISADVANTAGES.

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by

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Life is correlated in every way with tension of a certain quality—with a force, a pressure that keeps the atoms whirling in organic circles. Lower, beyond a certain point, the pressure with which the blood flows in the medulla, changes the surface tension of the fluid in which a leucocyte swims, or an amoeba crawls, and the atoms of the man, of the leucocyte, and of the amoeba soon cease to swing in organic rhythm, and change to that to which all inorganic matter has been attuned since, in the words of Lucretius, "the atoms fell into such a disposition as those whereby our world of things created holds together."

Blood pressure—the force with which the blood circulates—maintains in organic activity every part of the body. With the five factors concerned in its maintenance I need not detain you. The heart pump supplies a force which the elastic coats of the large arteries store to convert an intermittent into a continuous stream. The small arteries act as sluices or taps regulating the supply to different parts. Over the capillary bed the nutritive fluid is distributed. And there is a drainage system of veins and lymph channels. Life depends on the maintenance of a due pressure in the irrigation fields, to the canals of which Galen first likened the blood vessels: "So it is with the animal body. Many canals dispersed through all its parts convey to them blood, as those of a garden convey moisture, and the intervals separating those canals are wonderfully disposed by Nature in such a way that they should neither lack a sufficient quantity
of blood for absorption, nor be overloaded at any time with an excessive supply.” On a huge scale, one sees this in a land like Egypt, the very life of which depends on the height of the pressure of water, whether in the annual rise of the Nile, or as it is dammed and stored artificially.

A man’s life may be said to be a gift of his blood pressure, just as Egypt is a gift of the Nile (Herodotus). It is interesting to see at first hand how this pressure is kept up in Egypt by the big dams at the Delta, at Assiut, at Esna, and the monster one at Assouan. When raised 15 ft., the last named will give life to another one and a half million acres of dead sand. Along the Nile big steam pumping stations keep certain canals and reservoirs full. For thousands of years, long before dams were built, the patient fellaheen have baled the water from level to level with a bucket at one end of a crossbeam, counterpoised with a weight at the other. Of the three forces which now keep Egypt watered, gravity, steam, and human muscle, the first is the most important. In the human irrigation scheme there is nothing to correspond with this—indeed, gravity in the circulation of all living things is a great obstacle, to overcome which the pump had, in animals at least, to be introduced. The man with the shadoof working on the banks of the Nile, the immediate agent in the old-fashioned plan of irrigation, represents rather the living capillary cell. And the Nile mud itself is alive, not alone in the magic potency which gave man his earliest civilization, but in plastic qualities which enable the fellaheen to build the dykes and dams with canals and rivulets, making every acre a miniature of Egypt itself. In the fields, as in the body, are schemes for distributing the vital fluid, for varying the pressure in different parts, and two all-important things are arranged—the final channels of distribution between the cotton rows or the corn are kept free from weeds and obstructions, and provision is made for drainage, for carrying off the surplus water, to prevent dropy of the soil.

The whole question of blood pressure is too vast for me to do more than touch upon two points essential to my purpose this evening. The smaller arteries act as stopcocks—taps which regulate the flow to the vascular areas according to requirements. Under the control of various stimuli—vasomotor, hormonal, physical, and postural—they are sluice-gates to be open or shut. The mean pressure in them depends less on the forces of the pump than on the distribution of the blood bulk, the state of the arterial walls, and the state of the capillary bed. So important is distribution that a person may bleed to death into his own vessels, splanchnic or systemic. Hold a hutch rabbit up by the ears, and so much blood accumulates in its splanchic reservoir that the pressure falls in the smaller arteries of other regions, and the animal dies. The average pressure in the various territories to be irrigated is regulated from the vasomotor centres, just as a man in charge of a big irrigation plant controls the sluices, often nowadays raising or lowering them by simply touching an
electric button. In man a mean arterial pressure is maintained—about 125 to 130 mm. of Hg, and 140 to 160 mm. in persons over 50. A permanent pressure above 160 mm. may be called high, but we must not forget the great regional variations pointed out by Leonard Findlay and others.

In the capillary lake into which the arterial stream widens the current slows and the pressure lessens, though on the latter point authorities are not agreed. There are probably great variations. The Nile, when in low water, takes ninety days to flow from Lake Victoria Nyanza to the sea. Between Gondokoro and Khartoum it passes through the great capillary lake known as the Sud, and more than one-half of the time—forty-six days—is taken to pass this short region. But when in flood it takes only fifty days from Lake Victoria Nyanza to the sea, twenty-eight of which are occupied in passing through the Sud. But it is not merely a matter of rate-flow and pressure in the capillary bed; there are two other factors of prime importance. In the brief fraction of a second, and in a short quarter to three-quarters of a millimetre of space, the business of life is transacted, for here is the market or exchange in which the raw and the manufactured articles from the intestinal and hepatic shops are spread out for sale. The endothelial capillary cell is not a simple dead membrane under the laws of diffusion, but has an active selective power. Playing the part of a middleman, it is everywhere a free trader in the bread stuff of life, oxygen, but a strong protectionist in certain commodities. Thus the renal capillary cell trades in water, salts, urea, and uric acid, but has a high tariff wall against proteins and sugars. In the secretory glands the selective capacity of the capillary wall must be of the first importance, as here the middleman and the retailer are cheek by jowl, and their shops abut, back to back, opening to different streets. These retail shops, represented by the gland and body cells of the capillary areas, do a roaring trade, partly in common commodities—water, oxygen, salts—and partly in special goods made up on the spot for the use of the body. Each cell, factory as well as shop, collects a great deal of dust and rubbish, and special provision is made for getting rid of this, part being dumped back into the common river, and part into a special lymphatic drainage system, which keeps the irrigation fields free from weeds and dirt. The transactions which take place between the middleman (the capillary cell), the factory and shop-people (in the gland or body cell), and the sanitary department (represented by the lymph circulation), are regulated in part by the laws of diffusion and osmosis, and partly by the cell specialists (enzymes of various sorts), some of which, for example, enable the liver cells to make bile, others to make glycogen. All this activity is associated with movement. The force taking the protein molecule through a capillary cell, through the furnace of a muscle cell to make it appear in the lymph space as sarcocolic acid and other organic compounds, is not simple osmosis;
but in its working currents caused by the machinery of the cell must set from blood to lymph stream. Though we know very little about it in the animal body, this *vis a fronte*, which Galen compared very aptly to a magnet, is not a negligible quantity. We know of its immense power in plants, and I believe botanists agree that the force which may lift water to a height of 500 feet or more in a tree is a *vis a fronte*, and not a *vis a tergo*. All this is preliminary to the main topic of my address, the associations, advantages, and disadvantages of a high blood pressure.

Some years ago I wrote a short paper with a somewhat paradoxical title: "The advantages of a trace of albumen and a few tube casts in the urine of men over 50 years of age." It was written with the specific object of allaying the unnecessary fears of physicians obsessed with the old idea that the presence of these bodies in the urine always indicated serious and progressive disease of the kidneys. This bogey has been to a large extent replaced by that of high blood pressure, a knowledge of which has filtered to the laity with the usual disastrous results. A good many people are unnecessarily alarmed, and much needless worry and anxiety has been caused. For example, a robust, full-blooded country girl was taken to a physician for some menstrual disturbance, and was told that her blood pressure was 140, and that the outlook for her was serious. The poor girl, very much depressed, regarded her condition as hopeless, particularly in so far as a married life was concerned. She was a strongly built, plethoric, muscular girl, who only needed the reassurance that with her physique such a pressure was as natural as one of 90 would be in a thin, pale delicate girl.

What are the conditions in which we see permanent high pressure, and what are its advantages and disadvantages? For practical purposes we may consider three groups of cases: Simple high tension, hyperpiesis, without signs of arterial or renal disease; arterio-sclerosis, with the associated high tension, renal, and heart changes; and chronic nephritis, with secondary high pressure, arterio-sclerosis, and heart changes.

I. Hyperpiesis.

Hyperpiesis signifies simple high pressure without signs of cardio-vascular disease. We have learnt to recognize an average pressure, as taken with ordinary instruments, and the figures given are usually accepted. There are, of course, great variations, usually temporary, but now and again we meet with individuals whose pressure is permanently high—above 180—without, so far as can be ascertained, arterial, cardiac, or renal disease. Of course the difficulty is to exclude internal, not discernible, alterations in the splanchnic and other vessels, since, as is well known, vascular disease may be very localized, but, clinically, the group, well defined and very important, has been carefully studied by Allbutt and others. We see the condition most often in men who work hard, drink hard, and smoke hard, particularly in keen business men with
heavy responsibilities, and we see it now and then in neurasthenic and gouty persons. Let me give a few illustrative cases:

A man just over 40 years of age, 13 st. 7 lb. in weight, of excellent family history and no syphilis, had lived a business life of the greatest possible intensity. Early successful, he began to speculate, and made and lost several fortunes, lived "high," as the saying is, smoked eight to ten cigars and several cigarettes in the day, took a dozen drinks of Scotch whisky, always champagne at dinner, and with it all found time for a moderate amount of exercise, chiefly riding. In short, he lived the "hustling" life of Wall Street. He regarded himself as "hard as nails," nothing could hurt him. The ill effects of the night disappeared with the morning cold bath. He was always ready for his breakfast, and sharp as a hawk for business at 9 o'clock in the morning. Suddenly one day, without warning, after a heavy dinner, he lost the power of speech, and for nearly three days was confused in his head and could not express himself intelligently. There was no paralysis of face or arm, and at the end of a week he was quite himself again. A trace of albumen and a few tube casts were found in the urine, and he had a blood pressure of 212. Of course this was a terrible shock. He gave up business, went to Carlsbad and various health resorts. I saw him just a year after the attack. He was still very apprehensive and worried, and had had a few attacks of pain about his heart after exertion. He was a big, healthy-looking man, of good colour and good physique. Careful examination showed no alteration in any of his viscera. The pulse was 80. Both the radials and temporals could be rolled under the finger, and the pulse could be felt just as well on the distal side of the pressure. Compressing a section of the radial at a distance of 2 in. apart, the intervening portion of the vessel full of blood felt firm, and could be readily rolled under the finger. If, however, with gentle pressure, the blood column was forced out of about 2 in. of the radial, its wall could not be felt or differentiated in any way from the tissues about it. The same held good for the temporal. With a similar experiment it was not easy to feel the wall of a brachial artery. The retinal arteries looked large and full, but they did not compress the veins specially. The apex beat was not outside the nipple line. The cardiac flatness was not increased, but there was a snapping, valvular aortic second sound. The systolic blood pressure was 235. No difference in the recumbent position and after exertion. The specific gravity of the urine was 1020, and at times there had been a slight trace of albumen. There was none when I first saw him. There were no tube casts.

Here was a man whose arteries, as far as one could make out, had not thickened palpably, certainly not beyond his age. His heart was not hypertrophied, but he had a very high blood pressure, and he had had one of those peculiar but not very uncommon attacks of aphasia in connexion with it.

It is interesting, sometimes distressing, to see a man of great vigour, in the prime of life, full of work and energy, in the first shock of the realization that he is a machine, with the works of which there is something radically wrong.

A fine strapping fellow of 48, a lawyer of distinction, and among his friends a boon companion, full of work, public and private, suddenly noticed a slight obscurity of vision. As he was going off for his holiday in Europe he consulted an ophthalmic friend, who told him he had retinal haemorrhages
and disease of his arteries. To a man who had never realized that his body was a mechanism it was a great shock to find himself “out of gear,” and as he said pathetically, “it did not seem the same world when I had to give up cigars, champagne and Scotch whisky, and pleasant evenings at the club.” I saw him in July, 1909, the picture of health, and with the frame of a prize-fighter, but self-centred, nervous, apprehensive, worrying all the time lest another blood vessel might break. He had had a permanent blood pressure above 220, records taken by a dozen different doctors, and he had copies of the analysis of his urine, and had provided himself with Theodore Janeway’s book.

It is not always possible to suggest the factors causing the high blood pressure. It may be met with unexpectedly and determined only by the apparatus; indeed one may feel a keen sense of disappointment that the educated finger should be so far astray. It may sometimes be the initial event in an inherited bias towards cardio-vascular mischief, without the occurrence of any of the usual factors.

I saw this year, with Dr. Lichfield of Pittsburgh, a healthy looking woman, aged 46, whose father, mother, several brothers, and a sister had died comparatively young of heart or arterial disease, and in whose family there was marked gout. She had herself been very healthy, except for occasional “nervous attacks.” She is stated to have had congenital syphilis. She had some pains in the muscles, rheumatic or gouty, and Dr. Lichfield was astonished to find that her blood pressure was above 200. She was a well nourished, healthy looking woman, without inetic stigmata. The peripheral arteries were nowhere sclerotic. The empty radial artery could not be felt. The temporals were not palpable. The heart impulse was not forcible, and the aortic second sound was not specially accentuated. To the touch I could not determine that the pressure was high in the peripheral arteries, but it was above 200 mm. The urine was of low specific gravity; no casts.

Where is the change in these cases? Not, so far as one can say, in the heart, not in the mains, not in the supply pipes, but to keep up a normal irrigation in the capillary beds there has to be a widespread increase of pressure in the smaller arteries. Where is the first link in the chain? In an altered condition of the vessels in the splanchnic area? In a toxæmia from the bowels? In an over-secretion of pressor substances by renals and adrenals? More likely the block is in the irrigation fields. If the director of a large irrigation plant found the pressure rising in the supply pipes of the third and fourth dimensions, and there was nothing wrong in the pump or the sluices, he would go directly to the fields to see if the channels were free, and to see that the drainage was proportionate to the supply. I believe that in these cases the primary mischief lies between the capillary cell and the lymph spaces, in the working area of the body—a row between the middle man, the manufacturers, and the sanitary authorities—a sort of general strike, to overcome which the Government has to intervene. Remember, as I mentioned, vegetable physiology teaches plainly that the vis a fronte is a powerful factor in the metabolism of the cell, and it may be disturbances in this sphere that necessitate, as a conservative action, an increase in the pressure
with which the blood flows in the supply pipes. Or there is a difficulty in clearing of ashes and cinder the furnaces which keep up the fires of life in every unit of the bodily frame. The engines are stoked for the Glasgow express on the London and North-Western Railway, but put to work shunting empty trucks in the station yard!

Cannon and others have shown that in emotional states there is an increase in the adrenal flow, and this is a factor which has to be considered in the high pressure of modern life. Understand one thing clearly—this high pressure is not itself the disease, but a compensatory, salutary state, if not for the man, at any rate for his circulation. That this is so, try to reduce it below a certain point. You may, for a time, but up it goes again, and the man only feels comfortable when you allow him to live at a certain high level. By diet, a change in the mode of life, etc., the pressure may be kept at a reasonable rate, but in my experience, never again does it fall to the normal. The first patient illustrates how difficult or impossible it may be to permanently keep down the blood pressure. He had been at spas for special treatment; he had taken nitrites and potassium iodide; he had had “high frequency” treatment and a special course of sterilization of his colon—but all of no avail, as the pressure kept up. As he had become morbidly apprehensive and self-centred, I urged him to resume his business, lead a rational life, and stop taking “cures.”

The disadvantages are: (1) Just such transient cerebral attacks as the first patient had, or headache, vertigo, flushings, or an anginal attack, or transient bouts of dyspnoea with palpitations. But more serious still is (2) the certainty that sooner or later sclerosis of the arteries will follow. And this brings me to the consideration of group II.

II. ARTERIO-SCLEROSIS WITH HIGH TENSION AND ASSOCIATED CARDIAC AND RENAL CHANGES.

There are two essential factors in arterio-sclerosis—the quality of the tubing and the way in which it is treated. The marvel is that any set of pipes could be constructed to stand the continuous strain to which for years the human blood vessels are subjected. To use a well-worn simile—very different qualities of rubber are used in the make up of our tubing, and longevity is very much a matter of its quality, whether good Para or not. There is, too, that curious and inexplicable element which brings such uncertainty into our calculations. Take two 1910 motor cars turned out from the same shops and by the same workmen and with the same parts. The one may give no trouble, the other may be half the time in the repair shops. Of a dozen blades of a Gillette safety razor, all identical in appearance and in fineness of edge, some may be used for weeks, even months; others may have to be cast aside in a few days. So it is with man and his blood vessels. The contract calls for from sixty to eighty years of usage. Some hold out well, and even after ninety
years are still fairly good, but the personal equation has always to be considered. The ordinary wear and tear of life may bring about arterial degeneration in a temperate man of 40 years; on the other hand, who has not seen lusty octogenarians with untouched hearts and arteries?

The commoner causes of arterio-sclerosis need not detain us, toxic agents, chiefly, exogenous or endogenous, some of them acting directly on the vessels, others by disturbing the circulation in the cell factories, calling for higher pressure in the supply pipes, and so leading indirectly to sclerosis.

I should like to refer to two other causes, one of which has a note of personal appeal. There is an old motto, "It is the pace that kills," and nothing is more certain than that the pace of modern life kills many prematurely through the complications of arterio-sclerosis. The keen, sharp business or professional man, year in, year out giving his engines no rest, leading a life of high pressure, though a teetotaller and temperate in his diet, and a non-smoker, may have so driven his machine that at 50 it is only fit to be scrapped. These tragedies of life are only too common among us. It is not only a great leader like William Pepper, who died an arterial death at 55, but we see it in the men who live the hard, unselfish lives of general practice. I have notes of at least a score of physicians wrecks before 50—men, too, who had enjoyed their work, untiring, unsparing of themselves and of their time—sensible fellows in everything but in the care of their machine. Some were victims of angina pectoris, some of myocarditis, others of progressive cardiac failure, many more of the complications of arterio-sclerosis—all of the high-pressure life too often nowadays the necessary accompaniment—the penalty—of success. And I think we must recognize another factor—prolonged overuse of the muscles. That athletes die early is well recognized, but it is not easy to determine always how far the cardiovascular changes are due to muscular effort alone. Take a not uncommon picture:

An exceedingly vigorous man, aged 50, spare, weighing only 10 st., with a good family and a good personal history. He had never had syphilis, but at 28 he had had a bad attack of typhoid fever. He had lived an out-of-door life, and had used his muscles incessantly in sports as a young man, at cricket and hunting, and when at college as a long-distance runner; no gout in his family. He had been a moderate user of alcohol and had smoked cigars and cigarettes, but not in excess. Four or five years ago he began to have headaches, which have bothered him at intervals ever since; but he has kept at work, has played tennis and golf, and it was only a few months ago that he consulted his doctor for the headaches. A very healthy-looking fellow, strong and muscular; his pulse was 80—the vessel rolled easily under the fingers. The pulse was recurrent, and there was practically no difference as one felt the vessel with the blood current in or when it was pressed out. The arteries were like whipcord. The temporals could be easily felt. The walls of the retinal arteries looked thick and they compressed the veins. The apex beat bulged the fifth interspace an inch and a half outside the nipple line—a strong, forcible, and visible beat, localized in the one interspace. The
shock of both sounds was palpable, and the shock of the aortic
second sound so intense that it could be heard six or seven
inches away from the chest wall. The first sound at the apex was
booming, a little murmuring. The urine had a specific gravity of
1020, and he did not pass an excessive amount; it showed a
few hyaline casts. The blood pressure was 212.

It is true the man had had typhoid fever, and a bad
attack, but the arterial changes of the acute infections
rarely take the form of a widespread sclerosis. I have
notes of cases of angina pectoris in comparatively young
men, not syphilitic, in whom the sole factor leading
to coronary artery degeneration was persistent over-
exertion.

As a rule men under 60 years of age with primary
arterio-sclerosis have high blood pressure, indeed the
highest known records are in this condition.

In this group of cases it is well to recognize that the
extra pressure is a necessity—as purely a mechanical
affair as in any great irrigation system with old encrusted
mains and weedy channels. Yet the victims are often
robust, energetic men of great vitality. Get it out of your
heads, if possible, that the high pressure is the primary
feature, and particularly the feature to treat. We tied up
one evening near a big pumping station on the Nile, and in
conversation the Scottish engineer in charge told me that
the two essential factors in maintaining uniformity in
irrigation were keeping the terminal channels free between
the rows of cane, and maintaining the drainage. Obstruc-
tion in the fields could be overcome by increasing the
pressure, to a certain point, but it was cheaper and safer
to clear out the weeds. The difficulty, I believe, is to
keep the human irrigation plant free from weeds, the sod
that chokes the capillary bed, through which it takes a
greater force to drive the fluids. We too often tinker at
the pump and the mains, instead of looking for the real
seat of trouble in the fields.

It is alarming to find that a patient may only be com-
fortable with a pressure about 200 mm., but, as a rule, do
not take too gloomy a view of the condition, which is often
not so bad as it looks. For years a man may enjoy good
health and do hard work with high-pressure, whipcord
arteries and a hypertrophied heart. Take warning,
prismists, from this story:

I saw on June 21st, 1901, a judge, aged 46, a man of good
habits, except that he had been a very heavy eater. He had
been very moderate in alcohol and tobacco, and had not had syphilis. He had taken a great deal of exercise, and had always
represented himself as in the pink of condition. A year before I
saw him he began to have a little shortness of breath, particu-
larly if he played too much golf or went uphill rapidly. He
consulted Dr. Delafield, who told him he had sclerosis of the
arteries and enlargement of the heart, and who urged him to
change his habits of life. He presented the usual picture—
markedly sclerotic arteries, very high blood pressure, a strong,
forcible apex beat 3 in. by measurement outside the nipple line.
The aortic second sound at the base was much accentuated. The
specific gravity of the urine was high; no albumen, no tube
casts. Now that did not look a very satisfactory condition in a
comparatively young man who had never had syphilis nor any serious infections. He was a sensible fellow—cut down the intake of fuel, lived an easy life, attended to his duties, and has got on very comfortably. He called on me last summer; unfortunately I was away, but a message on his card read: "Am feeling very fit!"

"Judgement is difficult," says Hippocrates; but I never knew a man with so marked hypertrophy of the left ventricle to have an extension of life even beyond that granted to Hezekiah. I do not think even the most optimistic would have given him five years; Nature gave him twenty.1

High tension is not always associated with arterio-sclerosis, though present in a large majority of all patients under 60. Normal or low pressures may occur in three conditions: (1) In elderly persons with extensive sclerosis of the aorta and its chief branches; (2) with a general failure of health and strength; and (3) in the late stages with the failing, dilated heart.

What is the condition of the kidneys in these cases? This important question is not always easy to decide. In many instances the urine presents no abnormalities. There may be a trace of albumen, particularly in the morning, and a few tube casts, but the output is up to the mark, and certainly patients may for years have extreme arterio-sclerosis without serious kidney disease. And post-mortem studies show this to be the case. With permanent high tension alone, or with high tension plus arterio-sclerosis, the kidneys have been found in a few cases practically normal. We must remember that no one at 50 has kidneys completely normal histologically. In the cases of chronic arterio-sclerosis which came to necropsy from my wards in the Johns Hopkins Hospital three types of kidneys were found.

1. The full-sized, hard, beefy organ, often with a smooth surface, sometimes with slight adhesion of the capsule, but an organ obviously not contracted. When I lived in Philadelphia a remarkable man was demonstrator of morbid anatomy at the university, and coroner's physician, the late Dr. Formad. He had had a rich experience in medico-legal cases. I remember he brought before us the results of the study of the kidneys in some 250 cases of sudden death in alcoholics—176 men and 74 women—the great majority of them above the middle period of life. Accurate figures were not given of the causes of death, but the interesting feature is that nearly all of these patients had somewhat enlarged, hard kidneys, frequently, too, of the rounded, sausage-like or pig-backed form. Emerson's analysis of our cases of patients dying with features of general arterio-sclerosis showed that in 60 per cent. the combined weight of the kidneys was above 300 grams. The general experience is that in a very considerable proportion of all middle-aged persons with arterio-sclerosis the kidneys are not contracted.

* Since giving this lecture, Dr. McCrae tells me of his death—the usual way, gradual heart failure, with the distressing mental symptoms so often seen.
2. The patchy arterio-sclerotic kidney, which presents atrophy of surface areas, or sometimes an extensive section of the end of one kidney, and everywhere showing the effects of irregular vascular sclerosis.

3. The small, red, granular kidney, the final outcome in a limited number of cases of renal arterio-sclerosis.

I need not dwell upon this side of the question further than to ask you to bear in mind that conditions of chronic hypertension and of advanced arterio-sclerosis may exist without serious interference with the renal function.

Many of these patients have been condemned as cases of incurable Bright's disease without full knowledge. Fully fifteen years ago I saw an old friend with slight swelling of the feet, cardiac weakness, retinal haemorrhages, traces of albumen in the urine, and tube casts. In a man of 60 who had worked very hard such a state certainly looked serious. He had stiff arteries and an accentuated aortic second sound. Though urged to retire, like a wise man he decided to slow the engines but to continue the voyage. I saw him a few weeks ago, now a man of 75, who meanwhile has travelled much, organized new departments of his work, and has been an active, though not a vigorous man. On and off his ankles have swollen and he has been short of breath on stairs and hills; but, like the ship in Kipling's Devil and the Deep Sea, with patched machinery he has been able to keep up an 8 to 10 knot rate. I was interested to examine him carefully, and found his blood pressure above 180; cardiac impulse outside the nipple line and diffuse; the pulse regular, moderately stiff vessels, a small amount of albumen with tube casts in the urine, and in one eye a fading retinal haemorrhage.

III. CHRONIC NEPHRITIS WITH ARTERIO-SCLEROSIS AND HIGH PRESSURE.

Only a man of brazen boldness will speak dogmatically on this last, long and much-discussed group. That hyperpiesis may lead to arterio-sclerosis, that arterio-sclerosis in turn may lead to sclerosis of the kidneys, that there are primary lesions of the kidney associated with fibrosis, which lead secondarily to high blood pressure, sclerosis of the arteries, and hypertrophy of the heart—these are points upon which most of us are agreed. Here, of the two important divisions—the chronic nephritis of the infections, and the nephritis of the intoxications, gout, lead, alcohol—the end-product in both may be the small, hard, contracted kidneys. In a large proportion of all cases there are associated gradually hypertension, arterio-sclerosis, and hypertrophy of the heart. To distinguish between the two sets of cases, the primary arterio-sclerotic and the primary nephritic, is not often difficult. In the infectious group the history is generally very distinct, the patients are younger, and they rarely have the general vigour of the arterio-sclerotic form. In the lead and gout toxemias one is rarely in doubt, though in the latter the etiology is often over-
looked. On the other hand, the urinary changes in both differ from the arterio-sclerotic form in the persistent low specific gravity, the lower nitrogen output, the more constant presence of albumen (though in slight amount) and the persistence of granular casts. The symptoms, too, are renal and cerebral in the nephritic group, cardiac in the arterio-sclerotic. Uraemic features, progressive pallor, headaches, and marked ocular changes are very much more common in the primary nephritic form, and the retinal changes are degenerative, not simply haemorrhagic. There are transitional stages, and the end of the arterio-sclerotic kidney may be small, red and granular. Intercurrent acute or subacute attacks of nephritis may at any time blur the picture. I have not infrequently been mistaken, led astray usually by the robustness of the patient, and forgetting that chronic interstitial nephritis leading to extreme contraction of the organ may be consistent with good health up to the very onset of fatal uraemic convulsions. In this nephritic class we see remarkable variations in the arterial tension, persistently high in some cases, in others quite moderate, though with extreme arterio-sclerosis and hypertrophy of the left ventricle. The hypertension, doubtless compensatory, and so far as it goes salutary, is caused possibly by increased discharge of pressor substance, and in any case is imperative in the irrigation fields of kidneys choked with débris and overgrown with the weeds of connective tissue growth. The disadvantages are obvious when the chronic hypertension leads to arterial degeneration and renders the patient liable to rupture of the cerebral vessels—a common mode of death in these cases. Careful study of the blood pressure is demanded in the form in which we see hypertensive crises associated with severe headache, often the precursor of uraemia or of transient aphasia with or without paralysis, attacks which a timely bleeding, or purge, or a sweat may ward off.

Lastly, a few words on the care of these cases. Differing as they do so much in etiology and symptoms, a thorough study of each patient is required. At the same time do not lay too much stress upon the hypertension, particularly in nervous patients. When the first intimation comes in the form of an angina, or of a cerebral attack, a man naturally becomes very apprehensive. Patients easily become hipped on the subject of blood pressure; one man had his records carefully charted for eighteen months, and talked like a lay Marcy on the various methods. I am not sure whether he was consoled or disappointed to be assured that it was a very good thing for him that his engines had kept up a pressure of about 180 mm.

I.

The first thing is to determine the nature of the case whether simple hypertension, arterio-sclerosis, or chronic nephritis, or all combined. In the case of the active, driving, business man, who has unconsciously damaged the machine, let him reduce the speed from the twenty-four knots of a Lusitania to the ten knots of the ocean tramp.
It is interesting to note that the worry and apprehension associated with the first shock of the discovery that something is wrong may cause loss of weight and with it reduction in the blood pressure. A man of 62, whose first indication of trouble was an attack of transient aphasia, lost 2 st. in weight in a year, and his blood pressure sank from 200 to 150. He has been better since he has taken a philosophical view of the situation, and his blood pressure has risen to 180.

II.

The second thing is to lessen the intake. We all eat too much, and in no age was the saying more true that “the platter kills more than the sword.” Time and again I have been impressed with this as a possible factor in obscure forms of hypertension and arterio-sclerosis in persons otherwise temperate. Largely a matter of habit, the amount of food taken should be just enough to keep the engines going at a steady speed. A diet of low protein content is best, and fairly large quantities of liquid should be taken.

III.

Thirdly, elimination should be promoted in every way, by making the action of the kidneys, bowels, and skin thoroughly efficient.

IV.

Fourthly, of drugs none are entirely satisfactory in chronic hypertension. Nitrites in various forms may be used, and are often of temporary benefit, but I think the general opinion now is that neither the nitrites nor potassium iodide are of permanent benefit; though now and again one meets with an instance in which the prolonged used of potassium iodide is followed by marked lowering of the pressure. A preparation of mistletoe has also been much lauded, but it, too, is very variable in its effects. Be careful in this point—if the patient does not feel so well, and begins to get thin and look badly, stop all drugs, trust to general measures, and let the pressure rise. In the robust man of full habit in the hypertensive crises with headaches, dyspnoea, or angina, a free venesection is indicated, to be followed by mercurial and saline purges.

The clinical picture which I have thus briefly sketched of chronic hypertension with its associations, advantages, and disadvantages, may not have all the outlines or full details which an artist with more pains and greater skill would put on his canvas, but it is a fair presentation of the subject as I have seen it, and you cannot expect more. The colours, necessarily a bit sombre, have been brightened when possible. And I believe Candide to be wrong—life at the best is not a bad bargain. Even the victim of high tension may find it useful and enjoyable if, following the rest of the moral, he will cultivate his garden—weeding the irrigation channels, and keeping free the drainage.
SPECIALISM IN THE GENERAL HOSPITAL.

By Sir William Osler, Bart.,

Regius Professor of Medicine, Oxford; Honorary Professor of Medicine, The Johns Hopkins University.
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It is not easy to put in words my appreciation of the honor [167] of delivering one of the formal addresses at the opening of this institute or to express my gratification at the inauguration of this new development in the Johns Hopkins Medical School. The pleasure is heightened by the thought that the generosity of an old and valued friend has made today possible. This hospital has already experienced the wise liberality of Mr. Henry Phipps, one of whose tuberculosis foundations, under its management, ranks as a model of its kind.

That, after nearly a quarter of a century, all those professionally concerned in the early working of the hospital are here to take part in this ceremony, is, for us at least, a happy circumstance. One man I should like to have seen with us, Francis T. King, the first president of the hospital, whose devotion to its interest and whose faith in its future were the stay and support of his declining years. Three of those closely connected with the early organization have passed away. Dr. John S. Billings was, from the first, the adviser of the board of trustees, the real designer of the hospital, and the friend to whom we all turned for advice. I know with what satisfaction he looked back on this part of a life great in achievements for the public and the profession.

No one of all that fine band of men with whom we were associated, Judge Dobbin, Judge Gwinn, Mr. Francis White, Mr. Lewis Hopkins, Mr. W. T. Dixon, Mr. G. W. Corner, Dr. Cary Thomas, Dr. Alan Smith, Judge Brown, Mr. James

* Remarks made at the opening of the Henry Phipps Psychiatric Clinic of The Johns Hopkins Hospital, April 16, 1913.
Cary, Mr. Joseph Elliott, Mr. C. Morton Stewart, would have appreciated to-day more keenly than Daniel C. Gilman, whose work in connection with the opening of the hospital must never be forgotten. He was a man with rare vision and one also who could drive the straight furrow, as the people of this state—of the country at large—well know. And how Isabel Hampton would have rejoiced to see this day— with its great opportunity to develop the special work so dear to her heart. How full of gratitude must be our first director, Dr. Hurd, to see the fruition of many years of strenuous, hopeful toil!

In 1889 this institution seemed to many the last word in hospital construction, and those of us who were fortunate enough to take charge of the departments felt that here was something to be lived up to, something in which our dreams could be realized. Only when in working order did we feel its incompleteness. We had no medical school, a big gap quickly filled by the generosity of Miss Garrett and her friends. Year by year saw new departments added, new lecture rooms, operating rooms, laboratories, additions to the out-patient departments, to the Nurses’ Home, and, by Mr. Marburg to the private wards; and hand in hand, an internal growth in efficiency, and an ever-widening sphere of influence, educational and philanthropic. Our ambition was to do for medicine what Mr. Gilman and his faculties of the university were doing in arts and science, and at a pace hard to follow. The race was not an easy one, but fortunately there were close bonds between the two training stables, and we had the advantage of the prestige of their 13 years of brilliant success.

Only a few impressions of life endure. We use the same cylinders over and over again, the dots and markings become confused, and when we call for a record, a jumbled medley is poured out, a confused message from the past. But certain records are time-fast, and bite in such a way that no subsequent impressions can blur the clearness, and the story comes out fresh and sharp. So it is when I call up those early years so full of happiness, so full of hope. And to have seen in so many ways the fulfillment of our heart’s desire is more than we could have expected, more indeed than we deserved.
I am sorry for you young men of this generation. You will do great things, you will have great victories, and, standing on our shoulders you will see far, but you can never have our sensations. To have lived through a revolution, to have seen a new birth of science, a new dispensation of health, reorganized medical schools, remodeled hospitals, a new outlook for humanity, is not given to every generation.

By temperament a dreamer, wherever I have worked, visions of the future have beset me, sometimes to my comfort, more often to my despair. In desolate days I have wandered with Don Quixote, tilting at windmills; in happier ones I have had the rare good fortune to dream dreams through the gate of horn, and to see their realization, to have both the vision from Pisgah and the crossing of Jordan. I have seen the school at which I began in Toronto, in an old building, dirty beyond belief, transformed into one of the most flourishing on the continent, a staff of seven teachers increased sevenfold; my alma mater, McGill, prosperous even then in men of mettle, but housed in wretched quarters, now in palatial buildings, and in affiliation with two of the best equipped of modern hospitals. How paltry were my aspirations of those days! How insignificant do they seem. My feelings when Sir Donald Smith, now Lord Strathcona, gave us the first endowment of $50,000, could not be stirred to the same intensity to-day by less than a million! Nearly 30 years have passed since I joined the University of Pennsylvania, the premier school of the country. There were new buildings, and a new hospital grouped about a single arts building. But what a transformation since! Whole squares of West Philadelphia annexed and covered with laboratories, dormitories and lecture halls and largely due to the magic energy of a prince of dreamers, William Pepper.

It has been my lot to see others do what I should have liked to do myself, and to feel that it has been better done! Looking back over a somewhat vagrant career, my fission from an academic body has always been a stimulus, and has invariably quickened the pace of progress. And this thought was a consolation when I left this comfortable billet, a few years ago. Among the scanty seeds scattered in my peaceful valedictory
only those in which I ventured into the dangerous region of prophecy appear to have fallen on good ground.

I spoke of the needs of special departments—hoping that within 25 years we should have a psychiatric institute, a children's hospital, a genito-urinary clinic and a special building for diseases of the eye, ear and throat. Two of these are already accomplished facts—the Harriet Lane Johnston Children's Department, has been opened; to-day we open the Phipps Psychiatric Institute, and for the new genito-urinary clinic, that money has been furnished through the liberality of Mr. James Buchanan Brady. Others will follow rapidly, and it is safe to say that within a dozen years there will be as many special departments, semi-independent units in a great organization. The occasion seems fitted for the expression of a few thoughts on specialism in the general hospital.

The work of the units is identical; each a place where rich and poor receive the best skilled help that the profession can command; each a place where students are taught; each a center of study and research. Let us consider briefly these three functions. Similar in diversity, each unit in organization, in aims, and in methods, is a replica of the other. Each represents a technical school linked to the university by the medical faculty of which, by Mr. Hopkins' will, this hospital was to form a part. They differ from the more purely scientific departments of the medical school in one important particular. The hospital units mint, for current use in the community, the gold wrought by the miners of science. This is their first function.

A mother to-day brings her child to Dr. Harry Thomas, at the neurological department, a poor dwarfed, idiotic creature, but all the same very dear to her heart. It is a far cry from the little laboratory where Schiff made his immortal experiments, and literally thousands of workers in the mines of science have slaved years to find the pure gold, handed out freely from this hospital to that poor woman, with which salvation was wrought for her poor child. It seems so easy now. "Ah, a cretin. How interesting! How old do you say? Eight? Why, she looks three. All right, do not worry, the
child will get well quick; get these powders. Yes, three times a day!"

An anxious mother, whose son goes to Manila next week, brings him to Dr. Barker in the private ward for an antityphoid inoculation. Again a far cry from Zurich, where Klebs—so often a pioneer—first saw the typhoid bacillus. Again, a host of miners and a vast store of gold—golden knowledge, with which, would they but use it, people of the country could redeem from certain death thousands of their sons and daughters.

The two incidents I have mentioned illustrate what is going on in every unit of a hospital today. Take another—that street brawl last night. "Yes, he was shot through the abdomen." "A dozen wounds in the bowels, you say? Hum! What a job! Must have taken you a long time—doing well, of course." "Oh, yes, we got him early—they all do well now!" Who would have believed such a story in my student days? Again, the pure gold dug out by the elder Gross, Lister, Halsted and thousands of miners, minted in the laboratories and handed out, Mr. President, to the public last night by your surgeons.

We sit over the fire in the evening and pile on the coal without a thought of the dark and dangerous lives of the poor miners who risk so much for so little. It distresses my soul to think that we have done so little for the miners of science, and it does not lessen my distress to know that very often they do not give a thought to us. That coal put on the grate last evening—do you think the Hungarian in West Virginia thought how comfortable you would be over the fire? No! Nor did Schiff realize that his work would be utilized to brighten the hopes of thousands of mothers or that he was following a lode richer for humanity than the Golden Fleece. Only a cold-hearted, apathetic, phlegmatic, batrachian, white-livered generation, with blood congealed in the cold storage of commercialism, could not recognize the enormous debt which we owe to these self-sacrificing miners of science; and yet there are to-day sons of Belial, brothers of Schimei, daughters of Jezebel, direct descendants of the Scribes, Phari-
sees and hypocrites in the time of Christ, who malign these prophets and wise men, winners in a fight for humanity unparalleled in the annals of the race.

The perfect physical form in man or woman is much more sought than found. The perfect mental form is even more rare. The best to hope for in the average man, from nature and nurture, is to have a right judgment in all things. In how few of us is this consummation reached! One philosopher made the comforting remark that "Every man has a sane spot somewhere." Burton, in his survey of humanity in the famous Anatomy of Melancholy concludes that the whole world is mad, and needs a journey to Anticyra, (where the best hellebore, a specific against madness, was grown).

There should be, Mr. President, no lack of candidates for help from the unit we open to-day. Many a man goes to his physician now for an overhauling of his machinery. I found a big West Virginian in the private ward one morning. The history was colorless. I went over him thoroughly. "There is nothing the matter with you," I said. "I did not say there was," came the reply, "that is what I wanted to know."

We are all a bit sensitive on the subject of our mental health, but a yearly stocktaking of psychic and moral states, under the skilled supervision of Professor Meyer, would be most helpful to most of us.

Mr. J. A tendency to irritability of temper.
Mrs. R. Too much given to introspection.
Miss B. Over-anxious about her soul.
Master G. Worried by a neurasthenic mother.

These would be some of the headings in the diagnosis slips. But the Institute will have enough to do—meeting a demand for the early treatment of borderland and acute cases.

The progress in the rational treatment of insanity is a bright chapter in the history of the past century. The story recently told by Dr. Hurd, of the changes in this country within forty years, is full of encouragement. The larger staff, the skilled assistants, the scientific study of the cases has become a rule and this community has had the benefit of the up-to-date methods of the Sheppard-Pratt Hospital, and has
seen with pride the rapid development of the work of the state institutions. New methods of treatment will be tested, every advance in technique controlled, and to new theories will be applied the touchstone of science. A wide diffusion of its benefits should take place through the nurses who will pass through the institute. The discreet, even-balanced, thoroughly trained mental nurse will be a great boon in general practice, and she will have a sociological value amid the widespread activities that have been aroused in connection with mental hygiene.

That the medical student is an essential factor in the life of a great general hospital, has been of slow recognition in this country. Admitted to the dispensaries, welcomed in the amphitheater, he has been, until recently, rigidly excluded from the wards, except as a casual attendant on ward classes. I am glad to say that from the day he leaves the medical school laboratories, he is in this hospital a co-worker with doctors and nurses, in every one of its activities, and as his right, not as a privilege grudgingly granted by the trustees.

And so it should be in all general hospitals. Every unit must be so organized as to make him fit in as part of its machinery. It is his business to know disease, and for the sake of the public, every possible opportunity should be given to him. I would even throw open the private wards, that the clinical clerks and surgical dressers might see the vagaries of sick life in all classes of society. In the palmy days of Rome, the physician was followed to the houses of the wealthy by his pupils—a practice we could emulate in our private wards—limiting, of course, the numbers, and selecting the cases.

But with the medical student there is a real difficulty, expressed 25 centuries ago by the Father of Medicine, in the famous aphorism "Life is short; the art is long". The stay of the medical student in the hospital is so brief, the amount to be learned so vast, that we can only hope to give him two things—method (technique) and such elementary knowledge as how to examine patients, the life history of a few great diseases and the great principles of surgical practice. He cannot be expected in the short period of the curriculum to go
the circle of the units, spending time enough in each to master the chief details of a dozen specialties.

In most schools, a system of elective studies has been arranged to meet this really pressing and serious condition, which has grown in acuteness with the multiplication of the specialties? How can an institute like this touch the medical curriculum? At many points, directly and indirectly. The very existence in a general hospital indicates the recognition of psychiatry as part of its legitimate work. One of the tragedies of the subject has been a dissociation from centers of active professional and university life. A department of medicine, with the closest affiliation with the life of the community, has been segregated and stamped with a taboo of a peculiarly offensive character. Here it will take its proper place—a unit in the work of the medical school of a university.

This, in itself, will be a lesson to the student. A new atmosphere will be diffused, a new group of energies and activities will come into the hospital, which cannot but be helpful. The director, his staff, and the nurses will play a new rôle, which will greatly enhance the reputation of the old company. Living as he does in such close fellowship with the staff of the hospital, the medical student will be influenced in this way by the very presence of the institute.

It is to be hoped too, time may be found for general instruction of the senior class in the elements of neuro-psychology, and with the elective system, an active group of students be found to whom this study will appeal strongly. But after all as practical men, we have to face the Hippocratic aphorism—the art is getting longer and longer, the brain of the medical student, not getting bigger and bigger, has its limits; and though keener and more industrious than ever in history, the time is too short for a man already burdened to the breaking point, to study any specialty from the standpoint of the specialist.

To a large outside body, this institute should cater with extraordinary benefit. There must be a thousand or more assistants in the asylums of the country, whose pineal glands are not yet crystallized, and who should find here inspiration
and help. Amid isolated and depressing surroundings, these men do yeoman work in the profession. From the director and his staff, they will receive that warm and encouraging sympathy, the very leaven of life, a quality which has been the inspiration of the benefactions of the founder of this institute. And I hope room and plenty of it will be found for the general practitioner, through whom more than any other group, the benefits of this institute may be distributed. He needs enlightenment, instruction and encouragement—enlightenment as to the vast importance of early deviations from normal mental states, instruction in new methods of diagnosis, and treatment and encouragement to feel that in the great fight for sanity in the community he is the man behind the guns.

A larger outlook is connected with the third function of a hospital unit. The old Greek, with his quick sense of helpfulness, always asked about a work: "Does it make life a better thing?" and Prof. Gilbert Murray remarks that one who wished to give the greatest praise to the Athenians said, "They strove to make gentle the life of the world." The American, the modern Greek—mentally if not orally—always asks the same practical question; sometimes, in the case of pure science, when it is both foolish and fruitless. But he may ask legitimately how such an institute as this may be helpful in studying lapses and freaks of the human mind—I cannot give the answer. "It is not in the book I learned out of," as the children say. I could tell you in internal medicine, and could refer you to the long list of studies in dysentery, malaria, typhoid fever, pneumonia, heart diseases and blood diseases that have come from the medical unit. But a psychopathic unit is a novelty in a general hospital, designed for the study as well as for the cure of mental aberrations.

We talk a great deal about the human mind, and, when cornered, quote Hamlet to cover an unpleasant ignorance of its true nature. The modern student, like the ancient, takes his stand either with Plato and compares the mind and brain to a player with his musical instrument, or with Lucretius to a musical box wound up for so many years to play so many
tunes. Authorities lean to one or other of these views, and I have a shrewd suspicion that some of our distinguished visitors, great representatives in this specialty, do not see eye to eye in this matter. Three things we do know, departures from normal states are extraordinarily common—they are the most distressing of all human ills—they should be studied systematically by experts, with a view to their prevention and cure.

When Dean Swift left the little wealth he had to found a house for fools and mad, he could not forego the pleasure of adding the satiric touch: "No nation needed it so much." This idea, was not, I am sure, in the large heart of Mr. Phipps; but a wide-spread feeling has arisen in this country that the hygiene of the mind is just as important as the hygiene of the body—that we must return to the Greek ideal of the fair mind in the fair body. How beautifully Plato visualizes the day (in a passage I am never tired of quoting)—"When our youth will dwell in a land of health amid fair sights and sounds and receive good in everything; and beauty, the effluence of fair works, shall flow into the eye and ear like a health-giving breeze from a purer region, and insensibly draw the soul from earliest years into likeness and sympathy with the beauty of reason." (Republic, Bk. II.)

What a revelation of an awakening in the community that it was possible to organize such a Congress of Mental Hygiene as was held here a few months ago under the auspices of the Medical-Chirurgical Faculty! The program itself was an inspiration. In this country, to recognize a wide-spread need is to meet it; and such gatherings held under auspices of the National Committee will go far to lessen the sad prevalence of early nervous breakdown.

What a philosopher said of the Melissians may be said of many people—they are not fools, but they do just the things that fools do, in the matter of training the young. Unfortunately, we cannot pick our parents, and still, as of old, our hearts give our hands, regardless of our heads. Dr. Mott will tell a tragic tale of heredity in relation to insanity. I am afraid several generations must pass before we see any practical results of the present active eugenic crusade, but there
is an immense and hopeful work to be done in educating parents in training-stable methods. An Ethiopian cannot change his skin, but a queen bee results from a change of diet. This institute, I am sure, will play its part in this national campaign of prevention of mental ill health through education—a campaign as important to the public, and just as worthy of support as the great struggles against tuberculosis and infant mortality.

It will be helpful too, to study in a sane, sober and sympathetic way, epidemics of mental, moral and even economic folly as they sweep over the country. The present opportunity should not be missed. With causes just as definite as small-pox or yellow-fever, they never occur under exactly the same conditions, but all have their basis in, and are mere specks upon, that fine old humanity that is ever fighting its way towards the light.

The present out-break has not been equaled since the capture of the Roman world by Oriental cults. The same old-fashioned credulity exists that enabled Mithras and Isis, Apolonius and Alexander to flourish then as the new cults do to-day—and for the same good reason. There is still potency in the protoplasm out of which arose in primitive man, magic, religion and medicine. Circe and Asculapius were probably twins! Historically our fringe of civilization is of yesterday, if we compare the six or seven thousand years of its record with the millions which must have passed since man assumed his present form on the earth. In this vast perspective Aristotle and Darwin are fellow-students; Hippocrates and Virchow are contemporaries.

Primitive views still prevail everywhere of man’s relation to the world and to the uncharted region about him. So recent is the control of the forces of nature that even in the most civilized countries man has not yet adjusted himself to the new conditions, and stands, only half awake, rubbing his eyes, outside of Eden. Still in the thaumaturgic state of mental development, ninety-nine per cent of our fellow creatures, when in trouble, sorrow or sickness, trust to charms, incantations and to the saints. Many a shrine has more followers than Pasteur; many a saint more believers than Lister. Less
than 20 years have passed since the last witch was burned in the British Isles!

Mentally the race is still in leading strings, and it has only been in the last brief epoch of its history that Esop and Lewis Carroll have spun yarns for its delight, and Lucian and Voltaire have chastized its follies. In the childhood of the world we cannot expect people yet to put away childish things. These, Mr. President, are some of the hopes which fill our hearts as we think of the future of this new department.

One word of appeal to the units. Members of a corporate body, successful life will depend upon the permeation by harmonics which correlate and control the functions. Isolation means organic inadequacy—each must work in sympathy and in union with the other and all for the benefit of the community—all toward what Bacon calls the lawful goal of the sciences, that human life be endowed with new discoveries and power.
Syphilis of the Liver with the Picture of Banti's Disease

BY

SIR WILLIAM OSLER, BT., M.D., F.R.S.

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Syphilis of the Liver with the Picture of Banti’s Disease.

By Sir William Osler, Bt., M.D., F.R.S.

From the tangled skein of splenic pathology we have for years been trying to unravel one definite thread, and it looks as if, at least, the attempt had been successful. There is now recognized a disease of splenic origin characterized by:—

(1) Progressive enlargement of the organ, lasting for many years, and not necessarily impairing the health.

(2) Anaemia of a secondary type, with leukopenia, which may come on acutely and recur at long intervals.

(3) A final stage, with cirrhosis of the liver, jaundice and ascites.

That permanent cure follows the removal of the organ, even in long-standing cases and after the jaundice has supervened, is a strong warrant for the belief that the primary lesion is in the spleen itself.

It is a serious difficulty that a motley group of maladies is associated with big spleen and anaemia. From the form just described, which may be called Banti’s disease, we have gradually separated off other conditions, such as splenomegaly with acholuric jaundice, splenomegaly of the Gaucher type, splenomegaly with primary pylethrombosis, and certain forms of tropical splenomegaly. Then in a few cases of chronic infectious endocarditis the early history suggests splenic anaemia. Parkes Weber has reported such a case with enlargement of the spleen, and a red blood count of 1,700,000 and a leucocyte count of 1,900. I have recorded a very similar one, in which the picture of the spleen and the low blood count led to the diagnosis at first of splenic anaemia.¹ No condition is more apt to cause confusion than splenomegaly associated with various forms of cirrhosis of the liver. Occasionally in the ordinary Laennec type the spleen is greatly enlarged, and the anaemia is pronounced. More than once I have been deceived by this picture.

¹ Interstate Med. Journ., St. Louis, 1912, xix, p. 103.
In this brief paper I wish to call attention to a group of cases of syphilis of the liver in which the splenomegaly and anaemia are so dominant that splenic anaemia or Banti's disease is diagnosed. The first case of this kind which I saw was in a girl, aged 22, admitted to my wards in November, 1890, with ascites. She had been a delicate child; had not walked until the fourth year. When aged about 15 she had an obscure illness with trouble in the abdomen, with which she was confined to bed for six months. Ever since the abdomen had been somewhat enlarged. For the past three years she had been fairly well. Her present illness dates from two weeks ago, when she had a chill, headache, and pain in the left side, with fever. She has been at work until two weeks ago.

Condition on admission: The patient was a small, delicately built, anaemic girl, with a very sallow facies. She sat up in bed; was unable to lie down on account of pain. The temperature was 103·5° F., the pulse 120, respirations 36. There was marked deformity of the chest, owing to a flattening of the right side from old disease. The left side of the chest was large and moved very freely. There was a marked curvature of the spine due to the old contraction, following the chronic pleurisy. The abdomen was distended, measuring 78 cm. at the level of the navel. The enlargement was not symmetrical, but was more marked in the left flank and in the hypochondrium. There was also a distinct protuberance in the right hypochondrium. The superficial veins were slightly enlarged. On palpation the abdomen was sensitive, particularly on the left side, and at the edge of the ribs there could be felt a firm mass, which extended nearly to the left inguinal region. Towards the right a sharp edge could be distinctly felt. It was movable on bimanual palpation. There was no question that this was an enlarged spleen. On the right side, occupying the epigastric and hypochondriac regions and the upper umbilical region, there was an irregular firm mass which extended a little below the level of the navel. The edge was rounded and hard. Deep in the right flank and apparently connected with it there were two smaller masses to be felt. These descended with inspiration, and they were thought to be in connexion with an enlarged liver. The inguinal glands were a little larger than normal, and were very firm. The epitrochlear glands were enlarged and firm; the glands in the neck and axilla were moderately enlarged, freely movable, and nowhere matted together. The blood count was:

2,234,000 reds per cubic centimetre, and a ratio of white to red of 1 to 25; haemoglobin 28 per cent. On November 14 the ratio of white to red was 1 to 16.

The temperature fell from 103° F. on November 11, and on November 14 was 99·5° F. She complained a great deal of shortness of breath, vomited, and seemed very ill. The urine was scanty, specific gravity 1020, contained a small amount of albumin and a few hyaline casts. The pulse became very rapid. On November 15 and 16 she had nausea and vomiting, became unconscious on November 16, and died early on the morning of November 17.

Autopsy (Dr. Councilman).—The external lymph glands were enlarged and hard. The peritoneal cavity contained 200 c.c. of slightly bloody fluid. The lower border of the spleen was 11 cm. from the ribs. The mesenteric and peritoneal lymph glands were moderately enlarged and hard. Both liver and spleen were surrounded by firm fibrous adhesions. The liver was brownish-yellow in colour, very tough and hard. It was divided into a number of nodular masses from the size of an apple to that of a filbert, some of them almost separated from the liver and only connected with it by a thin pedicle. The greater portion of the liver was made up of an enlarged left lobe. The right lobe was divided up by bands of connective tissue into the nodular masses already mentioned. On section of the liver there were large bands of connective tissue which traversed it in different directions, and from which smaller bands were given off. The largest of these bands ran between the right and left lobes. There were in addition fibrous gummata which projected from the capsule into the liver substance, and in these were hard necrotic areas. The portal vein was dilated to double its normal size. The spleen measured 23 cm. by 16 cm. The surface was covered by slight adhesions, but was otherwise normal. The surface of the section was firm, of a dark purple-red colour. Neither the trabeculae nor the Malpighian bodies were visible. The organ weighed 1,510 grm. The right lung was small and firmly bound down by old adhesions. In the lower part of the pleural cavity there was a cavity containing 70 c.c. of opaque, gritty, semi-fluid material.

The blood-picture was that of leukaemia. It was before the days of accurate differential counts. A very similar case has been reported by Hoche from von Jaksch's clinic1 in a girl, aged 20, admitted with

1 Berl. klin. Wochenschr., 1902, No. 16.
the clinical picture of splenic anaemia. With a progressive fall in the red corpuscles there was an increase in the leucocytes, which reached 58,400 per cubic centimetre—1 to 46 red. The autopsy showed syphilis of the liver.

A very similar picture may be present in acquired syphilis. On December 11, 1897, a man, aged 34, was admitted to the Johns Hopkins Hospital with an enormously enlarged irregular spleen, a red blood count of 1,400,000, leucocytes 7,500 per cubic millimetre. The patient had had syphilis, and three years ago had been in another hospital with jaundice and dropsy, both of which had gradually disappeared. For eighteen months he has noticed the gradual increase of a mass in the left side of the abdomen, and he has become anaemic. The spleen extended beyond the navel and below the level of the anterior superior spine of the ilium. It was freely movable, irregular in shape, the edges rounded, but notches could not be felt. The liver formed an irregular mass in the right hypochondrium, with rounded edges and fissured surface. The picture was very like that of the primary splenic anaemia, but the history and the condition of the liver left, I think, no doubt of the nature of the disease.

For the past four or five years there has been under observation at the Radcliffe Infirmary a boy who, at the time of his death, was aged 11. In 1906 and 1907 we had him in the ward for the examiners for the M.B. as a case of splenomegaly. We did not recognize the nature of the trouble until some three or four years ago, when he was admitted with nodes on the shins and syphilitic arthritis on the left knee. At this time the liver was slightly enlarged and a little irregular, but the blood count was practically normal. The father had died of obstruction of the bowels. The mother had lost several children, but there was nothing to suggest syphilis in the family. The spleen was very large, reaching to the right beyond the navel and below the anterior superior spine. It was smooth, not painful, and the notch could be felt. When first under observation the liver was enlarged and irregular, the left lobe easily palpable. Subsequently the liver decreased in size and the rounded irregular edge could at once be determined. His last admission was under Dr. Collier on Christmas Day, 1912. The following is an abstract of a long history:—

He looked fairly well. Red blood corpuscles, 5,770,000; leucocytes, 4,640; haemoglobin, 65 per cent. The spleen was about the same size as on previous admission, filling the greater part of the left half of the abdomen. The liver could not be felt in the middle line. In the nipple
line an ovoid, somewhat irregular, smooth tumour could be felt. The fingers could be placed beneath it and the under surface was distinctly irregular. In January the ascites came and increased rapidly, so that he had to be tapped. On February 15 he had bleeding from the gums; on February 23 a severe attack of vomiting of blood. The anæmia then became pronounced, the red blood corpuscles falling below 2,000,000, the ascites recurred, and he had to be tapped several times. On March 11 he had several large bloody stools. On March 12 he vomited twice in large amounts, the spleen became much reduced in size. There was a slight rise in temperature, and during the day he had to be tapped frequently. On February 24 he again had vomiting of blood, and he died on the night of February 27. The Wassermann reaction was negative.

The post-mortem, by Dr. A. G. Gibson, showed (1) the usual features of anæmia; (2) œsophageal varices, from one of which the bleeding had come; (3) a greatly enlarged spleen; and (4) a syphilitic liver, which presented very remarkable features. The left lobe was reduced to a thin flat band; the right lobe was reduced in size, much scarred, fissured, and cirrhotic, with many coarse bands dividing islands of greyish-yellow liver substance. The most interesting feature was the oval mass which was felt during life, as it was attached to the anterior portion of the right lobe, the capsule somewhat thickened; in section the surface was smooth and of a normal, red-brown colour, without a trace of cirrhosis, but there were several small gummata, from about 3 to 4 mm. in diameter. This was really the only normal portion of the organ.

The point which I wish to emphasize in this paper is that syphilis of the liver may present a picture clearly resembling Banti's disease, the splenomegaly, anæmia and hæmatemesis completely overshadowing the hepatic features. The spleen has been removed as in the case of splenic anæmia reported by Dr. S. Coupland.¹ Splenectomy was performed by Mr. Pearce Gould. Two year later the patient died with melæna, hæmatemesis and ascites. The post-mortem showed typically scarred syphilitic liver, with varicose veins in œsophagus and rectum.

An Introductory Address

ON

EXAMINATIONS, EXAMINERS, AND EXAMINEES

Delivered at the Opening of the Winter Session at St. George's Hospital Medical School on October 1, 1913

BY

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An Introductory Address

ON

EXAMINATIONS, EXAMINERS, AND EXAMINEES.

GENTLEMEN,—In every department of human knowledge men are asking guidance in the solution of a world-old problem—how to train the mind and heart and hands of the young. The past and the present are in the melting pot—the moulds are ready, and all await with eagerness the result of the casting, and none with greater eagerness than our own profession. For we are in a quandary. Naturally conservative, we are bewildered by the rapidity of a forced progress and change. There is a new outlook in every department—not alone in the fundamentals of science and in methods of practice, but in the relations of the profession to the public and to the State. The actual care of the sick, once our sole duty, is now supplemented by such a host of other activities, social, scientific, and administrative, that an ever-increasing number of our members have nothing to do with patients as such. But the chief difficulty is the extraordinary development in every subject of the curriculum—a new anatomy, a new physiology, a new pathology, new methods of practice, to say nothing of phenomenal changes in physics, chemistry, and biology. Everywhere increased complexity and mind-burdening terminology. What is the teacher to do? And more important, What can the poor student do, confronted with so much new knowledge and a Rabelaisian onomatopedia? How simple was a cell in the days of Schwann and of Schultze—nucleus, nucleolus, protoplasm, and cell membrane; to-day in one of the very briefest of recent descriptions I counted 40 new names, not one apparently superfluous. Turn to the index of a new treatise in embryology, to a work on immunity, or to a text-book on neurology, and you will appreciate the extraordinary complexity of the diet of the modern student. Even the titles of the journals startle, and to read unintelligently an article in the *Zeitschrift für Chemotherapie* or in the new archives dealing with immunity and metabolism requires a special education.

The truth is, we have outrun an educational system framed in simpler days and for simpler conditions. The pressure
comes hard enough upon the teacher, but far harder upon the taught, who suffer in a hundred different ways. To help you to realise this pressure and to suggest measures of relief are the objects of this address.

**Examinations and Their Relations to Education.**

What a student knows and what he can do—these are judged by examinations, oral, written, and practical. Tests of progress, tests on behalf of the public of fitness to follow certain callings, they have always loomed large in educational systems. At the best means to an end, at the worst the end itself, they may be the best part of an education or the worst—they may be its very essence or its ruin. Helpful if an integral part of the training, they may, and do, prove the intellectual ruin of many good men. Long practice as an examiner—year by year since 1875—in many subjects, in many methods, and in many places, an intimate relation with a large body of students, and a keen interest in medical education give me the assurance, if not of wisdom, at least of experience. Moreover, at the old universities survives a mediæval tradition of the omniscience of the professor, and with my brother Regius of Cambridge I enjoy the rare privilege of examining in every subject in the curriculum, from organic chemistry to obstetrics, a privilege with this advantage—it enables me to see the work of many examiners.

Regarding examinations, I have one question to ask—Are they in touch with our system of education? and one suggestion to make—That from the day he enters the school, in laboratory, class-room, and wards, the work of the student should count, and count largely, in the final estimate of his fitness.

**The Influence of Examinations on Medical Education.**

Apart from a general feeling of dissatisfaction with the present system, two things strongly suggest a negative answer to the first question. As a discipline of mind and memory examinations play a leading part in all educational schemes. How they may finally control and sterilise the mind of a nation may be read in the story of China. For this has come about, not from lack of brains, not from any failure to appreciate the value of learning, not from any defect in the system itself, which is more rigid and exacting than anything in Western life, but from the blighting influence of an education directed to a single end, the passing of examinations. To test an education by its practical results at the table is to sin against the spirit of the Greeks, who first taught the fundamental lesson that the pursuit of knowledge to be productive must be disinterested. Nothing is more fatal to a true intellectual training than a constant preoccupation with its practical results. To be of any value an education should prepare for life's
work. To train the senses for observation and the mind for reasoning, and to acquire a knowledge of the human machine and its disorders, a man spends five or more years at a medical school. Given a knowledge of the sciences on which it is based there is no more fascinating study, since medicine is the only one of the great professions engaging equally head and heart and hand. In its subject matter there is everything in its favour, and it is the easiest possible thing to carry out John Locke's primary canon in education—arouse an interest. With our present methods there is scarcely a subject which cannot be taught easily, and so many of them are practical, manipulative, and not at all difficult to acquire. To an inquisitive mind the study of medicine may become an absorbing passion full of fascinating problems, so many of which present a deep human interest. In the long category of man's conquests none are more brilliant than those with which a teacher of medicine can inspire his class. It is hard indeed to name a dry subject in the curriculum. And yet in an audience of medical students such a statement nowadays raises a smile. Why? Because we make the examination the end of education, not an accessory in its acquisition. The student is given early the impression that he is in the school to pass certain examinations, and I am afraid the society in which he moves grinds this impression into his soul. Ask at what he is working, and the student will answer for his first M.B. or his final. The atmosphere is Chinese, not Greek, and too often the one aim is to get through. We have become quite shameless about it, and practically admit a failure in our teaching when we advertise special tutorial classes for the different examinations, and consign a large proportion of our pupils to the tender care of "grinders"—and to no purpose! The spirit is taken out of instruction, and teacher and taught alike go down into the valley of Ezekiel—where they stay among the dry bones.

The Number of Rejections.

And a second circumstance proclaims loudly how out of touch are our tests with our teaching. The qualifying examinations of this country are well organised and admirably conducted, and, speaking by the book, I may say that nowhere is the knowledge that a man can use so freely tested in the laboratory and at the bedside. And it has been so for several generations, yet year by year the General Medical Council issues a report that gives any teacher food for serious thought, as it demonstrates, beyond peradventure, how completely out of touch he or the student, or both, has got with the examiner. A medical school is a human factory, turning out doctors as the finished product at the end of five years of careful preparation and fitting of the mental machinery. Failure is incidental to every human effort, and even the Rolls-Royce Company turns out cars from their shops that fail in the tests, but not many. But from our
shops, after five long years or even more, we send our medical motors to be tested for the road by the official experts, and nearly one-half are declared to be defective and sent back to the shops. Use and Wont, those "grey sisters," have so dulled the edge of this bitter experience that we have become accustomed to conditions nearly insupportable. Year by year for a generation the returns in the two great final subjects, the most attractive and the easiest to teach, show from 35 to 45 per cent. of rejections.

To the question much thoughtful attention has been given, and in the General Medical Council so far back as 1896 Mr. Pridgin Teale introduced a motion with the following preamble: "That the present system of accumulated examinations and the enormous increase in the number of rejections resulting from it are not only unjust to the student but damaging to medical education." Mr. Teale pleaded wisely and forcibly for a reduction of the examinations and for the substitution in certain subjects of certificates from the teachers and class examinations.

The Council reports show that the percentage of rejections at the final examinations has progressively risen from 12·4 in 1861 to 22·2 in 1876, to 34·8 in 1886, and to 41·9 in 1895. Mr. Teale, who quotes these figures, remarked that with the multiplication of examinations the more fatal do they become. The figures for the five years 1908 to 1912 show a continuation of the upward movement. Take the great final subjects, medicine and surgery, at the three Boards before which we may say the average student presents himself. I will put the collected figures as concisely as possible. The English Board: medicine—passed 1842, rejected 1135, percentage 38·12; surgery—passed 1821, rejected 1506, percentage 45·23. Scotland: medicine—passed 489, rejected 653, percentage 57·18; surgery—passed 492, rejected 731, percentage 59·77. Ireland: medicine—passed 322, rejected 231, percentage 41·77; surgery—passed 326, rejected 239, percentage 42·30. In the five years a total of 4572 students were examined at the Conjoint Boards of the three kingdoms in medicine, of whom 2019 were rejected, a percentage of 44·16. Of 5105 examined in surgery 2475 were rejected, a percentage of 48·43. Take for comparison the three universities—Edinburgh, Oxford, and Cambridge—for the five years ending 1912. At the Scotch capital there were 985 examined in medicine, of whom 267 were rejected, 27·10 per cent.; in surgery 974, of whom 317 were rejected, 31·52 per cent. In Oxford, where the three final subjects are taken together, it is impossible to say upon which subject a man came down, but in the final examination of 135 candidates 47 were rejected, a percentage of 34·81. At Cambridge during the five years, in medicine of a total number 519, 365 passed and 154 were rejected, a percentage of 29·67; and in surgery of a total 603, 233 were rejected, a percentage of 38·64.
There is not so much difference, you notice, between what may be called the pass men of the Conjoint Boards and the men entering the universities, and I do not believe there is any special difference in stringency between the Oxford and Cambridge examinations and those of the London Conjoint Board. There are two other examinations which the élite of the student body affect. How do they stand? All regret that in London only the select and the elect attempt to get the degree of their own University. And it is difficult! Twice in the past five years more students have failed than have passed the final subjects for the M.B. The total figures for the period are: of 1061 candidates examined 481 were rejected, a percentage of 41·01. And, lastly, to one other qualification, greatly prized, sought only by the very best men, the Olympic athletes of their classes, I will refer—the F.R.C.S. Eng. Consider, please, how carefully this group is trained—only the very best venture to compete, and they have a diet of which the intellectual calories are gauged with surpassing accuracy. There is no doubt they are our very best, the picked steeple-chasers of our stables. How do they fare? I am almost ashamed to read the figures. Your ears have tingled already, but only those hardened by familiarity will not be shocked at the demonstration of such a chasm between education and examination. Of 1186 men who have tried for the primary Fellowship examination of the Royal College of Surgeons during the past five years 821 were rejected, 69·45 per cent. Of 680 men at the final Fellowship examination 294 were rejected, 43·23 per cent. The high-water mark of examination fatality was reached in May, 1912, when of 118 candidates for the primary Fellowship only 31 were approved. These are picked men, our very best students, the most carefully prepared, who rarely attempt the trial without months of extra study and attendance upon grinding classes. Of the ploughed I have known personally, many seem to have been over-trained, others had spent their time in unprofitable original research; but all, passed and plucked alike, I maintain, are of the highest type of our students, whose calamities proclaim to the world the breakdown of our present educational system.

The failure is general all along the line and in all grades—at the licensing boards, at the older Universities of Oxford and Cambridge, at Dublin and Edinburgh, at South Kensington, and at Lincoln's Inn-fields; with singular uniformity all tell the same tale. There have been uneasiness and talk, but too much self-satisfied indifference, and even after the famous rout for the primary Fellowship in May last year I am told that satisfaction was expressed with the scope and method of the examination! Satisfactory to the examiners, perhaps, though I doubt it; but most unsatisfactory to the teachers, most painful to the students, and by no means a pleasure to the public as represented by the parents.
I venture to offer a few suggestions. First, by simplifying the curriculum to give the students more time. Allow the teachers a free hand in the matter of systematic lectures. Let them be reduced to a minimum or abolished altogether. One advantage they have—subjects may be dealt with which cannot possibly be illustrated in the wards. But such may be better presented in the "seminar" form, the senior students arranging the subjects among themselves under a skilled assistant. London students still have too many lectures in medicine and surgery to attend; Scotch students many more. I do not speak without experience when I say that the subject of medicine, for example, may be taught without the set lecture. The lecture has its value, a precious one from some lips—a Watson's or a Trousseau's; but its day has gone, to give place to other methods better adapted to modern conditions. Think of the saving of time if the lecture list was snipped in half, or if the lecture was limited to a few subjects, such as physiology and pathology, and if it were an offence for a senior student to be seen in a lecture-room!

Then let us boldly acknowledge the futility of attempting to teach all to all students. Burn the anatomical fetish to which we have sacrificed long enough, and to our great detriment. Just glance at "Cunningham's Anatomy"—1465 pages, many in small type, not one of which is without a water-jump for the first Grand National of the medical student. It is barbaric cruelty with so much ahead to burden the mind with minutiae which have only a Chinese value—a titanic test of memory. To schedule a minimum of the essentials should not be difficult, once the great principle is acknowledged that in all departments of the curriculum only a few subjects can be mastered thoroughly. I am afraid the secret of the tragic tale I have related lies in a quotation which Socrates made to Alcibiades:

Full many a thing he knew,  
But knew them all badly.

I acknowledge the difficulty of defining in different subjects a minimum of the essential, but it is not insuperable, and such schedules are issued in some universities.

Secondly, relief may be obtained by giving credit for work done throughout the course, changing the present system of "signing up" for one of reports by demonstrators and assistants on the character of the work done by each student. Let all who teach examine. Let education and examination go hand in hand. Let the day's work tell from the moment a student enters the school. Everyone from the junior demonstrator who supervises the student's first dissection to the professor—all should weigh while teaching. Day by day as I see John Smith in the wards, and read his notes, and watch his clinical work and discuss the features
of the patients, or as he narrates his case to the class about the bed and he and I have a Socratic dialogue, instruction and examination go hand in hand, and in such a way that at the end the formal tests should be but an amplification, an extension, and an inclusion of the scores of examinations which have been part of the routine of his life. Perhaps at present Utopian, this plan will be feasible in a new and reorganised generation; indeed, it is feasible now in self-contained universities. Once accept the principle that instruction and examination should go hand in hand and the difficulty is solved. The returns are automatically passed on to the head of the department. Yes, but someone will say, "Take the judgment of a group of young teachers? It is absurd!" Not a bit. They see more of the students, come into closer contact, and are better able to judge of the quality of their work than the professor, and much more than any outside examiner. According to the character of his work a student should acquire much or little merit, and should be able to take to the examination table enough to pass, or at any rate to make the final test in any subject pro forma. Where the classes are small, as in many of the provincial universities, this plan could be easily worked. I have had practical experience of it and came to the conclusion early that the judgment of the man who was fit to teach could be taken in estimating the progress of the student's education. And the system is being adopted. A few months ago I went into the beautiful clinical and pathological laboratory of the new Toronto General Hospital, and in one room I found an examination in pathology going on. The candidate had a set of cards in his hands, on each of which were written the details of the post-mortem examination he had made with a careful discussion of the case. Pass or pluck really depended on the cards a man held. He brought his marks with him—instruction and examination had gone hand in hand. I was delighted to hear from Professor MacKenzie that the system, introduced at McGill by my pupil and successor, the late much lamented Wyatt Johnston, had proved very successful in both Canadian schools.

Thirdly, simplify the examinations. Cut off some of the written papers. In the final subjects the long report on cases, the bedside viva, supplemented if need be by a special "oral," will give examiners the necessary knowledge of a candidate's mental outlook. If they will consider, not how much he knows, but how he knows what he knows, the long "written" is superfluous. As one watches a man handle a patient it is easy to tell whether or not he has had a proper training, and for this purpose 15 minutes at the bedside are worth three hours at the desk. We must substitute for the quantitative estimate the qualitative, and judge the student as much by manner as by matter.

Fourthly, when possible, evidence of original work should be substituted for examination. Think of the stimulus to British surgery if, in place of the Egyptian tyranny to which
our best students now slavishly bow, the President and Council of the Royal College of Surgeons selected for the Fellowship each year the 15 or 20 of the men under 30 who had distinguished themselves most highly in surgical research. It would change the mental attitude of the younger generation, instil the spirit of Hunter into its members, and prevent the paralysing mental sterility that overtake many good men who now spend precious plastic years in the dry drudgery of examination details.

Fifthly, compel no student to pass an examination twice in the same subject. At present brain and pocket alike suffer, and the burden could be lightened by a free reciprocity between the examining boards.

EXAMINERS AND THEIR DUTIES.

Men are usually very superior to the system in which they work, and so it is with examiners. After what has been said you may be disappointed not to hear a tirade against them; but I have had a singularly happy experience with my fellow inquisitors, whom I have found, as a rule, among "the mildest-mannered men that ever scuttled ships or cut throats." The two extreme types, the metallic and the molluscoid, illustrate inborn defects of character. The aggressive, harsh nature comes out strongly at the table, and the hard face, with its "what-the-devil-do-you-know" expression, sends a chill to the heart of the candidate, and it reaches his bone marrow when the first question relates, perhaps to a serious mistake in his paper. Imagine the mental state of a poor chap greeted with, "What did you mean by saying that the ciliary muscle is supplied by the pneumogastric nerve?" And the worst of it is that the metallic examiner may have no sense whatever of his failings, but is rather apt to pride himself on a keen appreciation of his duties. I remember a hard-faced inquisitor who took, so it seemed, the greatest pleasure in torturing his victims—dwelling with fiendish glee on all the small mistakes he could find, criticising the spelling, and ending on one occasion with the cheerful remark, "Mr. Jones, who taught you to write?" That evening, talking about examinations, I said in a joking way: "Judge Jeffreys, you are a heartless brute; I wonder some student has not assaulted you." He took it very much to heart, and I had a long letter about the great responsibility of the position and the rigid sense of duty he felt towards the University and the public. And the facial expression of the fellow examiner is not without importance, whether sympathetic, neutral, or antagonistic. One co-examiner always had a sardonic expression, a sort of Arian grin, plainly saying, "Well, you are a hopeless idiot!" The examination room may have the atmosphere of a cold storage chamber, and a student knows at once the type of man with whom he has to deal.

At the other extremity is the invertebrate examiner, so soft and slushy that he has not the heart to reject a man. It is
a variety not often met with in this country, but it exists. Sympathy with the student and a strong feeling for his position may completely overmaster the sense of duty to the university and to the public. A former colleague was made unhappy for days if he had to reject a candidate. For some years I sat on an examination board with an elderly professor, a man of great force of character and ability, who never gave a candidate less than 80 per cent. of the possible marks. In the case of the most hopeless duffers with 20, 30, or 40 per cent. in other subjects he would call out "pass." He was a great grief to me, as well as a mystery. At the last meeting which he attended as an examiner he tossed his book to me with a malicious smile. There were 116 candidates, not one of whom he had rejected, and not one of whom had less than 80 per cent.!

Between the metallic and the molluscoid is the large group of sensible examiners who try to put the candidate at his ease and to find out what he knows in a simple, sympathetic manner. But in any case the examiner is apt to take an unfair advantage of his position, and quite unconsciously. A specialist to whom the facts of his subject have become familiar and ingrained is apt to forget the years that have given the facility and the knowledge; and he may wonder when a man hesitates over an Argyll-Robertson pupil or mistakes a pericardial rub for an aortic insufficiency murmur. The most grievous mistake of the examiner is to regard the candidate as his mental equal and to expect from him knowledge of the same quality as that which he possesses, ignoring his long years of study and the short years into which the student has had to cram the knowledge of a dozen subjects.

Examining is often a heart-breaking task, with little to relieve the monotony of the long-drawn papers. It is distressing to meet with abysmal ignorance of elementary facts, and to realise with sorrow how many more minds are constructed as sieves than as sponges. But there are compensations, and who is there among us who does not appreciate Comte's statement that there were few more delightful experiences than the sweet and softened feeling when a young man's examination was thoroughly satisfactory? But it is much nicer to watch the gradual growth of a student's knowledge and to get it out retail day by day than to drag it out wholesale at set times. One thing is certain—the best we have should be devoted to our duties as examiners. Men should give their whole time to the business when at it. Much-engaged men should not be chosen, and to examine in the evening, after a hard day's work, is to handicap the candidates. We shall no doubt come to a time when professional examiners will be appointed by the General Medical Council to act as associates and assessors to the professors. That it is not a task lightly or inadvisedly undertaken the returns I have given indicate only too clearly. Not that we can lay at the
Doors of the examiners the responsibility for the lamentable state of affairs to which I have referred. No doubt there are unduly severe examinations, and there are examiners with hearts as hard as pieces of the nether millstone, but these are exceptions.

THE EXAMINEE AND HIS POSITION.

When quoting figures I purposely dealt chiefly with the results of the final examinations, and I am sure the feeling uppermost in your minds was one of sympathy with the hundreds of young men who, after five years of hard work, fail in ordinary tests, and this brings us to a brief consideration of the examinee and his position. In two respects he is an unfortunate victim. Of one I have already spoken—the enormous development in the subjects of the curriculum; and here, I am sure, lies his serious difficulty. It is the case of a quart measure and a pint pot. Intellectual dyspepsia from cramming is at the bottom of his trouble. It is like a diet of hot bread, which a man can stand at first, but, as Lowell says in the "Fable for Critics"—

By gradual steps he Is brought to death's door by a mental dyspepsy.

Another cause of the widespread rejections is defective preliminary education; but let me emphasise the fact that the percentages of rejections are nowhere higher than among the very best students—e.g., Cambridge men, among whom in some subjects more than 50 per cent. are rejected. I do not deny that much could be done to relieve the present stasis if all medical students began thoroughly trained in physics, chemistry, and biology. In this respect matters are improving year by year. And we should be more honest with the feeble ones, not fitted either by breeding or by pasture to pursue their studies, who should be asked early to withdraw. It is infinitely kinder to stop a man in his career than to allow him to struggle on painfully and submit to the humiliation of half a dozen or more rejections.

The conclusion of the matter is, the student needs more time for quiet study, fewer classes, fewer lectures, and, above all, the incubus of examinations should be lifted from his soul. To replace the Chinese by the Greek spirit would enable him to seek knowledge for itself, without a thought of the end, tested and taught day by day, the pupil and teacher working together on the same lines, only one a little ahead of the other. This is the ideal towards which we should move. The pity of it all is that we should have made an intolerable burden of the study of one of the most attractive of the professions, but the reform is in our own hands and should not be far off. A paragraph in an address of the late Dr. Stokes contains the pith of my remarks: "Let us emancipate the student, and give him time and opportunity for the cultivation of his mind, so that in his pupillage he shall not be a puppet in the hands of others, but rather a self-relying and reflecting being."
THE MEDICAL CLINIC: A RETROSPECT AND A FORECAST.

An Address
Delivered before the Abernethian Society, St. Bartholomew's Hospital, London, December 4th, 1913.

BY
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1914.
Unrest and change are the order of the day, and it may be taken as a good sign that the medical profession is bestirring itself about many problems, one of the most important of which relates to the future of our medical schools. Those who have followed the discussions of the past few years will have noticed that two diametrically opposite opinions have been expressed. On the one hand, there is a group thoroughly satisfied with existing conditions—and with themselves—the teaching was never better, the students never more contented, and any change could not but be for the worse. On the other hand, there are those who say that the existing conditions in our large hospitals are inadequate to meet the modern needs of student and of staff, that the teaching is defective, that the rejections at the examinations are shockingly high, that there is inadequate provision for research, and that an entire change is needed in the organization of the clinical departments of our medical schools.

Upon one point all are agreed—that in these islands during the past century an admirable system of teaching medicine and surgery has been evolved. I wish there were time to trace its historical growth; but the practical outcome is that the medical student, in his last years, lives and moves and has his being in the hospital. But with this there has been no internal development of the hospital at all commensurate with the growth of the science of medicine. The century-old custom prevails of a group of physicians and surgeons whose individual "services" are organized neither for teaching nor for research. On the Continent there has grown up a different system. In the medical schools there has gradually been organized separate clinics, each with a head, a graded staff, laboratories, and an organization resembling in every respect that of any other scientific department of the university. The burning question to-day is whether these systems cannot be combined, whether the Continental cannot be safely grafted on the English system. Practically in the large clinics of Paris the two have been combined for more than a century. The medical student is as much at home in the
Paris hospital as he is in the English, but there is not everywhere the complete organization of the German clinics. My address this evening is a small contribution to this problem, as perhaps I am the only English speaking teacher who has combined successfully both systems, and I am going to give you my personal experience. I would not bother any audience with it did I not feel that, at the present moment, it may have a certain value. Montaigne somewhere remarks that to talk about oneself cannot possibly be done without detriment to the person talked about, but you will overlook, I am sure, the necessary personal element in the story.

When I began clinical work in 1870, the Montreal General Hospital was an old coccus- and rat-ridden building, but with two valuable assets for the student—much acute disease and a group of keen teachers. Pneumonia, phthisis, sepsis and dysentery were rife. The "services" were not separated, and a man for three months looked after medical and surgical patients, jumbled together in the same wards. The physic of the men who were really surgeons was better than the surgery of the men who were really physicians, which is the best that can be said of a very bad arrangement. The talk of the teachers was of the Royal Infirmary of Edinburgh, or of Glasgow, of the Meath Hospital, of the Rotunda, and of Bart's, of Guy's, of St. Thomas's; and in a town four-fifths French the lights of Paris medicine burned brightly. Scottish and English methods prevailed, and we had to serve our time as dressers and clerks, and, indeed, in serious cases we very often at night took our share in the nursing. There were four first-rate teachers of medicine on the staff—Howard, Wright, MacCallum and Drake—three of whom had learned at first hand the great language of Graves and of Stokes. The bedside instruction was excellent and the clerking a serious business. I spent the greater part of the summer of 1871 at the hospital, and we had admirable out-patient clinics from Dr. Howard, and a small group worked in the wards under Dr. MacCallum. An excellent plan, copied from an old custom of the Lancet, was for the clinical clerk to report the cases of special interest under Hospital Practice in the local medical monthly. My first appearance in print is in the Canadian Medical and Surgical Journal, reporting cases from Dr. MacCallum's wards. Our teachers were men in whose busy lives in large general practice the hospital work was a pleasant and a profitable incident. A man like Palmer Howard got all that was possible out of the position, working hard at the hospital, studying the literature, writing excellent papers, and teaching with extraordinary care and accuracy; naturally such a man exercised a wide influence, lay and medical. I left the old General Hospital with a good deal of practical experience to my credit and with warm friends among the members of the staff.

In the summer of 1872 after a short Rundreise, Dublin, Glasgow, and Edinburgh, I settled at the Physiology
Laboratory, University College, with Professor Burdon-Sanderson, where I spent about fifteen months working at histology and physiology. At the hospital across the way I saw in full swing the admirable English system, with the ward work done by the student himself the essential feature. I was not a regular student of the hospital, but through the kind introduction of Dr. Burdon-Sanderson and of Dr. Charlton Bastian, an old family friend, I had many opportunities of seeing Jenner and Wilson Fox, and my notebooks contain many precepts of these model clinicians. From Ringer, Bastian, and Tilbury Fox, I learned, too, how attractive out-patient teaching could be made. Ringer I always felt missed his generation, and suffered from living in advance of it.

The autumn semester of the next year was spent in Berlin, where I had my first introduction to the medical clinic on a large scale. Professor Burdon-Sanderson had given me a letter to Frerichs, who very kindly assigned places in the arena of his clinic to Dr. (afterwards Sir) Stephen Mackenzie, and to Dr. (afterwards Sir) Charles Hutchinson, and myself. To Hoffmann, Riess and Ewald, his assistants, we were under obligation for many attentions. The other clinic of the Charité was in charge of Traube. The experience of the semester was invaluable. Systematically, day by day, the more important cases of the wards were shown, the symptoms, pathology, and treatment discussed at length. To each case a student was called, who was supposed to take charge of the examination and to answer questions. Sometimes this was serious for the student, though very often quite formal. He was supposed to keep himself informed of the progress of his patient day by day. I remember one morning Professor Frerichs called down a student who had had a case the day before, and he asked, "How is your patient this morning, Mr. Schmidt?" To which the reply, "Very well indeed, very well; he is much better than yesterday." To which the professor replied in his slow, quiet way, "Very well indeed; he died this morning; you will see what was the matter shortly."

The wealth of material in each department, the systematic arrangement of the clinic, the graded assistants, all men of experience working at the problems of disease, was a striking contrast to the small hospital service of the London clinician, with his single house-physician and absence of all laboratory accommodation. Traube made a great impression upon me as an ideal physiological clinician, and to the three volumes of his Gesammelte Beiträge I still turn for clinical information.

The first five months of 1874 I spent in Vienna attending the clinics of Hebra, Bamberger and Widerhoffer. In Bamberger I found another ideal clinician—accurate, painstaking, devoting the whole morning to his teaching and "rounds."

When I returned to Montreal in September, 1874, the Professor of the Institutes of Medicine had had to retire on account of heart disease, and instead of getting, as I
had hoped, a position as his demonstrator, the faculty appointed me lecturer with the ghastly task of delivering four systematic lectures a week for the winter session, from which period dates my ingrained hostility to this type of teaching. Four years in the post-mortem room of the general hospital, with clinical work during the smallpox epidemic, seemed to warrant the governors of the general hospital in appointing me, in 1878, full physician, over the heads—it seems scandalous to me now—of the assistant physicians. The day of the election I left (with my friend George Ross) for London to take my Membership of the College of Physicians and to work at clinical medicine. For three months we had a delightful experience. Murchison, whom I had seen before in 1873, was most kind, and I do not think we missed one of his hospital visits. He was a model bedside teacher—so clear in his expositions, so thorough and painstaking with the student. My old friend Luther Holden introduced us to Gee, in whom were combined the spirit of Hippocrates and the method of Sydenham. Fred. Roberts, at University College Hospital, showed us how physical diagnosis could be taught. We rarely missed a visit with Bastian and Ringer, and at Queen Square I began a long friendship with that brilliant ornament of British medicine, Gowers. With my old comrade Stephen Mackenzie we went to Sutton’s Sunday morning class at the London—his “Sunday School” as it was called—and we learned to have deep respect for his clinical and pathological skill. I mention these trivial details to indicate that before beginning work as clinic teacher I had at least seen some of the best men of the day.

In the summer session of 1879 I had my first clinical class. We worked together through Gee’s Auscultation and Percussion, and in the ward visit, physical diagnosis exercises, and in a clinical microscopy class the greater part of the morning was spent. I came across the other day the clinical notebook I had prepared for the students with a motto from Froude, “The knowledge which a man can use is the only real knowledge, the only knowledge which has life and growth in it, and converts itself into practical power. The rest hangs like dust about the brain, or dries like raindrops off the stones.” The next five years passed in teaching physiology and pathology in the winter session and clinical medicine in the summer. In 1884 I spent four months in Germany, chiefly at Leipzig, working at pathology with Weigert, and clinical medicine with Wagner, a model teacher who devoted the whole morning to hospital work, and whose clinic was splendidly arranged for post-graduate study. After a preliminary visit to the ward he would enter the amphitheatre with clock-like regularity, and day by day demonstrate the more important cases, always finishing the morning’s work with a visit to the post-mortem room.

This year I accepted the chair of clinical medicine in the University of Pennsylvania, Philadelphia, the premier medical school of the United States, founded in 1789 by
Morgan, Shippen, and Wistar, a group of men who had come strongly under the influence of John Hunter. The teaching of medicine was by lectures and the theatre clinic, which, with the large classes and short period of study, had become an important educational feature. In the hands of a man like William Pepper it resembled rather the larger French clinic, but all through it was an affair of the professor, who demonstrated three or four cases, and dwelt specially upon the diagnosis and treatment. Ward classes for physical diagnosis were in vogue, but clinical clerks were unknown and theoretical lectures occupied a large share of the student's time. The University Hospital and Blockley, the large city hospital, contained an abundance of clinical material which could be utilized for physical diagnosis and for general clinical instruction. I started a small clinical laboratory, which was in charge of Dr. George Dock, now Professor of Medicine in St. Louis. At the Infirmary for Nervous Diseases I became associated with that remarkable man, Dr. S. Weir Mitchell whose career illustrates how a great clinician may develop apart from academic influences or work. The pleasantest memories of five years' sojourn in the "Quaker city" are associated with my friendship with this modern Francesco Redi.

The opening of the Johns Hopkins Hospital in 1889 marked a new departure in medical education in the United States. It was not the hospital itself, as there were many larger and just as good; it was not the men appointed, as there were others quite as well qualified; it was the organization. For the first time in an English-speaking country a hospital was organized in units, each one in charge of a head or chief. The day after my appointment I had a telegram from Dr. Gilman, president of the university, who had been asked to open the hospital, to meet him at the Fifth Avenue Hotel, New York. He said to Dr. Welch and me: "I have asked you to come here as the manager is an old friend of mine, and we will spend a couple of days; there is no difference really between a hospital and a hotel." We saw everything arranged in departments, with responsible heads, and over all a director. "This," he said, "is really the hospital, and we shall model ours upon it. The clinical unit of a hospital is the exact counterpart of one of the subdivisions of any great hotel or department store."

Fortunately the university had not enough money at first to open the medical school, so that we had several years to wait, during which there was only post-graduate teaching, and we were able to complete our organization.

I am going to show you, illustrated by lantern slides, the method of work gradually adopted in the medical unit. But first let me say that we had the good sense to make a high standard for entrance to the school, either the B.A. or the B.Sc. Through the influence of Professor Newell Martin, to whom American biological science owes a deep debt, and Drs. Remsen and Welch, an
The admirable three years' preliminary course to medicine was offered by the university.

By the time the first class of medical students had reached the final stage the hospital was in very good working order. The medical unit consisted of about seventy beds (the number gradually increased to above one hundred), a large out-patient department, and a clinical laboratory close to the chief wards. In charge was the head, *ex officio* professor of medicine in the university, a resident staff of first, second, and third assistants (nominated by the professor), a fourth assistant in charge of the laboratory; and in addition four house physicians, appointed annually. The first assistant, a man of experience, remained for some years, and in the absence of the chief was in complete control of the department. He had rooms in the hospital and was paid £200 a year, half by the hospital, half by the university. All of the assistants were engaged in teaching and were paid. The appointments were for no fixed period, and during the sixteen years of my control there were only five first assistants, Dr. Laffleur, now Professor of Medicine at McGill, Dr. Thayer, Professor of Clinical Medicine at the Johns Hopkins Hospital, Dr. Futch, Associate Professor of Medicine at the Johns Hopkins Hospital, Dr. McCrae, Professor of Medicine at Jefferson College, Philadelphia, and Dr. Cole, at present Director of the hospital connected with the Rockefeller Institute. In each instance these men had lived as junior and senior assistants in the hospital for seven, eight, or more years. I had the good fortune to have in charge of the clinical laboratory for some years Dr. Emerson, now Professor of Medicine in the University of Indiana.

I have always felt that the success which followed this experiment—for such it was in hospital work in the United States, at any rate—was due to the type of men we had as senior assistants in the various departments. We chose the best that were to be had; the nomination was in the hands of the chief of the department; they were given responsibility, encouraged to teach, and to write, and their professional development was promoted in every way. An excellent plan, greatly favoured by the director of the hospital, Dr. Hurd, was to allow the senior assistants every couple of years a vacation of from four to six months to go abroad for study. The out-patient section of the medical unit was in charge of a separate staff, usually men who had been senior assistants and had gone into practice in the city. There were three; each took two days a week, and had his own staff of three or four assistants, and all were directly engaged in teaching. You may gather from this some idea of the size of a medical unit and of the number of men at work in it, at least twenty-three or twenty-four when I left the hospital. This may be said to be an impossible task for one man to control. Not at all; it is all a question of organization, of subdivision of labour, and of co-operation among workers, and the introduction into a department of modern business methods.
To come now to the actual work. The first duty in the unit is the care of the patient. For the sake of hospital managers I would like to make a statement. If one wishes patients well taken care of, their diseases thoroughly studied, and their treatment in every detail up to date, have medical students in the wards and outpatient departments. They represent the suprarenal extract of the body medical, maintaining the tonus and furnishing the working stimulus. A man's attitude towards his fellow-creatures is largely temperamental. If naturally devoid of the milk of human kindness, to assume a kindly interest in the sick is impossible. This was the meaning of that striking remark of Hippocrates that to a proper love of the profession must be joined a love for humanity—or words to that effect. In any ward visit one can see immediately the spirit in a hospital—whether patients are regarded as just so much material, or as our brethren deserving under all circumstances of every possible consideration and kindness. I have always felt that in this respect we can all take a lesson from our French colleagues, whose gentle courtesy towards their patients has always made a deep impression upon me. In the wards of the Bicêtre, or of the Salpêtrière, where congregate the very dregs of humanity, the greetings of the old men and women show how they feel that in their physician one friend at any rate is left.

The second great function of the clinic is concerned with teaching—assistants, students, nurses. One of the special advantages of an organization of this kind is the progressive training of a group of young men who take part in the work and are taught progressively, often unconsciously, how to teach.

The first assistant is the understudy of the chief, the second of the first, the third of the second, and any one at a moment's notice is able to take the duties of the other. If Professor Halstead was absent at any time or during his summer vacation, the first assistant did the operative work and had charge of the clinic. If I was away, my first assistant took my place, and did my day's work in the hospital. In this way a group of men are educated who are fit to take teaching positions, and a source of the most legitimate pride in a teacher is to have his old associates scattered over the country in responsible positions. The organization of the university clinic exists primarily for the training of the student, who has a right to demand systematic, thorough, and punctual instruction, enough to give a working knowledge of his profession. With students in a hospital as part of its machinery, and if you do not try to teach them too much or lecture them too much, in two years, given a thorough preliminary training, they should get a very fair knowledge of medicine and surgery.

JUNIOR CLINICAL CLASS.

We divided the classes into junior and senior, representing the third and fourth years. As our numbers were
limited we rarely had more than sixty to seventy in each. They were arranged in three groups in each year—medical, surgical, obstetrical and gynaecological—each of which spent about three months and a half in medicine and surgery and the rest of the time in obstetrics and gynaecology. Let us take first the junior class. A strong believer in the out-patient department for teaching purposes we utilized this almost exclusively for the junior students. The arrangement was as follows:

(a) Physical Diagnosis.

The three men in charge of the out-patients were demonstrators or associates in medicine, and responsible for the routine instruction in physical diagnosis. To each one a small group of students was assigned who day by day helped in the work and were taught practically physical diagnosis. As the school grew this teaching fell into the hands of experienced men such as Dr. Thayer, Dr. Futcher, and Dr. McCrae, and it was with special satisfaction that I saw the full development of this work. The out-patient department was arranged with suitable teaching rooms and a small laboratory. When the Phipps Tuberculosis Dispensary was opened as an annex, each member of the junior class passed through it in the routine of training. The out-patient room offers much the best opportunities for the beginner. He sees the sick man or the sick child as he is, and he can be taught much more satisfactorily how to take the histories provided that he has plenty of time, numerous instructors, plenty of patients, and ample accommodation. In medicine the work of a junior student was to get a knowledge of

Fig. 1.—Out-patient clinic.
disease and of its methods of recognition in the outpatient department. To supplement this, three times a week, at the close of the outpatient hours, was held—

(b) A Systematic Out-patient Clinic.

I used to call this an observation class, as its primary function was to train men in the use of their senses. My instruction to the assistants was "send in anything the men can see or handle." The picture (Fig. 1) shows the out-patient clinic at work in a room large enough to hold thirty men comfortably seated. Students were taken in routine, and by this next picture (Table I) it is seen how

<table>
<thead>
<tr>
<th>Date</th>
<th>Clerk</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 3</td>
<td>Riggins</td>
<td>Periostitis, luetic.</td>
</tr>
<tr>
<td>3</td>
<td>Oschner</td>
<td>Chlorosis.</td>
</tr>
<tr>
<td>10</td>
<td>Wright</td>
<td>Haemachromatosis.</td>
</tr>
<tr>
<td>10</td>
<td>Scholl</td>
<td>Enlarged liver, syphilitic.</td>
</tr>
<tr>
<td>12</td>
<td>Simpson</td>
<td>Cancer of stomach.</td>
</tr>
<tr>
<td>12</td>
<td>Steele</td>
<td>Lues, secondary.</td>
</tr>
<tr>
<td>12</td>
<td>Talant (Miss)</td>
<td>Tachycardia.</td>
</tr>
<tr>
<td>15</td>
<td>Silverberg</td>
<td>Aneurysm, carotid.</td>
</tr>
<tr>
<td>15</td>
<td>Wight</td>
<td>Angiomata, nasal haemorrhage.</td>
</tr>
<tr>
<td>15</td>
<td>Williams (Miss)</td>
<td>Dementia praecox.</td>
</tr>
<tr>
<td>15</td>
<td>Williams</td>
<td>Lues, secondary.</td>
</tr>
<tr>
<td>17</td>
<td>Arsdall</td>
<td>Phthisis.</td>
</tr>
<tr>
<td>17</td>
<td>Browne</td>
<td>Aneurysm, thoracic.</td>
</tr>
<tr>
<td>19</td>
<td>Auer</td>
<td>Haemoglobinuria.</td>
</tr>
<tr>
<td>19</td>
<td>Briggs</td>
<td>Thickened pleura.</td>
</tr>
<tr>
<td>22</td>
<td>Bruns</td>
<td>Epithelioma of lip.</td>
</tr>
<tr>
<td>22</td>
<td>Bryan</td>
<td>Acute pleural effusion.</td>
</tr>
<tr>
<td>24</td>
<td>Bush</td>
<td>Tuberculosis, pulmonary, pleural, and peritoneal.</td>
</tr>
<tr>
<td>24</td>
<td>Churchman</td>
<td>Malignant disease of oesophagus.</td>
</tr>
<tr>
<td>24</td>
<td>Clarke</td>
<td>Gout.</td>
</tr>
<tr>
<td>29</td>
<td>Cook</td>
<td>Pleurisy, tuberculous.</td>
</tr>
<tr>
<td>29</td>
<td>Coons</td>
<td>Tabes, mitral disease.</td>
</tr>
<tr>
<td>29</td>
<td>Dolley</td>
<td>Polypnoea, neurasthenia.</td>
</tr>
<tr>
<td>29</td>
<td>Duffy</td>
<td>Pulmonary tuberculosis.</td>
</tr>
</tbody>
</table>

the scheme worked. The clerk's name was put down, the name of the patient, and then the ward if he was admitted.
The clerk was expected "to keep track" of his case, and to report on it in a way that you will hear in a few minutes. Upon one strong conviction I have always tried to act—to make as far as possible the student participate in the teaching. The next picture (Table II) illustrates

**Table II.—1900–1901.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Subject</th>
<th>Read.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 6</td>
<td>Bryan</td>
<td>Pediculi and peliomata</td>
<td>x.14</td>
</tr>
<tr>
<td></td>
<td>Dohme</td>
<td>Method of healing of aneurysm</td>
<td>x.16</td>
</tr>
<tr>
<td></td>
<td>Bush</td>
<td>Fowler and Fowler’s solution</td>
<td>v. 8</td>
</tr>
<tr>
<td></td>
<td>Coons</td>
<td>Virchow’s original description of leukaemia</td>
<td>x.30</td>
</tr>
<tr>
<td></td>
<td>Duffy</td>
<td>Huntingdon’s paper on chronic chorea</td>
<td>x.20</td>
</tr>
<tr>
<td></td>
<td>Ferry</td>
<td>Lung stones</td>
<td>x.15</td>
</tr>
<tr>
<td></td>
<td>Frankenthal</td>
<td>Gastric ulcer at early age</td>
<td>x.25</td>
</tr>
<tr>
<td></td>
<td>Haynes (Miss)</td>
<td>Diagnosis of varieties of tapeworm</td>
<td>x.25</td>
</tr>
<tr>
<td></td>
<td>Hirshberg</td>
<td>Hippocrates’s description of phthisical chest</td>
<td>xi.12</td>
</tr>
<tr>
<td></td>
<td>Lehr</td>
<td>Bronchectasis, pathology of</td>
<td>xi.1</td>
</tr>
<tr>
<td></td>
<td>Reed</td>
<td>Round-up for October</td>
<td>xi.8</td>
</tr>
<tr>
<td>Nov. 13</td>
<td>Briggs</td>
<td>Argyria, smallest amount of nitrate of silver to cause,</td>
<td>xi.22</td>
</tr>
<tr>
<td></td>
<td>Williams (Miss)</td>
<td>First description of mitral stenosis</td>
<td>xi.22</td>
</tr>
<tr>
<td></td>
<td>Wright</td>
<td>History of Peruvian bark</td>
<td>ii.21</td>
</tr>
<tr>
<td></td>
<td>Bruns</td>
<td>Nerve changes in herpes zoster</td>
<td>xi.22</td>
</tr>
<tr>
<td></td>
<td>Clarke</td>
<td>Visible peristalsis in pregnant uterus and in distended bladder</td>
<td>xii.4</td>
</tr>
<tr>
<td></td>
<td>Cook</td>
<td>Analysis of lithia waters</td>
<td>xii.13</td>
</tr>
<tr>
<td></td>
<td>Dolley</td>
<td>Recovery of thyroid feeding</td>
<td>xii.11</td>
</tr>
<tr>
<td></td>
<td>Duffy</td>
<td>St. Vitus</td>
<td>xii.24</td>
</tr>
<tr>
<td></td>
<td>Ferry</td>
<td>Round-up for November</td>
<td>xii.5</td>
</tr>
<tr>
<td>Dec. 4</td>
<td>Frankenthal</td>
<td>Subcutaneous fibroid nodules</td>
<td>xii.6</td>
</tr>
<tr>
<td></td>
<td>Eving</td>
<td>Glycosuria in tuberculosis</td>
<td>xii.11</td>
</tr>
<tr>
<td></td>
<td>Glenny</td>
<td>Who first described the <strong>bruit de diable</strong></td>
<td>xii.13</td>
</tr>
<tr>
<td></td>
<td>Hardy</td>
<td>Weir Mitchell’s paper on post-hemiplegic movements</td>
<td>xii.20</td>
</tr>
<tr>
<td></td>
<td>Lootz (Miss)</td>
<td><strong>Re</strong> prognosis of diabetes in the young</td>
<td>i.3</td>
</tr>
<tr>
<td></td>
<td>Haviland</td>
<td>Acquired lues in congenital syphilis</td>
<td>i.8</td>
</tr>
<tr>
<td></td>
<td>Karsted</td>
<td>Necrosis in chrome workers</td>
<td>iii.7</td>
</tr>
<tr>
<td></td>
<td>Meisenhelder, J. E.</td>
<td>Round-up for December</td>
<td>i.5</td>
</tr>
</tbody>
</table>

how this was carried out. At the top of the list you see the words "pediculi" and "peliomata." A case had come in with this association. It is an interesting point, and Mr. Bryan, the student who happened to be called up, was
asked to report on the subject the next week. If you go
down the list you will see what a motley group of subjects
came under discussion. Take, for example, No. 3 on the
list, Fowler. I would ask: "Who is Dr. Fowler who
introduced Fowler's solution? Where was the article
published?" Of course, Mr. Bush had not the faintest
notion; but he was at once reassured when I told him that
I also did not know. Nor could he give an affirmative to
the next question: "Where will you look for it?" In
such cases they were always referred to the Index Catalogue
of the Surgeon-General's Library; sometimes to Neale's
Medical Digest, and if the books were not in our own
library they could be procured from the Surgeon-General's.
Two things were required from the student who presented
his report—brevity and lucidity—and, as far as possible,
men were encouraged to speak, not to read from a MS.
You see from the list how varied were the subjects pre-
presented during one semester. I got a great deal of in-
struction myself, we saw a great deal of valuable medical
literature, it did not take very much time, and it was a
great help in the education of the individual student.

On the table you will see at the end of each month the
word "round-up," which we took from a practice of the
Western cattle ranches. The last man called at the end
of each month had to report the next week on the cases
that had been before us during the month. In this way
we kept in touch with them, and at the end of the session
a complete report was presented by the eight or nine men
who had had the monthly round-ups. Table III shows the

**Table III.**

(Cases, 230; deaths, 15; mortality, 6.5 per cent.)

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific infectious diseases</td>
<td>61</td>
<td>6</td>
</tr>
<tr>
<td>Diseases of digestive system</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>Diseases of respiratory system</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>Diseases of circulatory system</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>Constitutional diseases</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Diseases of blood and ductless glands</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Diseases of kidney</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Diseases of nervous system</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Diseases due to animal and vegetable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parasites</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Diseases due to intoxications</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Anatomical and pathological curiosities</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

analysis of the session's work. You see that 230 cases were
presented in 1899-1900, and I pass round a typewritten
copy of the report which each student could procure.
It illustrates the wealth of material available for teaching
in the out-patient department of any large general hos-
pital. You will be impressed with that first item on the
list—61 cases of specific infections. It is a great advan-
tage to see these in the unwashed, unprepared condition
in which they present themselves at the hospital; and an
analysis such as you see in the next figures could only be
arranged by a great deal of co-operative work among the
TABLE IV.—Specific Infectious Diseases.

A. Malarial Infection (12 cases; 1 death).

<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Aestivo-autumnal</td>
<td>3</td>
</tr>
<tr>
<td>(b) Single and double tertian</td>
<td>9</td>
</tr>
<tr>
<td>October</td>
<td>5</td>
</tr>
<tr>
<td>November</td>
<td>3</td>
</tr>
<tr>
<td>December</td>
<td>2</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
</tr>
<tr>
<td>(11 cases; history of chills and fever during summer.)</td>
<td></td>
</tr>
<tr>
<td>April (tertian infection)</td>
<td>1</td>
</tr>
<tr>
<td>(No history of chills and fever during previous summer.)</td>
<td></td>
</tr>
</tbody>
</table>

B. Typhoid Fever and its Sequelae (5 cases).

<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Abortive typhoid (October and November)</td>
<td>2</td>
</tr>
<tr>
<td>(b) Obliteration of femoral vein (ten years' duration)</td>
<td>1</td>
</tr>
<tr>
<td>(c) Hemiplegia with athetosis (two years' duration, developed three weeks after attack)</td>
<td>1</td>
</tr>
<tr>
<td>(d) Peripheral neuritis (seen October, 1899, developed ataxia, at present greatly improved)</td>
<td>1</td>
</tr>
</tbody>
</table>

C. Sequelae of Diphtheria (4 cases).

<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Peripheral neuritis (all in children developing during or from two to four weeks after attack)</td>
<td>4</td>
</tr>
<tr>
<td>Pathological lesion—</td>
<td></td>
</tr>
<tr>
<td>(1) Paralysis of palate in</td>
<td>4</td>
</tr>
<tr>
<td>(2) Ptosis in</td>
<td>3</td>
</tr>
<tr>
<td>(3) Paralysis of iris in</td>
<td>1</td>
</tr>
<tr>
<td>(4) Paralysis of legs developing two weeks after paralysis of palate</td>
<td>1</td>
</tr>
<tr>
<td>(All made complete but slow recoveries.)</td>
<td></td>
</tr>
</tbody>
</table>

D. Pneumonia (1 case with extensive pleurisy) | 2 |

E. Varicella | 1 |

F. Parotitis | 1 |

G. Febricula | 1 |

H. Amoebic dysentery | 1 |

I. Gonorrhoeal Arthritis (five years' duration, girl 15) | 1 |

J. Syphilis (other than of the liver) | 15 |

<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Secondary (rash appearing five weeks to eight months after primary sore)</td>
<td>9</td>
</tr>
<tr>
<td>(b) Tertiary</td>
<td></td>
</tr>
<tr>
<td>(1) Perforation of palate</td>
<td>1</td>
</tr>
<tr>
<td>(2) Periostitis</td>
<td>1</td>
</tr>
<tr>
<td>(3) Arthritis</td>
<td>1</td>
</tr>
<tr>
<td>(All in women 25 to 40 years.)</td>
<td>0</td>
</tr>
<tr>
<td>(4) Gumma of scalp</td>
<td>1</td>
</tr>
<tr>
<td>(c) Congenital</td>
<td>2</td>
</tr>
<tr>
<td>(1) Girl, 18</td>
<td></td>
</tr>
<tr>
<td>(2) Negro child, 3 months.</td>
<td></td>
</tr>
</tbody>
</table>

K. Tuberculosis |

<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Pulmonary</td>
<td>15</td>
</tr>
<tr>
<td>(12 men, 3 women, about equally divided between negroes and whites. 10 under 3 years, 5 over 30 years, greatest number between 20 and 30 years.)</td>
<td>0</td>
</tr>
<tr>
<td>(b) Peritonitis</td>
<td>1</td>
</tr>
<tr>
<td>(c) Ulcer of lip</td>
<td>1</td>
</tr>
<tr>
<td>(d) Lupus (5 years' duration)</td>
<td>1</td>
</tr>
</tbody>
</table>
students. Table IV, a page of the report, shows the analysis of the cases of specific infectious diseases. Of course such a rich group of interesting cases could only be obtained through the keen co-operation of assistants always on the look-out after suitable cases to show at this third-year clinic. For the teacher himself this type of class is ideal, only it must be thoroughly practical, theoretical discussions must be tabooed, and the student
must do as much work as possible. It is an ideal way in
which to begin the study, as the young men are encouraged
to look up the literature, and to visit their own cases
whether in the homes or in the wards, and it gives good
men an opportunity to show what they could do in the
way of presenting the reports.

(c) The Clinical Laboratory.

The young medical student needs above all things
method and technique, and to be trained early in the use
of instruments of precision. In the physiological and
pathological classes he becomes adept in the use of the
microscope, etc., and when he comes to the hospital side
he should have opportunities to apply this knowledge in
the study of disease. He may get this haphazard, doing
work in the out-patient rooms and in the wards, but it is very
much better to have well-organized instruction extending
throughout the entire session. In the scheme which we
followed each student had his place in the laboratory with
a microscope, always a good one, rented to him by the
school for £1 a year. Here three afternoons a week through-
out the entire session the junior class had routine instruc-
tion in clinical laboratory methods. The next two pictures
(Figs. 2 and 3) represent the class at work. How much
really good work may be done in classes of this sort may
be gathered from Emerson’s Manual for the Clinical
Laboratory, which is largely based on material collected
by the students. I was fortunate to have in charge of the
laboratory such men as Lazier (who sacrificed his life in
the yellow fever investigations), Camac, Emerson, and
Cole.

In a laboratory of this type the student feels at home,
with his own apparatus and reagents; here he can do his
private work, always in reach of skilled assistance, and in
a scientific atmosphere, as researches were always in
progress.

The junior clinical student had plenty to do, with
physical diagnosis classes, the routine work of the out-
patient department, the tri-weekly out-patient clinics, and
three afternoons weekly in the clinical laboratory. He
had one other class—

(d) The General Clinic.

The general clinic, which both the juniors and the
seniors attended, and of the organization of which I will
speak in a few minutes. You notice that the work of the
junior student was almost exclusively in the out-patient
department. There are those, I know, who feel that
instruction may be better given to him in the wards, and
that, as a senior, he appreciates more the out-patient
department, but if the out-patient work is suitably
arranged, and if teaching is made a predominant feature,
there are many advantages in confining the work of the
juniors to this section of the hospital. Of course, there is
no objection whatever to the teaching of physical diagnosis
in the wards, but one has to consider the patients.
SENIOR CLINICAL CLASS.

In the three chief subjects the men were assigned for work in the wards as clinical clerks or surgical dressers in groups of 20 to 25.

(a) Ward Work.

Each morning until 12 o'clock was free for it; the ward visit was made at 9 o'clock sharp. The number of beds assigned to each clerk varied—five, six, or eight, or even more. Under the direction of the house-physician, the clerk took the history and worked up the case, doing himself the various analyses. For this purpose each clinical clerk had to have his own microscope, rented from the school, and his own place with the reagents, etc., in the clinical laboratory. The ward visit was on the plan with which you are so familiar. I show you a couple of pictures (Figs. 4 and 5) which illustrate its disadvantage—namely, the crowding round the bed—and in the next figures (Figs. 6 and 7) you may see the professor dictating a note or listening to a student making a report. Of a new case the clerk was encouraged to give orally a summary, not to read a full elaborate history. In this
way he was again made to help with the teaching, and, in fact, he was encouraged to do as much of the talking as possible. The Socratic dialogue is the ideal bedside

Fig. 6.—Ward visit.

method, in which long harangues are out of place, and, after all, the priceless value of the system is not in the tongue of the teacher, but in the daily routine of personal

Fig. 7.—Ward visit.
contact with the patient, who is really the teacher. The assistants shared the ward work with me, and on alternate days, when I had the out-patient clinic, they made the visit with the clinical clerks.

Fig. 8.—Theatre teaching.

Fig. 9.—Theatre teaching.

(b) The General Clinic.

There are several methods of conducting what may be called the theatre clinic of a hospital. In the German method a series of cases is usually presented, on which the professor gives a more or less elaborate lecture. In
France, from the days of Corvisart, the ward visit has been the feature, after which the teacher lectures, usually without the cases before him, on special affections. Sometimes these lectures are extraordinarily complicated. I heard D'Enlafoy lecture three successive Saturdays on the same case.

I utilized the theatre clinic largely to present to both the junior and senior students the general work of the wards. These next two pictures (Figs. 8 and 9) illustrate the theatre and the method of teaching. As far as possible we followed the seasons and their acute diseases; typhoid fever and malaria in the early autumn, then pneumonia as the winter progressed. Special emphasis was always laid on the more common affections. The clinical clerk described the main features of the case, if possible without his notes, talking, as I always insisted, to the back benches. This, again, was for a definite purpose—to teach the young fellows to control their vasomotors and to stand and think and talk simultaneously. In response to a question a keen student would give an answer that contributed not a little to the lecture itself. You notice on the second figure of the clinic (Fig. 9) the large blackboards. The lists of cases that you see represent an important feature of the clinic. As I mentioned, its special object was to present, week by week, to the third and fourth year students—all of whom were required to attend—the work of the wards. On the important diseases committees of the students were appointed to report. The tabulated lists on the blackboard represent the cases of typhoid fever and pneumonia entered week by week. Only the typhoid cases with complications were put up, but the entire experience of the clinic with pneumonia was presented. One of the first questions asked was for the chairman of the typhoid and pneumonia committees to report. In the longer list on the blackboard you see for the session 1900-1901 some 60 cases of pneumonia, very many of which were shown at the clinic, and all of which we reported upon. At the end of the session typewritten copies of these lists were circulated among the students. By the end of his fourth year a man could have a knowledge of at least 70 or 80 cases of pneumonia and of the complications of several hundred cases of typhoid fever.

Very special stress was laid upon this side of the work, and here again you see the important feature of making the student an active participant in the teaching. As far as possible groups of cases illustrating special features of disease were presented; very often an assistant participated in and was asked to present a case which he worked up specially. Sometimes we had a symposium conducted by the students. I remember on one occasion, when we had in the wards a number of cases of diabetes, the students held the clinic, and six of them presented the various features of the disease. Of course, they could not let the occasion pass without a joke, and on my table and in their buttonholes were sweet-peas! One last feature
remains to be noticed. The concluding remark always was: What deaths? what post-mortem? If a post-mortem examination had been held, the clerk whose patient had died was responsible for the demonstration of the lesions. In making it as far as possible a student’s affair the clinic may lack the dramatic unity of the French or the thoroughness of the German, but I claim for the method an educational feature of a high order; well arranged by the assistants and students, there is one thing it will not miss—the power to draw large and appreciative audiences.

(c) Seminar Classes.

In a very busy clinic there is neither the time nor is there the necessity for systematic lectures, but even in a rich hospital service it is impossible to show the student even types of all diseases, so that it is necessary to supplement in some way the teaching of the wards, the dispensary, and the theatre. We managed this in two ways. One of the assistants held each week what is called a "recitation" class, in which the students were examined upon set subjects given out previously. Sometimes textbook chapters were put down for study, sometimes journal articles, and, as far as possible, the important literature of the subject discussed was placed on the table. In this way one feels sure that the student gets at least some knowledge of the more obscure and less common maladies.

Then, a couple of years before I left, the assistants and the clinical clerks started a weekly seminar, in which, seated about a long table, the important recent contributions in the literature usually to the diseases under observation were reported upon and discussed.

(d) Research.

The third function of the clinic is organization for research, a side of the work which presents many difficulties. If a laboratory man, the professor may neglect patients and students, and if an old time bread-and-butter clinician he may neglect the laboratory side. He sets the pace, but one thing is certain, that in a university clinic the interest of the student should be paramount.

Every patient presents problems for research, and the clinical clerk should be able to carry out the necessary investigations. For this purpose there must be skilled assistants, directly attached to the clinic, who are able to advise and control his bacteriological, chemical and physiological studies. For example, in pneumonia and in typhoid fever the bacteriological work should be done under skilled supervision, and the clerk should be able to make his own blood cultures or to plate out a stool. In gout and diabetes he should carry out his own chemical studies with the help of a trained clinical chemist in a laboratory attached to the clinic; and in a case of heart-block he should have at hand all the graphic and electrical apparatus necessary for this study. The student should
himself carry out researches, particularly if he comes into the ward with a good chemical training. With reference to the arrangement of the laboratories one of two plans may be followed. In very large hospitals they may be concentrated in one building and even combined with pathology, but in the university medical clinic there are great advantages in having small laboratories of bacteriology, chemistry and pathological physiology associated directly with the wards.

In every university department the chief research must be done by the young assistants and special students under the direction of the chief, who fertilizes them with ideas. Here again it is a matter largely of organization, only I feel strongly that however important research may be every man associated with the clinic should take his share in teaching, and should be made to feel that the student is the pivot round which the machine works. Research becomes very absorbing, and in some men fosters a seclusive selfishness that is most deplorable.

I can testify in an interesting way to the large amount of good work that may be done by the students and young assistants. When I left the Johns Hopkins Hospital, the graduates of the first eight years of the medical school presented me with twelve handsomely bound volumes containing just five hundred contributions they had made.

As briefly as possible this is a summary of my life as a clinical teacher. At a farewell dinner given to me by the profession of the United States and Canada, I expressed the pious wish that my epitaph should be, "He introduced routine bedside teaching into the United States"; and I think I may claim for my colleagues that in all the departments of the Johns Hopkins Hospital the English and Continental systems of teaching were combined with great advantage.

A Forecast.

Now, in a few concluding words, let me give you a forecast. I designedly took this subject for my address because the future is with you young men, who are certain to see within the next few years radical changes in the medical schools of this country. There are two important problems. Is it possible to organize in the English hospitals university clinics such as exist on the Continent, and such as those which we had at the Johns Hopkins Hospital? There are difficulties, of course, but they are not insuperable, and, once started, clinics of this type will be instituted in every school in the kingdom. Only let them be complete; the chief in full control, responsible for the teaching, responsible for the work of his assistants, and let them be well equipped with all modern accessories for research. The other problem is more difficult. Shall the director of such a clinic devote his whole time to the work, or shall he be allowed to take consulting work? For the former many advantages may be claimed, though the plan has nowhere yet had a practical trial. The amount of work in a modern clinic is
enormous—quite enough to take up the time and energies of any one man in conducting the teaching, treating the patients, and superintending the researches. Then it is attractive to think of a group of super-clinicians, not bothered with the cares of consulting practice, and whose whole interests are in scientific work. It is claimed that as much good will follow the adoption of the plan of whole-time clinicians as has followed the whole-time physiologists and anatomists. Against it may be urged the danger of handing over students who are to be general practitioners to a group of teachers completely out of touch with the conditions under which these young men will have to live. The clinician should always be in the fighting line, and in close touch with the rank and file, with the men behind the guns, who are doing the real work of the profession. The question, too, is whether the best men could be secured; whether academic and scientific distinctions would satisfy these men. Then for the hospital itself, would it be best to keep our best in clinical seclusion? Would there not be the danger of the evolution throughout the country of a set of clinical prigs, the boundary of whose horizon would be the laboratory, and whose only human interest would be research? I say frankly that I am not in favour of the whole-time clinical teacher. This is not surprising, as my life has been largely spent in association with my professional brethren, participating in the many interests we have had in common. At the same time let me freely confess that I mistrust my own judgement, as this is a problem for young men and for the future. I know how hard it is "to serve God and mammon," to try to do one's duty as a teacher and to live up to the responsibility of a large department, and at the same time to meet the outside demands of your brethren and of the public. And if added to this you have an active interest in medical societies, and in the multifarious local and general problems, the breaking point may be reached. I had had thirty-one years of uninterrupted hard work. William Pepper, my predecessor in Philadelphia, died of angina at 55; John Musser, my successor, of the same disease at 53! After listening to my story you may wonder how it was possible to leave a place so gratifying to the ambitions of any clinical teacher: I had had a good innings and was glad to get away without a serious breakdown.
REMARKS ON THE DIAGNOSIS OF POLYCYSTIC KIDNEY

BY SIR WILLIAM OSLER, Bt., M.D., F.R.S.
Regius Professor of Medicine in the University of Oxford

Polycystic kidney in the adult is not often recognized. It is a rare disease, but, following the law of dual coincidence, there are two cases at present under observation. In the patient before you, a woman, aged 52, sent by Dr. Hayward, of Abingdon, the diagnosis has already been made by Dr. Thompson, the house physician. She is thin, semicomatose, with purpuric spots about the face, and there is a blood-stained fluid oozing from her mouth. She is very apathetic, and it is difficult to get her to reply to questions. Interesting and, in my experience, unique features are seen on inspection of the abdomen. It is enlarged, particularly in the flanks, which bulge. But what catches the eye at once, particularly on the right side, are large, hemispherical projections between the navel and the costal borders. On the right side there is a whole series—one as large as an orange above the level of the navel, while below, extending to Poupart's ligament, are half a dozen, ranging in size from a small marble to a large walnut. On the left side they are smaller, but very distinct, particularly as the tumors descend on inspiration. It is a very remarkable pattern of abdominal tumidity—the bilateral swelling, the marked prominence of the flanks, and the hemispherical projections seen beneath the thin abdominal wall. One could not go far wrong in making the diagnosis on inspection alone of bilateral cystic kidneys. On palpation large tumors can readily be felt passing posteriorly deep into the flank, and firm, resistant cysts of various sizes project from the surface. The heart does not appear to be much enlarged, the arteries are sclerotic; the urine is very scanty, with a low specific

1 Radcliffe Infirmary, Oxford, November 23, 1914.
gravity, and contains numerous hyaline tube casts. The history of the case is remarkable. At the fourteenth year she had the first attack of hæmaturia, with colic, and naturally the diagnosis was made of stone. These have occurred at intervals, sometimes of a few months, sometimes of a year or more, but she has had fairly good health, and has been able to work hard. About two years ago she had a uræmic attack. Last year, for the first time, the tumor on the right side was detected. She had felt the abdomen increasing in girth; she was at that time much stouter, and a well-known gynaecological surgeon suggested that it might be an ovarian tumor. Within the past few weeks she has had constant vomiting, has been very drowsy; a purpuric rash has broken out, and there has been slight bleeding from the gums. She has grown progressively worse, and is in a very critical condition.

[The patient died the next day, unfortunately, before a photograph was obtained of the abdomen. The post-mortem showed enormous bilateral cystic kidneys. The large cyst on the right side extended into the pelvis, and was in contact with a small pedunculated fibroid of the ovary—a very puzzling condition, I should think, for a gynaecologist. The colon was completely pushed aside and lay to the left of the kidney. As is often the case, the liver contained numerous cysts; one on the upper surface of the right lobe was larger than the fist, and was filled with a clear fluid. The heart was not enlarged, but the arteries were sclerotic.]

The other patient, a woman, aged 39, has been admitted once or twice to the surgical side, where, too, the diagnosis has been made. She is, as you see, very healthy looking, not thin, and with a good color. About ten years ago, after an aching feeling in her right side, she passed two stones, with hæmaturia. Since then she has had several attacks of pain, associated with passage of blood, and twice she has passed small calculi. In the intervals the urine has always been clear, and it now has a specific gravity of about 1.014, and is without albumin.

On inspection of the abdomen, the flanks bulge, more to the left than the right, but there is no special prominence in front. On the right side a large tumor occupies the flank, passes high beneath the costal border and into the epigastric region, and below reaches
to the level of the anterior superior spine. The colon can be felt passing over the tumor, the surface of which presents numerous irregular bosses or projections. On deep palpation from behind the tumor mass can be moved forward, and lifts the skin. The left side is occupied by a smaller mass with similar characters. The liver is not enlarged. The superficial arteries are palpable, the blood-pressure is only 130 mm., the apex beat cannot be felt, the heart does not appear to be large, and the aortic second is not specially accentuated. There are no other special features on examination. Her eyes are normal. The X-ray picture shows, on the right, three or four small shadows, suggestive of stones, far away from the kidney position, but quite within the limits of the tumor mass.

The pathology of polycystic kidneys has been much discussed. They are often congenital, and the tumors may be at birth of enormous size. They may be associated with other anomalies. They may be quite small at birth, as in a child with several congenital malformations, in whom both kidneys were slightly enlarged and uniformly occupied by small, just visible cysts, lined with epithelium. A very remarkable feature is the hereditary character. In 1902 I reported the case of a man, aged 39, whom his mother died of the same disease. As the subsequent history of the case has never been given, I may state that between 1902, when I saw him, and 1906, when he died of uræmia, he had many attacks of hæmaturia, and the kidneys increased greatly in size. The right kidney weighed 4370 grammes, the left kidney 5270 grammes. Three cases have been reported in one family, and a woman has been known to give birth to five children in succession with the disease. The origin of the condition has been much discussed, but the view put forward by Koster is probably correct, that in an error of development there is failure in the union of the secretory and collecting tubules, which develop separately. Very strong confirmation of this view has been recently brought forward by Forssman, who, studying the problem by the method of reconstruction, arrives at the conclusion that there is a failure of the union of the collecting canals, which develop from the ureter section, with the tubules of the metanephric portion. His

2 American Medicine, vol. iii, p. 951.
paper is illustrated by many figures showing an interruption in the development and the failure in many places of the union of the two systems. An extraordinary feature is that they may remain stationary for years, and then somewhat rapidly increase in size. This has been the case with two patients I have studied, and Dr. Alfred King, of Portland, Maine, noted within three years rapid growth. They may remain of very moderate size until middle life. The condition is consistent with robust health for many years.

Early and common symptoms are pain and hemorrhage, which lead to the diagnosis of stone. Haematuria may be a predominant feature for years, and it has to be borne in mind that this is one of the causes of obscure recurring hemorrhage. In 1907 I saw a lady, aged 60, who had led a life of unusual physical vigor. From childhood she had had at intervals haematuria, for which she had consulted numerous physicians on the continent and in this country. She had many letters about her case, in which she herself took a very intelligent interest. The bleeding had recurred at intervals of about eight months. She did not think that from her girlhood she had ever passed six months without an attack. One of her physicians—I suspect Sir William Gull—told her not to bother as it was of no more moment than nose-bleeding. I could not get from her that he used the term renal epistaxis, which has been attributed to him. When I saw her the diagnosis was simple enough—enormous bilateral tumors, with irregular surfaces, sclerotic arteries, colossal heart, with apex beat in the axilla, low specific gravity of the urine, and oncoming uræmia, of which a few weeks later she died.

Haematuria has been present in five out of the six cases in adults of which I have notes. The urine usually presents the features characteristic of chronic interstitial nephritis—constant low specific gravity, with a slight trace of albumin, hyaline tube casts, and there may be constantly a small number of red blood-corpuscles. Associated with these are the usual cardiovascular changes of chronic nephritis—sclerotic arteries, high tension, except in the last stages, and hypertrophy of the heart. These features have been well marked in four of the six cases. In one, as I have already mentioned, the enlargement of the heart was enormous. I do not know that I have ever felt an apex beat so powerful or so far to the left. On the other
hand, in the cases at present under observation, the cardiovascular changes are not marked, and at post-mortem in the first case the heart was not at all enlarged.

The physical signs are distinctive. No other condition gives the same picture of bilaterally enlarged kidneys with numerous elevated projections, and usually one kidney is much larger than the other. Occasionally, when unilateral, it would be difficult to distinguish the condition from hydronephrosis. In the second case the passage of calculi would suggest an ordinary hydronephrosis, but I do not think it at all likely, as the urine is clear, except during the spells of haematuria, and she has never passed pus. The type of dendritic calculus may be associated with progressive increase in the size of the kidneys and a gradual onset of chronic interstitial nephritis, with sclerotic arteries and enlarged heart. There may be no colic, extraordinarily little pyelitis, and progressive hydronephrosis may follow. In such cases the tumors are not very large, and I think it much more likely that this patient has bilateral cystic kidneys complicated with calculi.

When affecting one kidney the tumor has been mistaken for an ovarian. In rare instances, as I have already mentioned, it is unilateral, but, as a rule, both kidneys are involved, so that removal of one deprives the patient of so much valuable secreting tissue. A fatal uræmia has followed the removal of the larger of two cystic kidneys, so that surgeons now make it a rule to examine both organs before attempting to remove one.
The International Clinics gives bedside instruction by the leading medical men of the world. One cloth-bound volume (300 octavo pages) every three months, containing 25 practical articles, short and crisp, giving the latest views as to diagnosis, therapeutics, and treatment, beautifully illustrated, thoroughly indexed, covering every department of medicine and surgery. Positively the most practical and economical work you can buy. Published by J. B. Lippincott Company, Philadelphia.
THE WAR AND TYPHOID FEVER.

BY

SIR WILLIAM OSLER, BART., M.D., F.R.S.,

Regius Professor of Medicine in the University of Oxford.

(Paper read at a Meeting of the Society of Tropical Medicine and Hygiene, Friday, November 20th, 1914).

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I.

From the days of Homer, Apollo, the far darter, has been a much more formidable foe than his colleague Mars. With the two in conjunction unspeakable woes afflict the sons of men. In his great strait David, you remember, chose three days of pestilence as the equivalent of three months' military disaster. To-day the front of Mars is wrinkled, the world is at war, and the problem for the children of Aesculapius is to keep grandfather Apollo from taking a hand in the fray. In this game another member of the family, Hygeia, holds the trump card and gives victory to the nation that can keep a succession of healthily efficient men in the field. The Empire is confronted with a great task, in the successful performance of which the medical pro-
fession may play a leading part. For generations the health of the army and navy has engaged the attention of the very ablest men in our ranks. Let me quote a sentence written in 1785 by Gilbert Blane, a pioneer in sanitation, and as true to-day: "The great importance of the subject (that is, prevention) will plead my excuse for again calling to mind that such attentions are not only dictated by humanity, but would be the greatest wisdom in an economical and national light, considering how expensive it is to replace men and to support invalids, not to mention that it is upon the health and lives of men that every public exertion essentially depends, and upon which even the character of officers in the day of battle may depend."1

Of the camp diseases, typhus, malaria, cholera, dysentery, and typhoid fever, it is a reasonable hope that the armies of the West will escape the first three. Dysentery is pretty sure to cause trouble; but with regard to enteric fever we are on trial as a nation and as a profession, in what way it will be the object of this address to shew.

The nineteenth century saw the discovery of the cause of typhoid fever, the recognition of its transmission through polluted water or milk, and the enforcement of sanitary measures, which have caused a steady and gratifying reduction in its prevalence. Those of us brought up upon the writings of Simon, Buchanan, Budd, and Murchison, and convinced of the truth of the water-borne and milk-borne theories, were often confronted with epidemics in schools and barracks and private houses in which it was not possible to trace the infection to either of these sources. Yet experience lent little support to a doctrine of direct contagion. There was some other factor. Even with the purest supply of water and of milk, cases would crop up and local outbreaks occurred. Within the past ten or fifteen years we have not only filled gaps in the etiological picture, but we have added so many details that the canvas is approaching completion. Let me dwell upon four points in our new knowledge.

I. THE IMPORTANCE OF THE INDIVIDUAL CASE AS A FACTOR IN INFECTION.

Though the infectiveness was recognised, only within the past decade have clinicians made it an essential feature to completely sterilize the dejecta, urine and faeces, and to avoid all possible contamination about the patient. As in surgery, we have changed the antiseptic to an aseptic
battle, and nowadays the physician feels as keen a duty to keep the surroundings of a patient sterile as to treat his symptoms.

This in itself is a great gain, as the possibility of the abolition of the disease is a problem of the sterilization of the individual cases as they occur. I cannot here enter into the question of the methods of conveyance, but it is sufficient to say we have recognised fingers and flies as two of the chief, and the special liability in houses and wards of food contamination.

II. RECOGNITION OF THE PROTEAN CHARACTER OF THE DISEASE.

Not only are there differences in the germ that causes typhoid, but the clinical picture itself varies from the text-book standard very much more than was dreamt of by Louis, Budd, Flint, or Murchison. A transient febrile attack, a slight diarrhoea, bronchitis, acute nephritis, an attack of pneumonia, cholecystitis, acute pyelocystitis, may be a manifestation of the infection. In endemic areas mild, indefinite illness in children may be due to the typhoid bacillus. The organism, indeed, may lodge and live in an individual without ever causing symptoms, and then acutely excite an illness without a trace of resemblance to the disease we usually associate with its name. One of the first cases in which this was recognised I saw with Dr. Cushing in Dr. Halsted's wards—a woman, aged 26, who had a clean bill of health except for occasional attacks of abdominal pain and vomiting. It was evident at the time of examination that she had acute cholecystitis. Dr. Cushing removed fifteen large gall stones; pure cultures of the typhoid bacillus were isolated from the mucous contents of the bladder. Here was a woman who had never had, so far as could be ascertained, typhoid fever, and yet she had probably had for years the organism in her gall bladder, which had ultimately caused the formation of the stones. This case at the time unique, is no longer so. In the Spanish-American war, and in the South African war, there were an extraordinary number of mild ambulatory cases, which in the former were frequently reported as malaria. In public health work it is all-important to recognise these mild atypical cases. Dr. Chalmers, in the Health Report of the City of Glasgow for 1913, calls attention to the simulation of enteric by mild pneumonia and by intestinal catarrh.
Eight cases of enteric appear to have originated from an undetermined case of the latter in a child.

III. THE DISCOVERY OF TYPHOID CARRIERS.

Briefly stated, in from 1 to 3 per cent. of cases of enteric fever the bacilli do not disappear from stools or urine. The patient becomes a chronic carrier and a possible menace to the community. It has been estimated that, in countries in which typhoid fever prevails, the typhoid carriers number from 2 to 3 per 1,000. Infectivity may exist for years, and scores of small epidemics have been traced to carriers. How persistent the infection may be, and how difficult to get rid of, is well illustrated by the case studied for the past five or six years by Davies and Walker Hall, of Bristol. The patient had enteric in July, 1905, and eight instances of infection had been traced to her. The special interest in the case is the careful study of the different plans of treatment and the variability of the presence of the organisms in the urine. They were also isolated from her blood five years after the original attack. The relation of the carrier to public health is of vital importance, particularly the question of the detention of notorious carriers who follow dangerous occupations. The New York Board of Health was judged to be within its rights when an action was brought against them for the illegal detention for three years of the celebrated "Typhoid Mary." Carriers should not follow the occupation of cooks, butchers, grocers, as the fingers deposit bacilli on everything they touch, unless scrupulous attention is paid to cleanliness after defaecation. The good effect of precautionary measures in the case of chronic carriers is illustrated by the report of Lentz from the Oberstein district. For ten years the disease had been endemic, and then a systematic attempt was made to discover the carriers, of whom six were found in 1894, two in 1897, and one in 1898. They were practically all mothers with large families. It was impossible to enforce vigorous methods of isolation, so that repeated warnings were given, and instructions as to scrupulous cleanliness, particularly after defaecation, never to touch an article of food without a systematic washing of the hands, and having their under-linen carefully sterilized. The fever in the district has practically disappeared.
Lastly, and the most important point of all, is the discovery of immunisation against the disease, for which we are indebted to the brilliant investigations of Sir ALMROTH WRIGHT. The net result of the enormous amount of work which has been done since the publication of his first paper—September, 1896—is that, for a time at least, man may be immunised safely and surely. It is only by the statistical method that we are able to judge of the results of the practice. While in a way this is unfortunate, as figures have an extraordinary mobility as manipulated by different individuals, still, practical men have to use them and to form judgments by their help. The new iatromathematical school of KARL PEARSON and his scholars have made the profession cautious in drawing results from statistics; but in the matter under consideration the figures are, I believe, trustworthy. I will only give a few, the more important.

For many years the death-rate from typhoid fever in the United States has been very high. The disease prevails widely in the country districts. During 1912 it was 16·5 per 100,000 of the population—the lowest for many years. Antityphoid inoculation was voluntary in the U.S. army from 1909 to part of 1911; it was made compulsory in part of 1911 and in 1912 and 1913. Major RUSSELL's last report, dated May 2nd, 1914,\(^4\) gives the following figures:

*Typhoid Fever, 1907 to 1913, for the whole Army, Officers and Enlisted Men, American and Native Troops.*

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Strength.</th>
<th>Cases.</th>
<th>Deaths.</th>
<th>Percentage of Total Cases.</th>
<th>Occurring among those who were Vaccinated.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>Ratio per 1,000 of Mean Strength.</td>
<td>N.</td>
<td>Ratio per 1,000 of Mean Strength.</td>
</tr>
<tr>
<td>1907</td>
<td>62,523</td>
<td>237</td>
<td>3·79</td>
<td>19</td>
<td>0·30</td>
</tr>
<tr>
<td>1908</td>
<td>74,692</td>
<td>339</td>
<td>3·20</td>
<td>24</td>
<td>0·31</td>
</tr>
<tr>
<td>1909</td>
<td>84,077</td>
<td>282</td>
<td>3·35</td>
<td>22</td>
<td>0·26</td>
</tr>
<tr>
<td>1910</td>
<td>81,434</td>
<td>198</td>
<td>2·43</td>
<td>14</td>
<td>0·17</td>
</tr>
<tr>
<td>1911</td>
<td>82,802</td>
<td>70</td>
<td>0·85</td>
<td>8</td>
<td>0·10</td>
</tr>
<tr>
<td>1912</td>
<td>88,478</td>
<td>27</td>
<td>0·31</td>
<td>4</td>
<td>0·044</td>
</tr>
<tr>
<td>1913</td>
<td>90,646</td>
<td>3</td>
<td>0·03</td>
<td>0</td>
<td>0·0</td>
</tr>
</tbody>
</table>
Major Russell states that no harmful effects have been produced. The newspaper reports of death following antityphoid inoculation in the United States have been shewn to be erroneous. In the case of Private Pantzer, of the National Guard, Brooklyn, death was shewn to be due to malignant endocarditis, and in no way the result of inoculation. The value of these results must be taken in connection with the fact that in many places the barracks are situated in districts in which typhoid fever prevails. In 1911 and 1912 there was a concentration of many thousands of United States troops on the Mexican border in localities quite as favourable to the spread of enteric as in the Spanish-American war.

Apart from vaccination, there has been in all armies a reduction in the number of cases of typhoid fever; thus, between 1882 and 1909 the incidence of the Prussian army dropped from 6·7 per 1,000 to 0·4, while in the same years in the French army a reduction from 16·6 to 3·4. But the special value of the experience of the American army is the remarkable drop in the case incidence which followed antityphoid inoculation without special change in the sanitary environment of the troops. An interesting comparison is reported of two divisions stationed in nearly the same latitude for about the same length of time each on a good site, with artesian water of unimpeachable purity. In the one at Jacksonville, Florida, in 1892, among 10,759 men there were 1,729 certain cases, probably 2,693 (the question of diagnosis of typho-malaria, etc.), with 288 deaths. In San Antonio, Texas, in 1911, among 12,659 men, all inoculated, there was one case of typhoid fever, and no death. In France the results appear to be equally satisfactory, and there is no country in which measures of protection are more needed, as during the past twenty years among the French troops in France there have been 66,000 cases, with 10,000 deaths. Professor Vincent reported to the International Medical Congress last year that among 30,325 vaccinated men no case occurred, while in the unvaccinated the case-rate was 2·22 per 1,000 in the metropolitan troops and 6·34 in the colonial. Specially good results have been met with in Algiers and Morocco, where the inoculation is compulsory, and the incidence per 1,000 has fallen from 15 to 5. A striking illustration is reported from Avignon by Paget, in a recently issued Research Defence Society pamphlet. Out of 2,053 men 1,366 were protected and 687 were not. The non-protected had 155
cases with 21 deaths; the protected had not a case. The Italian experience in Tripoli shews that the incidence of the disease among the unvaccinated was 35·3 per 1,000, while among the vaccinated the incidence for those inoculated once was 1·34 per 1,000, for those inoculated twice 1·65, and for those inoculated three times 0·49. The most careful study of the statistics for the British army are those presented in the report of the Antityphoid Committee, 1912:—"The histories, as regards typhoid fever, of 19,314 soldiers, whose average period of service abroad was twenty months, were carefully followed, and every precaution possible was taken to verify the diagnosis bacteriologically. Of this number 10,378 were inoculated and 8,936 not inoculated. The case incidence of typhoid fever among the inoculated was 5·39 per mille, and among the non-inoculated 30·4 per mille.

"There is no reason for supposing that this difference can be attributed to a want of homogeneity between the two groups. The age distribution among inoculated and non-inoculated was approximately the same. They were intermingled and lived under identical conditions."

The profession is greatly indebted to Sir WILLIAM LEISHMAN and his colleagues, HARRISON, SMALLMAN, and TULLOCK, for the good work they have done in connection with this subject.

SYMPTOMS FOLLOWING INOCULATION.

As in this country the practice is voluntary, and as in certain quarters opposition has been offered, I have thought it well to collect data of any untoward effects, and I have to thank many correspondents who have replied to my note in the British Medical Journal of October 10th. In the first place it may be stated that with ordinary care and precautions large bodies of troops may be successfully inoculated with extraordinarily little discomfort or disability. Colonel HODGETTS has kindly given me the figures of the recent inoculations of the Canadian contingent, some 31,000 strong, made under his supervision in the camp at Valcartier in the Province of Quebec. Of the total number only one had a local abscess at the site of injection, and there were no serious sequelæ. This may be said to be an exceptionally good record. The inoculations in this country during the past three months have been on a larger scale than ever before attempted, and considering the enormous number—several
hundred thousand—the serious sequelæ have been very few. We may group the symptoms as follows:

1. A varying proportion no symptoms, other than a little headache or malaise, with slight redness and swelling at the point of inoculation.

2. A large proportion run a normal course of what may be called the inoculation fever, which has many resemblances to the so-called serum sickness. The temperature rises within ten or twelve hours, sometimes with a slight feeling of chilliness, and vomiting may occur. There are headache, fugitive pains in the back and joints, sometimes abdominal tenderness, and for twenty-four or thirty-six hours the patient may feel very badly. In mild forms the temperature rises to 101° or 102°; in the more severe to 103° and 104°, or even higher. Sometimes there is diarrhoea; in other cases, perhaps in the majority, there is constipation. Giddiness and fainting are reported, and one physician within the first ten days had curious nervous symptoms, feelings of apprehension, and a transient state of neurasthenia. He felt inability to control his muscles, and dreaded lest he should be unable to avoid some impulsive act. There was a slight mental disturbance, and he had what he called "dreadful feelings," and had difficulty in forcing himself to do the simplest acts. In the North Midland Division, among nearly 16,000 inoculated, a man, two days after inoculation, had marked mental symptoms suggestive of confusional insanity, which, fortunately passed away. I saw with Dr. Collier an officer whose case was very fully reported to us by Dr. Joyce of the 4th Royal Berkshire Regiment. He was inoculated on September 14th and, after the usual slight local and general symptoms, on the 17th the temperature was normal. On the 18th he had giddiness, and on returning to his billet when the door was opened he mistook the parlourmaid for the colonel, and raising his hand to the salute overbalanced and fell unconscious. He had a few days' leave, and some weeks later had several giddy attacks.

Heavy exertion and exposure within twenty-four hours after inoculation may be followed by sharp general symptoms. In connection with the abdominal pains that may occur, it is interesting to note that Professor Boyd of Winnipeg, now associated with the 3rd North Midland Field Ambulance, reports two cases (admitted on the same day) with appendicitis—one on the third day after inoculation, the other within twenty-four hours. Both had acute perforation. There
have been several reports of sharp localised pain in the region of the caecum, with slight diarrhoea. The highest temperature recorded in the notes sent to me (Professor Boyd) was 106.4°, four days after inoculation.

In what may be called the normal course there is oedema and redness at the site of inoculation varying in extent, and several correspondents have noted a curious migration of the erythema downwards towards the elbow, and even reaching to the wrist. Blotchy erythema may occur about the joints, and purpura has been noted.

CASES WITH UNTOWARD EFFECTS, LOCAL OR GENERAL.

(a) Locally, the redness, swelling, tenderness rarely persists for more than a day or two, and may be equally marked at both inoculations, or may be slight at the first and abundant at the second, or vice versa. The local process may go on to suppuration. How rare this is may be judged from the experiences of the Canadian contingent already referred to, in which only one abscess occurred among some 31,000 cases. This is, indeed, a remarkable record, so I doubt if there is any hospital in the kingdom in which during a year’s experience abscess does not follow some form of hypodermic injection. I have had no report of severe sepsis following the local abscess. Lance-Corporal Goatley, whose case has been exploited by the “antis,” had a septic wound, which proved, on investigation by Surgeon-General Whitehead, to be an abscess following ordinary vaccination for small-pox, and the report states that the bad arm directly followed from his own neglect. And I may state that he was not discharged from the army for ill-health due to the vaccination.

(b) General.—The inoculation fever and its symptoms rarely last more than a couple of days; but in a few cases unpleasant, or even serious, complications may follow.

With the fever there may be pains in the joints, superficial redness, and even effusion. A patient was admitted to the base hospital, Oxford, with effusion in the left knee, following antityphoid inoculation three weeks previously. It resembled a gonorrhoeal synovitis, but there was no urethral discharge. I have already referred to the abdominal pains on pressure in the caecum region and the coincidence of appendicitis in two cases. Jaundice has been noticed in a few instances. There
were four in the North Midland Division, coming on about a week after inoculation (Boyd). Symptoms suggestive of enteric, and enteric itself, may follow inoculation.

Dr. Walter Broadbent, of Brighton, sends a report of a case: Second inoculation on October 13th, followed by headache and pains in the limbs on the 14th, then fairly well until the 20th, when he had headache, a temperature of 103.4°; on the 21st the temperature ranged from 101° to 102°, on the 22nd from 98.6° to 102°, then gradually fell to normal. On the 26th the tongue was very furred, there were no spots, but there was a positive Widal reaction on the 24th. The case was not treated as enteric.

In a case, the notes of which were sent by Boyd, the second dose, given on October 16th, was followed by sickness and giddiness. On October 19th and 20th he had diarrhoea, for which he saw the regimental medical officer. On October 23rd he was seen by the surgeon of the 1st North Midland Field Ambulance, who found him with a temperature of 101.5°, constipation, rose spots, slight abdominal tenderness, large spleen. After consultation, it was decided that it was a typical typhoid case, and he was sent to the 2nd General Hospital, London.

Occasionally septic fever follows unassociated with the local lesion. A case of this type, under the care of Colonel Hood and Dr. Hobhouse at Brighton, I had the privilege of seeing at the height of his illness. I am indebted to Dr. Hobhouse for the notes:—

On October 23rd I saw at Brighton, with Dr. Hobhouse and Dr. Hood, Private Walter Fuller, aged 23, No. 8 Bedfordshires, who had his first inoculation on October 3rd. Slight headache on the 4th, with fugitive pains, but he did not feel badly until the 7th, when there were fever and pains in the joints. On admission to hospital on the 9th the temperature was 102.5°. On the 11th his temperature was 104°, much pain, particularly in the joints, slight swelling and redness of the ankles and the smaller joints of the hands, with great stiffness and inability to use the muscles. On the 17th he began to have pain in the chest, with signs of involvement of the right base. On the 18th the leucocyte count was 15,300 per cubic millimetre, the pains in the chest were worst, he had cough, and the consolidation in the right lower lobe had increased. The Widal reaction was markedly positive. Between the 16th and the 23rd the temperature rose to about 103° each
day, there were pain and swelling in the joints, redness over the ankles and knuckles, and much disability. When I saw him on the 23rd he looked very ill, the respirations were 40, pulse 100, the small joints of both hands shewed swelling with slight erythema, tenderness on pressure and on movement, redness over the left ankle, moderate effusion in the left knee-joint and right elbow, consolidation of the right lower lobe, and left pleural effusion reaching to the fourth rib in front. The heart sounds were clear; the spleen was not palpable. There was no redness or swelling at the site of inoculation. The patient remained very ill for the following week, although the temperature was lower, rarely going much above 102°. There was a to-and-fro pericardial murmur. The patient then began to improve, and on October 30th the temperature for the first time fell to 99°. Between October 30th and November 5th it fluctuated around 100°5°, and then fell to normal. The smaller joints remained painful, and it was not until November 11th that he began to use his hands and arms. He is now convalescent.

In the same ward I saw, with Dr. Hobhouse, a man with dermatitis in the region of one axilla, which had spread rapidly after inoculation. He had symptoms suggestive of peripheral neuritis, stiffness of the arms, and loss of the knee-jerks. He had had zinc ointment used for a very large area, which Dr. Hobhouse thought might possibly be the cause of the neuritis.

The importance of avoiding exposure for a day or two after inoculation is emphasised by the fact that cases of pneumonia have been reported by several observers. In the North Midland Division series, among nearly 16,000 instances, in two cases lobar pneumonia followed within twenty-four hours (Boyd). Pneumococci were present in the sputum in both cases.

Private G. B. Jones, 12th Sherwood Foresters, reported by Dr. Walter Broadbent, was inoculated October 6th; chill on the 7th, and on the 8th was admitted to the 2nd General Eastern Hospital with pneumonia of the middle and lower lobes on the right side, and the lower lobe on the left, with a temperature of 103°, pulse 120, and much delirium. He had a very severe illness, and died on October 14th.

Reports of death as a result of the inoculation are false. Dr. Selby wrote from Aldershot (October 17th, 1914):—
This morning I was trying to persuade my Kitchener army men to be inoculated, when I was confronted by one man who said he went down to Shorncliffe last week-end and that there they had told him that three men had died within twenty-four hours of inoculation.

I wrote to Colonel Wilson, who replied (October 21st, 1914) that there had been no death from this cause, and giving particulars of the fatal cases from accident or disease since the formation of the camp.

The Beaujon Hospital nurse, Paris, whose case is so often quoted, died of typhoid fever a month after the last inoculation. She might very possibly have contracted the disease previously. The Neckar Hospital nurse received therapeutic injections of typhoid serum during the course of the disease, not a protective inoculation.

Private Pantzer of the National Guard, Brooklyn, died of malignant endocarditis and the inoculation had nothing to do with his fatal illness.

II.

Perhaps the best chapter in British sanitation is that which deals with typhoid fever. While a decrease in the incidence of the disease has been more or less general throughout civilised countries, nowhere else has the fall been so progressive and striking. Twenty years ago the death-rate per 1,000,000 of inhabitants was about 300; in 1912 it had fallen to 44, the lowest ever recorded; indeed, up to 1904 the rate had never fallen below 100. Enteric fever may be said to be in its "last ditch," but that it is still putting up a strong fight is indicated by 1,600 deaths in England and Wales in 1912. It prevails less in London than in the Midlands and in the South, and is much more frequent in the North, in both urban and rural districts. In certain urban districts the highest case-rate per 100,000 of the population was 34. In many of the large cities in the North, as in Liverpool and Glasgow, in which the disease was very prevalent, the fall has been progressive and rapid. In the former city in 1895 there were 1,300 cases. In 1911 it had fallen below 200. In Glasgow the case-rate per 1,000,000 has fallen from 1,386 in 1891 to 232 in 1913, and the death-rate per 1,000,000 from 218 in 1891 to 36 in 1913. General betterment of sanitation, particularly improved housing, better diagnosis,
greater care of the individual cases—to these factors may be attributed a large part of this decrease. But there is another to which the attention of the medical officers of health has been strongly directed—namely, the removal of local sources of infection by the isolation of the sick in hospitals,\(^9\) in which in some cities the proportion of cases treated has risen from 30 or 40 per cent. to 80 and 90. It has been well said that enteric fever is the sanitary index of a country; and that to-day our camps are not hotbeds of the disease is the result of more than half a century of intelligent and efficient sanitation.

Neither the profession nor the people at large appreciate fully the extraordinary sanitary advantages enjoyed by this country. In medical practice, if I were asked to state the most striking difference between England and the United States and Canada, I should say the absence of enteric fever in hospital and private work. The tragedy of typhoid fever was ever present, and one felt constantly outraged at the wantonness of the sacrifice. In full measure the tragedy was brought home to the United States during the Spanish-American war. There never has been in history a campaign so fatal to an army not yet in the field. Listen for a moment to the story of what may happen after mobilisation in a typhoid ridden country. Returning to the United States from a visit to England in the autumn of 1898, I found but one subject engaging the attention of the profession—the appalling outbreak of typhoid fever in the volunteer army, distributed in seven camps in different parts of the country. The figures published by REED, VAUGHAN and SHAKESPEARE in their elaborate report, of which a good epitome is given by Dr. CHRISTOPHER CHILDS\(^{10}\) shew that in six months, among 107,973 men, there were 23,738 cases of typhoid fever and 1,580 deaths. At Camp Alger, near Washington, with a mean strength of 21,988 men, there were 1,951 cases of typhoid fever. Never have I seen so many cases of fever concentrated together, barrack after barrack filled with the victims of neglected sanitary precautions. The lesson drawn by the authors of the report on this epidemic was that the disease was not water-borne, but that nearly two-thirds of the cases were examples of "connectible attacks"—that is, due to infection within the tent or from adjacent tents. It was the first great epidemic to call attention to the importance of local infection by means of fingers, food and flies. Two other points
were brought out—the frequency with which erroneous diagnosis was made, particularly in the southern camps, where many cases were supposed to be malaria; and the large number of minor attacks indicated by nothing more than transient malaise, slight fever, or a gastro-intestinal attack.

RECOMMENDATIONS.

More than three months have passed, and the reports from the camps indicate that nowhere is typhoid fever prevalent. That isolated cases have occurred should make the medical officers of health and the military surgeons redouble their efforts to prevent the spread. These should be watched with the utmost care, since, as Dr. Childs points out, epidemics in camps are usually preceded by scattered cases or by the unusual prevalence of diarrhoea. Watch the common ailments, should be the motto of the camp surgeons. The following measures are indicated:

1. Every recruit should be asked whether he has had typhoid fever, or if during the previous twelve months he has lived in a house with a case of fever. An affirmative answer should mark the man for laboratory study. This may seem an irksome precaution, but in preventive medicine nothing necessary is irksome.

2. A realisation of the extremely protean character of typhoid fever, so that mild cases of enteritis, obscure forms of bronchitis and pneumonia, and mild cases of fever should be watched with care.

3. Every typhoid patient should be regarded as a focus of infection, and should be suspected as long as the bacilli are present in the discharges. The cases should not be treated in the general wards with other cases. Measures should be taken in the larger camps and in the garrison towns to segregate the cases.

4. No typhoid patient should receive a clean bill of health until he has been shewn by bacteriological examination to be harmless.

5. Ample provision should be made for the careful bacteriological examination of all suspected cases.

III.

Fever in various forms has proved more destructive to armies in the field than powder and shot. It has been well said that bullets and bacilli are as Saul and David, "Saul has slain his thousands and David
The story of the destructive character of fevers has never been so well demonstrated as in the great Civil War of the United States, during which malaria, dysentery, typhoid fever, and other diarrhoeal diseases were fatal foes. Woodward's *Report of the Medical History of the War of the Rebellion* is a perfect storehouse of information on camp diseases. It is not easy to pick out the exact percentage of typhoid fever, as a large proportion diagnosed as diarrhoea and many of malaria belong to this disease; but the official figures for the army of the North are sufficiently appalling—79,455 cases and 29,336 deaths! There is the same story in the Franco-Prussian war; among the German troops there were 8,000 deaths from typhoid fever, 60 per cent. of the total mortality! It is said that the typhoid fever existed in every army corps at the outbreak of the war, and the campaigns were carried on largely in infected regions. I have already referred to the terrible experience in the Spanish-American war among the volunteer troops in the home camps. The sad memories of the South African war still haunt the memory. That was a war which brought out many new details in campaigning, but the sternest lesson taught is the one we are now considering, as it, too, was a war in which the bacilli counted for more than the men. Of the 22,000 lives lost, the enemy is debited with only 8,000; preventable febrile diseases for 14,000. And amongst these, as usual, typhoid fever headed the list, 57,684 cases, of whom 19,454 were invalided, and 8,022 died. The *Bacillus typhosus* alone did more damage than the Boers. Here again, as in the Spanish-American war, it was not so much water-borne typhoid as camp infection by fingers, flies, dust and food.

We are now in the fourth month of the war, and, so far as one can gather from the somewhat meagre reports, the health of the troops at the front has not been damaged to any extent by fever, and, so far, the sad losses have been from bayonets and bullets. On active service the soldier may take typhoid fever with him, or he may find it in the country. A large body of men has a certain percentage of carriers, any one of whom may act as a focus of distribution. The conditions in camp life are peculiarly favourable to case infection; thus it would be impossible for a carrier cook not to contaminate the food of an entire company. Of equal moment is the state of the country in which the troops are working. During the Spanish-American war it was
not possible in the United States to locate a camp in a typhoid-free position. In this country it is not possible to pitch a camp in an infected district. In South Africa both conditions prevailed; infection was brought by the soldiers, and was abundant in the country. It seems not unlikely that the troops in France and Belgium are reaping the benefit of the past ten years of active campaign against typhoid fever. Details are not at hand as to the prevalence of the disease in the eastern and north-eastern regions of France, but I am told there has been a great reduction in the incidence of the disease in Belgium, and that the troops have heretofore suffered but little. The Rhenish provinces should reap the benefit of the remarkable antityphoid campaign of the past ten years. Certainly it is very gratifying, particularly at this season of the year, that comparatively few cases have occurred. Among 2,000 German, English and Belgian troops who have been, or are at present, in the base hospital at Oxford, there have only been five cases of typhoid fever; and this, I believe, to be the experience in other large hospitals throughout the country. It will be a great triumph to go through this war without a devastating experience of typhoid fever. In the fighting line it is not possible always to ask the soldier to carry out sanitary precautions, and in a very infected country, even with the best of intentions, he cannot avoid exposure. Here we may expect to find the protective value of inoculation, and it is very satisfactory that the value of the measure has been so generally recognised by officers and men. An immense proportion of those who go with the Expeditionary Forces will have been protected—for a period at least. While with our present knowledge we cannot but regret that the inoculation has not been made compulsory, let us hope that a sufficient number have taken advantage of the procedure to make impossible a repetition of the enteric catastrophe in South Africa.

In the midst of this great struggle we stand aghast at the carnage—at the sacrifice of so many lives in their prime—

That many men so beautiful,
And they all dead did lie.

The bitterness of it comes home every morning as we read in the Roll of Honour the names of the much loved sons of dear friends. Strange that man who dominates Nature has so departed from Nature as to be the only animal to wage relentless war on his own species.
But there are wars and wars, and let our thought to-night be of the other army waging peaceful battles against our true foes. No one has so well contrasted the work of these two armies as the poet laureate of the profession, Oliver Wendell Holmes—

As Life’s unending column pours,
Two marshalled hosts are seen—
Two armies on the trampled shores
That Death flows black between.
One marches to the drum-beat’s roll,
The wide-mouth clarion’s bray,
And bears upon a crimson scroll,
“Our glory is to slay.”
One moves in silence by the stream,
With sad yet watchful eyes,
Calm as the patient planet’s gleam
That walks the clouded skies.
Along its front no sabres shine,
No blood-red pennons wave;
Its banner bears the single line,
“Our duty is to save.”

We shudder at the needless slaughter of the brave young fellows—allies and foes alike—but think of the slaughter which goes on in our homes, just as cruel as, often more cruel than, that of the battlefield! Tuberculosis alone will kill more than ten times as many this year in Great Britain than will die abroad for their country. Comparing the death-rate in England to-day with that of fifty years ago we may say that, as a result of the work of the other army, more will be saved from death by enteric fever in 1914 than will be killed this year in the war. Eberth’s Bacillus typhosus will kill in 1914 in the United States more than will German shrapnel and bullets in the Expeditionary Force. Moving in silence, the great army of sanitation, with a general staff and leaders of all lands and languages, claims allegiance only to Humanity. In war it has not often fought winning campaigns, but the new knowledge is full of such promise that even the vanquished may be victors.

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