AN ADDRESS

ON

ARMY MEDICAL STUDIES AND MILITARY HYGIENE.

*Delivered at the opening of the Thirty-third Session of the Army Medical School, Netley.*BY F. DE CHAUMONT, M.D.,
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GENTLEMEN,—The duty of addressing you on this, the opening of the thirty-third session of the Army Medical School, having devolved upon me, I must commence with what both custom and courtesy dictate; namely, by welcoming you to Netley in the name of my colleagues and myself. And this I do not as a mere matter of routine, but with the strongest wish on our parts that your stay here may be pleasant as well as profitable. That it has been so to many of your predecessors we have reason to know, from the kindly and even affectionate terms in which they have spoken of Netley in after-times. That we have not always been able to please everybody, is simply to say that we have not been able to effect an impossibility; but the most frequent conclusion has been, I believe, that there are a good many worse quarters than this, even though it be coupled with the irksomeness of lectures and examinations. Some of our critics, both in and out of the public services, have been inclined to question the necessity of lecturing and teaching at all to men who come as you do with legal qualifications for the practice of your profession. To this we may reply, that we in no way lose sight of the fact that, although here so far *in statu pupillari*, you are in a very different position from that of students in school or college under ordinary circumstances. You bring with you (or are supposed to bring, which, however, in some cases is not synonymous) such a general knowledge of the science and art of healing as your systematic instruction on the one hand and your own experience on the other—where you have had opportunities of gathering it—have enabled you to acquire. But this is not wholly sufficient for the work you have before you; and it was with the view both of making you more profitable servants of the State, and also of making it more easy for yourselves to perform the duties required of you, that this course of instruction was instituted.

When a young medical man proposes to start for himself in civil life, he must serve an apprenticeship in some shape or another before he gets into the full tide of practice. He must be an assistant to some other practitioner; or, if his means allow, he must bide his time and gain experience slowly and laboriously on his own account. Even when a young man can step into a practice ready made, he but rarely commands the confidence of his *clientèle* at once, and not unfrequently suffers from the want of those nameless but necessary qualifications which can only come by matured experience. Some acquire them sooner than others, but they must be acquired for true success. Again, if a practitioner desire to take up any speciality in the profession, how much training must he go through, and how long a time must generally elapse, before he can make himself a sufficient reputation to induce the public to employ him! In former days, this preliminary acquisition of knowledge and experience the medical officer in the public services had to work out for himself. He passed a time, varying in length as the exigencies of the State demanded, at Chatham or Haslar, and was then sent to doctor soldier and sailor “with all his imperfections on his head”. No instruction was given in military surgery, in the dietary or exercise of troops, the duties in camp or field, the precautions in epidemics or the like; whilst the man who was to take service with John Company went out to India without the slightest prejudice on the subject of tropical disease, his mind on that subject being usually a perfect blank. That mistakes were made on all sides we know well and freely acknowledge; but the blame certainly attached less to the medical officer than to the system that placed him in so anomalous a position. The truth is, the position of an army or navy surgeon is a most peculiar one, for there is no other man in the medical profession from whom so much may be demanded at any time, and who is so frequently thrown upon his own resources. Of course, to the mind of the

public, when his name is mentioned, the first idea that occurs is the cutting and carving of his fellow-man on the field or in the cockpit; but this, important though it be, can, in the nature of things, be but a part, and only an occasional part, of his duties. Although it is for war that we are instructed, retained, and paid, yet we are not and cannot be always in the field; whilst many most valuable and professionally distinguished officers have never seen a shot fired in anger. But the medical officer has to deal with medical as well as surgical cases, and with varieties of them such as are likely to puzzle a novice or one who has not received special instruction in the matter. He is also bound by the regulations to investigate the cause of death, as well as to diagnose and treat disease; and therefore he must be prepared not only to make *post mortem* examinations, but to give an intelligent and rational account of what he finds. Were these all his duties, they would be considerable; but they would not be far different from what an ordinary practitioner has to do in many cases, except in degree and variety. But there is still another wide and most important field of work, and that is the prevention of disease. Even at the risk of appearing to magnify my office as a teacher of this department of study, I may call it, without hesitation, *the most important work*; and it is here very specially that your duties differ from those of practitioners in civil life, whose main work is treatment, and to whom prevention means loss of money. It is, however, to the lasting honour of our profession that, as a body, they have ever been foremost in promoting the health of the people, without a thought that by so doing they were really taking the bread out of their own and their children's mouths. Still it is obvious that the duty of preventing disease cannot properly be carried on by a practitioner in active practice; and this has been, though imperfectly, recognised by the State. Unfortunately, in this matter, too much has been left to local and interested authority, and we see, as we do in this county, the Poor-law surgeon entrusted with the functions of health-officer, which he has not time to exercise properly; besides the fact that it places him in a position of difficulty, in having to deal with conflicting interests. Now, this duty of prevention of disease the army and navy surgeon is especially called upon to exercise, happily without the difficulties in most cases that surround his civil brother, although he has his own troubles, as you will, doubtless, find hereafter. Let me briefly point out the work before you in this line. You will be called upon to give opinions on the salubrity of sites, on the sufficiency and means of ventilation, on the quantity and quality of water-supply, on the sufficiency or otherwise of dietary, on the quality, purity, or adulteration of food and beverages, on the amount of work to be demanded from men, on the amount and character of their clothing; on the arrangements of camps and cantonments; on the precautions in time of, or in anticipation of epidemics; besides the special duties in time of war which occur in almost endless variety. To those I may add, for the naval officer, the various specialities of a sea life in addition. Besides all these, there are constantly questions cropping up which are referred to the doctor, not because they properly belong to his province, but because no one else can answer them. Now, I may confidently ask, which of you is prepared to undertake, without previous instruction, the multifarious duties I have thus briefly sketched forth? It would, of course, be easy to give an opinion on those or on any subject; but, now-a-days at least, a man requires to give a reason for the faith that is or is not in him; and empty words without true knowledge are more or less quickly detected. I can only record my own experience, and I am sure it has been that of many of my contemporaries, that I was frequently called upon, when I first entered the service, to decide upon questions of which I not only knew nothing, but of which I had never had any opportunity of learning anything.

In a letter I received recently from a distinguished teacher of hygiene, whose name I shall frequently have occasion to mention, viz., Professor von Pettenkofer of Munich, he says: “It becomes more and more clear that the duties of a military surgeon form a speciality just as much as ophthalmic surgery or obstetrics, and that hygiene forms a most essential part of that speciality. Hitherto the young practitioner has too often had to plunge into the practice thereof without ever having received instructions in the principles.” The speciality of the military and naval services has long been recognised in this country by those most competent to form a judgment, and it is now more than a century since the foundation of a school such as this was urged upon the Government of the day by the renowned Robert Jackson. At that time, however, the Government was too much occupied in wasting the country's substance in useless wars and alienating the affections of its own colonies, to have any time or money to spare for the establishment of an institution that had only public utility to recommend it. Who can say what blood and treasure were lost in consequence?

From that period down to the Crimean war, the history of the public

services has been one of struggle on the part of the respective medical departments to get the authorities to recognise what was for the true interest and efficiency of their fleets and armies, and in this our Government did not stand alone; it was the history of all, and it has only been after bitter experience and a waste of both men and money that would amount to an appalling total, that the victory of science has been won.

It was after a long period of peace, unbroken in Europe by anything like a real war, that the terrible disasters of the Crimean campaign awakened the rage and shame of the nation. An army which had left our shores amid much excitement and in high hope was, in a few months, reduced to a mere shattered remnant of scurvy-tainted and typhus-stricken scarecrows. The hospitals on the Bosphorus were crammed, whilst in the field whole regiments were represented by a corporal's guard. In the meantime, the casualties in action were comparatively few; and the people of England had the mortification to learn that, while money had been freely supplied, their soldiers were perishing from sheer want of administration and neglect of the simplest precautions. While 22,000 men perished in the campaign, barely one-fifth of those fell by the hands of the enemy. It is gratifying to know, however, that much as the medical department was blamed, it was really the one that least deserved it; for the late Sir Andrew Smith was able to show that he had not only foreseen the possibility of what occurred, but had actually warned the Government of it without effect. The same fate followed the medical officers of the French army, who foretold the terrible outbreak of typhus which occurred in 1855-56, and who were not only snubbed and their warnings unheeded, but in too many cases themselves fell victims to the very visitation they had too surely foreseen but had been powerless to prevent. Out of evil, however, good often comes; and those sad disasters were the cause that, as soon as peace was declared, a Royal Commission was ordered to sit and inquire into the health of the army and the organisation of the Army Medical Department. The body of evidence brought together is of a most valuable kind, and may be profitably consulted by medical officers of both services. The recommendations were very numerous, and, in many cases, have been carried out with most marked good effect. On some other points, however, they were before their time, and will only bear fruit when the people, and especially their rulers, are educated up to them.

One of the recommendations concerns us very specially to-day, for it is to it and to the enlightened efforts in carrying it out by the late Lord Herbert of Lea that we owe our being here to-day. It was, in fact, to give effect to the old suggestion of Robert Jackson and establish a school of instruction for the army medical officer, in which he might learn at least the principles that should guide him in the performance of his duties, which principles he had neither time nor opportunity of learning during his ordinary curriculum. Accordingly, the Army Medical School was established in our old quarters at Fort Pitt, Chatham, and opened with an address by my colleague Professor Longmore exactly sixteen years ago. On that occasion, its illustrious founder, Lord Herbert, was present, and said a few weighty and earnest words in wishing God speed to an institution, which was a new, but destined to be a most successful, experiment. The school was peculiarly fortunate in its constitution, but especially so in the selection of those who were to fill its chairs for the first time. It would, of course, be unbecoming in the presence of my colleagues, who still happily fill some of them, to say much of them; but there is one in whose praise too much could not be said, and who, alas! is no longer here amongst us. Of those who were present on the opening day of the school, three have gone to their rest—Lord Herbert of Lea survived but a short time to see the success of his work; Sir James Gibson, our then director-general, died about eight years afterwards; and, six short months ago, the grave closed over Edmund Alexander Parkes, who may be truly called the founder of the science of hygiene. Of his pure and guileless life, his wonderful sweetness of character, and his scientific worth, my colleague Dr. Aitken gave us a most touching and eloquent account at the opening of last session, and since that the subject has received treatment at the skilled and loving hands of Sir William Jenner, Dr. Orsborn, and others of his friends and admirers. He was a man who never lost a friend and never made an enemy. Of his worth as a writer, you will have ample opportunity of assuring yourselves, as his work will be in your hands. Of the personal charm of his presence, which you, alas! can now never know, I can speak, having worked with him so many years; but it can only be to record what must remain a life-long regret, that the place that knew him can know him no more for ever. It is accepting no light responsibility to undertake to fill the chair of such a man, and I can only do so in the hope that I may be able to impart to you some of the principles he taught in the spirit that he brought to all he did, even although

I may fall far short of so great an example. But to him I may apply the beautiful apostrophe of Lucretius to Epicurus:

"E tenebris tantis tam clarum extollere lumen
Qui primus potuisti, illustrans commoda vitæ;
Te sequor, nostræ gentis decus, inque tuis nunc
Fixa pedum pono pressis vestigia signis,
Non ita certandi cupidus, quàm propter amorem
Quod te imitari aveo."

Of him truly in matters sanitary might be said:

"Tu pater, et rerum inventor;"

and his words may well be called—

"Aurea dicta,
Aurea, perpetuâ semper dignissima vitâ."

The apostrophe is especially applicable, seeing that, before the publication of his *Manual of Hygiene*, twelve years ago, most thick and palpable clouds of darkness surrounded the whole subject, and hygiene, both public and private, was for the most part a mass of scattered and ill-digested material, a mere jumble of empty sayings or else a farrago of absurd and ridiculous maxims. That facts and observations had been accumulated is true; but, unless facts be made use of and reduced to some sort of usable order, they are unproductive. So well, however, was this done by my renowned predecessor, that his book has been the model of all others, the authors of which have done little else than copy the form, whatever they may have supplied in the details. It is a trite saying that there are no classics in science, and happy it is that it is so. It was not so once, when authority was allowed to have a voice in matters of fact; now, happily, we believe the facts, and, if the authority be at variance with them, we reject the authority. But, if there can be such a thing in science as a classic, at least for a time, we may certainly accord that high place to the work of Parkes, for our generation, at all events. And this is due, not only to the industry in collection and the judgment in selection of data, but to the remarkable absence of bias displayed and the eminently judicial character of his mind, which permitted him to give every fact and statement its full value. As one of his friends said, in speaking of his writings and researches, "He died without a theory"; not that he was not fully alive to the importance of theories or the advantages even of hypotheses as aids to investigation, but he was so anxious to establish a sound basis of fact that, with a wisdom as rare as it is valuable, he left the theories to take care of themselves.

On this point let me not be misunderstood: when a man sees a law, he is not only entitled but he is bound to enunciate it; but if he cannot distinguish between a law proper and a crude generalisation, his enunciation of it will only result in his own confusion, unless he take his stand like the famous Abbé who wrote a certain book, and, when he was informed that facts were against his conclusions, replied, *Tant pis pour les faits, mon livre est fait*. Theories wane and disappear, unless they are really the expression of laws; but facts, if they be facts, are eternal, and he who establishes one furnishes at least one stone for a *κτῆμα ἐς αἰὲν*. The work of Parkes, both as a teacher and inquirer, was a good type of the kind of instruction it has been the endeavour to give at this school, where the effort has always been to make practical work its most prominent feature. Of course, principles must be taught as far as they are known, but in a profession like ours a practical acquaintance with all parts of it is the only means of becoming a valuable member of it. I have already referred briefly to the work in general that lies before you in the public service; but, although the same principles must guide all of you, there are differences of detail in each branch of it.

For you, gentlemen, who are about to make India your home, there lies before you a varied and useful career, of which the more especially military duty will form only a small part, the greater part of that being discharged by your brethren of the military service. But to you will be entrusted another and not less important work—namely, the care of the health and well-being of all those millions that crowd the teeming land of the East. You will have opportunities of exercising every department of your profession, both practical and scientific; you will be the civil surgeons of the country, not only trusted in ordinary practice, but those to whom the Government will look for advice and information in everything that concerns the health of the people. On you also will devolve the instructing of the native population in science—natural, physical, and medical—a duty certainly not the least important and valuable when we consider that it probably forms the sole means of breaking down that superstition and prejudice which in all lands, but especially in India, are the great barriers to human progress. I look upon it that the office of the Indian medical officer is one whose importance can hardly be exaggerated: he is, above all others employed there, the true pioneer of civilisation. Descartes has said that if the perfectibility of human nature be possible, it will be through the medium of the medical sciences; and it will be certainly through their

influence that the deepest and most lasting traces of our rule will be left on the vast empire of India. Although the distribution of State honours and rewards has been but meagre in the Indian Medical Department, there is this to be said for the Government of India, that it has shown enlightenment in the fact, that it has been seldom slow to recognise a good man, in whatever branch of the state service he might be. A man, therefore, who will really work, and has a fair share of ability, may be well assured that he has in that country a career of both honour and profit before him. This has been so well recognised, that the service has never wanted men eager and ready to engage in it, and a long roll might be made of names great in science and literature, administration and diplomacy. The position of the medical officer in the navy or in the home army is so very different as hardly to be comparable with that of the Indian officer: all three are servants of the state; they have much the same grades and titles, and all may be called upon to serve in India among other stations; but there, I conceive, the resemblance ends. With the exception of the first few years of his service, during which he is liable to a good deal of knocking about, the Indian officer has a fixity of tenure in his posts which is next to impossible elsewhere; and, unless his health fail him, he rarely leaves a good post except to better his condition. In the navy, on the other hand, "knocking about" is, so to speak, the normal condition of the surgeon during the greater part—in fact, I may say up to the closing years—of his career. When to this came to be added other well grounded reasons of complaint, it was not to be wondered at that men were slow to respond to the call of the state for naval surgeons. Now, happily, many of those causes of complaint have been removed, and old-standing grievances redressed, so that now, although not all a bed of roses, the naval medical service offers a good career to a man who likes a sea-life, and especially to a man with a taste for travel and scientific inquiry. Apparently, however, the attractions of a sea-life are not so great as to induce many to adopt it at the time of life when medical men can enter. When a lad enters young, like a midshipman, he gets inured to his condition in the plastic period of life; but it is difficult in later years to accommodate oneself to the inevitable annoyances of shipboard, among which, speaking for myself, I should include a continual tendency to sea-sickness, from which, however, neither Nelson nor Collingwood was entirely exempt to the end of their career. Another thing that has had an influence in limiting the supply of naval surgeons has been the monotony of life on board, the work being, under ordinary circumstances, comparatively small. On this point it is important to urge upon you all as much as possible to have some occupation or hobby with which to fill up vacant time. Many of your predecessors in the service have done this most successfully, and become distinguished both in art and science. Some occupation is certainly necessary, were it merely to check the tendency to pipes and grog, which is too often the outcome of idleness and vacancy of mind.

The medical service of the army, like that of the navy, has of late years suffered from a dearth of applicants; and we have seen the curious fact, that although better paid as a whole than other branches of the service, the number has fallen short of the requirements, whilst there are for every commission vacant in the line three or four candidates, poorly paid though it be. For this there are several reasons: in the first place, the comparatively late period of life at which the medical officer enters; in the second place, the increasing market value of his services, on account of fewer men proportionately to the population entering the profession, and the numerous new openings in civil life in all parts of the world; and, in the last place, the possibilities open to him are few, in this point differing materially from his Indian brother; whilst in the case of the subaltern there is, theoretically, no limit to his advancement, or the nature of his employment. Of course, only the few draw the prizes of life; but still there is a chance for all, and this forms an element of attraction which has been too often lost sight of.

The above are probably the fundamental causes of the difficulty, but there are of course others, among which we may reckon the frequent moves to which the army surgeon is exposed, a condition that will always operate more or less unfavourably. The consequence has been that the changes in the service have been numerous and frequent of late years, various plans having been tried and proposed. You are now, gentlemen, about to enter upon a career in the army which is novel in character, and of which, as such, it is impossible to say very much, bearing in mind the maxim of the American humourist, "Never prophesy unless you know!" It remains to be seen whether or no the present will be better and more successful than the schemes that have been already tried. The success or otherwise of the scheme is, however, a matter so far beside the question that it does not in any way alter the duties and responsibilities that will be thrown upon you. To you will be entrusted the care of the health of

the army, by means of which we not only guard our own country, but also retain the dominion of our vast Indian empire and protect those of our other possessions that are exposed to the attacks of a foreign foe. Compared with Continental forces, our army looks small on paper, but, small though it be, it is a most costly article, and, therefore, its health and strength require to be husbanded with most jealous care. Our troops are estimated to cost about £100 a man *per annum*, our army vote for home and colonial service (excluding India) being between £14,000,000 and £15,000,000. We keep generally about 60,000 men in India, so that we must add at least £6,000,000 for them, but in reality far more, for the cost of a white soldier in India is very great. There are, therefore, at least £20,000,000 *per annum* required to keep our army on its existing footing. When war breaks out, I need hardly say the value of the soldier is greatly enhanced, and the importance of your services in the prevention of disease vastly increased.

Let us consider briefly what has been done of late years for the health of the soldier. The Royal Commission, appointed after the Crimean war, showed that our troops were dying at home, up to the date of that war, at the rate of nearly 18 per 1,000, or more than double the rate of men in civil life of the same ages. Had this continued, we should now be losing by death about 2,400 men annually, or a body equal to three battalions. As it is, the death-rate has now been reduced to one-half, so that at least a battalion and a half annually are saved; and, during the twenty years that have elapsed since the close of the Crimean war, a whole *corps d'armée* has been preserved to the state. In India, again, the death-rate was (in the prehygienic age) about 69 per 1,000, although the more violent fluctuations render it difficult to state an average with more than approximative accuracy. Now, the death-rate in India has been reduced below *one-third*, so that in round numbers 50 per 1,000 may be considered saved to the state. As we keep an army of 60,000 there, this means 3,000 men a year saved, who, under other circumstances, would have died. We have thus a body of more than 5,000 men annually, who are preserved from otherwise certain death by the more enlightened measures taken for their protection. In a mere money point of view, this represents an annual sum of half a million sterling, or more than the whole medical staff of white troops at home, in India, and in the Colonies, costs the state in pay and allowances. We may safely conclude from this, that, whatever may be his faults, the army medical officer has not been an unprofitable servant.

It may be useful to inquire into the causes of so advantageous a change in the health of soldiers and of so great a saving to the state. These have been carefully set forth from time to time in different ways, starting from the first report of the Royal Commission above referred to, and passing through the various reports, works, and papers that have appeared since. Although one cause appeared to be paramount, yet there were, as may well be supposed, several which worked together to the same end. The inquiry was instructive, because England was not alone in the position it held with regard to its army. The same thing existed in France, in Germany, in Austria, in Russia—in short, everywhere where the exigencies of defence or attack compelled the keeping of a standing army on the modern footing. In every case, the soldier died more rapidly than the civilian of his own age and class, even including the most unhealthy—and excluding the most healthy trades and occupations—such men as night-printers, bakers, miners, night-policemen, watchmen, etc., had all a less serious mortality. Two diseases mainly caused this difference, neither of them, however, by any means strangers to the civil population; these were phthisis and enteric (or typhoid) fever. Now, although to these many influences contribute, there are certain master-causes which statistics and experience have shown to be especially powerful. For phthisis, crowding and bad air; for enteric fever, bad sewage and indifferent drinking-water. To know the cause of a disease is to be at least half on the road to its prevention, and accordingly an intelligent and enlightened use of the knowledge obtained from careful inquiry has resulted in the great reduction of mortality above referred to.

Although much, very much, remains to be done to reach the standard of perfection we hope one day to attain to, the results as yet have been so encouraging that we need not fear that we shall be less successful in our further attempts. Thus, the amount of fresh air at present supplied to the soldier is not much more than one-third of the amount we believe to be necessary, still it is a great advance upon his former condition, and the statistics of phthisis show us the good effects. What may we not hope for hereafter, when the full conditions of sanitary dwellings are attained to? Again, we have in too many cases much left still to desire in the matter of drainage in many stations, but such improvements as have been accomplished have reduced typhoid or enteric fever to an amount that would have seemed almost hopelessly small not many years ago. There seems, therefore, no reason to

despair of stamping out that dreadful disease entirely, perhaps at no very distant date.

Other causes of amelioration of the soldier's condition may be found in his better dieting, especially in its variety and cooking; his improved clothing; and the better arrangement of his accoutrements, and the weights he carries. By these ameliorations, several diseases have either disappeared entirely or else become of extreme rarity. Among these, we may note all those of a scorbutic character, and the true contagious exanthematic typhus. Scurvy in any form is now hardly ever met with in the army; and typhus, which was by no means uncommon in my own recollection, is only met with on very rare occasions in time of peace. That the same causes will produce the same effects has, however, been shown again and again; and the amount of typhus and scorbutic dysentery in the Crimean war was a warning that our administration can never afford to disregard again, except at the peril of the indignation of the whole people. On the subject of diet, we have still much to desire, the constituents being but badly arranged, here redundant and there deficient—the same mistakes occurring in other armies as well as in our own. With regard to the knapsack and accoutrements, the improvement has been great; and for this the greatest credit is due to the Committee which so long and so carefully inquired into the question, of which Committee my distinguished predecessor was the most active and useful member. We have now in our army a pack and a set of accoutrements which will challenge favourable comparison with that of any army in the world. Indeed, we may say that, other things being equal, men will go further and do more without distress, if equipped on our present plan, than under any other conditions that a soldier could be placed in on service. As regards the influence of the old style of equipment, I may refer you to numerous papers and monographs, especially the writings of Dr. Parkes and the Commission before referred to; those of my colleague Dr. Maclean, and the work of Mr. Myers of the Coldstream Guards.

As regards the question of drinking-water, it is less possible to point to positive improvement than in other things; still, much more interest is being taken in the matter, and extended investigations are being made. In places where the water was bad or doubtful, new sources have been opened up, either of a special character or by obtaining water from existing companies whose supplies were presumably pure. The same march of improvement has taken place in India, with equally gratifying results, and to a great extent in those Colonies where we still retain a garrison. Unfortunately, it has in many cases been uphill work; for we have had to contend, not only with difficulties of a physical and local character, but still more severely with the ignorance and prejudice of both uneducated people and those who are called educated. Perhaps the latter are the more dangerous of the two. The former may be got to follow a leader, if an enlightened man of strength of mind and steadfastness of purpose can be found; the latter, in their pedantic ignorance, assume a cynicism that tries to pooh-pooh the earnest efforts of science, and to push them aside with a little ridicule—often a fatally effectual method with the vulgar mind. We have, however, this consolation that, no matter what rebuffs we receive, science is progressive, and the future belongs to her and to those who worship reverently at her shrine. As it is, much ground has been gained, although in some cases we are merely recovering that which was lost (at least in Europe) during the period of darkness that followed the collapse of the Roman Empire. The precepts of personal hygiene are laid down with much judgment and with wonderful precision, considering their opportunities, by both Celsus and Galen, not to speak of others even older. But, when dirt became the odour of sanctity, under the influence of fanatical devotees, personal washing went out of fashion, and every other sanitary precaution with it; and it was not till the revival of learning that people began to think that a little water, judiciously applied to the skin, might be rather beneficial than otherwise. How different from the days when Seneca exultingly spoke of the amount of bathing in cold water that he indulged in—"Tantus ego psychrolutes."

Again, the principles of the hygiene of camps are very well laid down by Vegetius; but how many scores of armies have perished since then from their sheer neglect! Aristotle carefully advises a separate source of drinking-water to be obtained—different from that used for other purposes. In how many modern cities is this attended to? Perhaps in one or two places, where dire necessity compels it under penalty of the most terrible consequences—such as Holland and such like places. To some extent it has also been done in Paris. The consequences of all this neglect was that the middle ages were devastated by plagues and epidemics, of which we find no recorded parallel in classical times. Throughout all the histories of Greece and Rome, the plagues there noted took place in times of forced circumstances, such as sieges, famines, and the like; but even then they pale before the records of the black death or the sweating sickness of later days. Even now, the

reappearance from time to time of, as yet, mysterious maladies, but apparently resembling some of those so dreaded formerly, is a warning of what might befall ourselves if we took no precautions to ensure our sanitary condition. Fortunately, such precautions are being taken more and more carefully, so that now the cholera, or even the plague itself, would in all likelihood make but little way, if either did reach our shores. Even since our last serious visitations of cholera, we have acquired more sure grounds to work upon, and more extended knowledge of the conditions favouring the propagation of disease. The choice of a good site for a habitation has been insisted upon, from time to time, for many ages back; and what constituted a good site was a point but vaguely understood. Although the solid material of the ground is a matter of great importance, it is not the only point in the question. We now know that we have a subterranean as well as a superterranean ocean to deal with; that there is, at a varying depth beneath the surface of the ground, a vast sea, which makes sober fact of the imagination of the poet, when he said that

"—Alph, the sacred river, ran,
Midst caverns measureless to man,
Down to a sunless sea."

We know that this sea is perpetually in motion, and that, if we allow impurities to pass into it, it is capable of returning them to us with interest, either in the water we drink or in poisonous emanations. We know also, further, that we have a telluric atmosphere to deal with as well as our ordinary meteoric one; that this atmosphere contains a variety of constituents, and that its composition forms an index of some value of the impurities to which the soil has been exposed. Indeed, so great appear the telluric influences, that a most important school of hygienists, of which Professor von Pettenkofer is the distinguished leader, is inclined to accord to them the paramount power for good or evil, to the exclusion of almost everything else as a direct cause. Whilst we cannot quite accede to this view at present with the evidence we have, we still must admit, after the researches that have been made, that the soil is at least a most powerful factor in the question. At the same time, the localists admit that other insanitary agents help, if they do not cause, the propagation of disease. But, in the case of the action of drinking-water, we can, I think, go further; for there are groups of cases where cholera has been propagated under circumstances which could hardly leave a doubt that the water was the active cause. Thus, in Holland, it was found that people who drank the water of the Polders (or reclaimed lands) died of cholera at the rate of 17.7 per 1,000; those who drank well-water, 16.8 per 1,000; those who drank river-water, 11.9 per 1,000; those who drank rain-water filtered, only 5.3 per 1,000. The city of Amsterdam itself, supplied by an aqueduct with rain-water from the downs near Haarlem, had only 4 per 1,000.

Another striking point is, that in Rotterdam during the epidemic, as soon as fairly pure water was supplied in the public streets by the authorities, the mortality diminished immediately by one half, in spite of the difficulty experienced in getting the inhabitants to take it. I shall have occasion to cite other cases to you in the lectures on water during the course.

On the questions of air and ventilation, we have also certain definite data which serve as a basis of action in the supply of fresh air to habitations. So short a time ago as in the days of Arago, that distinguished philosopher thought three hundred cubic feet an hour a sufficient supply for one man; we now demand ten times that as a minimum for health, and as much more as we can get in disease. In fact, our sole object now is to imitate natural open air conditions as much as possible by removing limitations whenever we can and letting nature accomplish the ventilation itself. Of course, rigour of climate introduces special difficulties which have to be provided for. Many other points of interest might be touched upon, which, however, I shall have an opportunity of calling your attention to during the course. I may say, however, in conclusion, that a bright future is dawning for sanitary science, not only in our own but in many other lands. Formerly health was talked about and sung about, called the first blessings, *πρεσβιότης μακαρῶν*, and what not, but comparatively little was really done. Now, however, the public is being steadily educated up to the level of knowledge, and a proof of it is the interest excited by the Congress of Hygiene and Sauvetege at Brussels, from taking part in which I have just returned. It is still in session, and has brought together many of the most distinguished men from the various countries of Europe. A variety of questions have been discussed and debated, and whatever may be the immediate practical result, it cannot fail to be the commencement of a great movement, connected as it is with an exhibition of sanitary life-saving appliances from almost every nation. The truth is, that the time may, perhaps, come, when people will think it less worth their while to fly at each other's throats, and

more so to vie with each other in the common cause of humanity. Then, perhaps, they may come to acknowledge the truth of the saying of Cicero in his oration *Pro Ligario*, "Neque enim ullâ aliâ re homines propius ad Deos accedunt, quam salutem hominibus dando".

EPIDEMIC CEREBRO-SPINAL MENINGITIS: REPORT OF *POST MORTEM* EXAMINATION IN THREE CASES OF THIS DISEASE.

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THE two *post mortem* examinations which I here record represent the sole occasions on which I have had an opportunity of making a dissection after death from epidemic cerebro-spinal meningitis; they will, therefore, be conveniently detailed apart from the clinical history of other cases which have lately fallen under my care at the Birmingham General Hospital or in private practice, leaving an opportunity of inserting hereafter the clinical details of these cases.

The two examinations which follow afford confirmation of the truth of Mr. Simon's observations on this subject, that "for practical purposes, the state of the covering membranes of the nervous centres may be regarded as a mere index of changes more or less distinctive which these centres, in their own intimate composition, have at the same time undergone; and hence it is that the essential phenomena of the disease during life consist in disturbances, more or less grave, of the functions of those all-important organs" (Reynolds's *System of Medicine*, 2nd ed., p. 513).

CASE I occurred in the person of a girl, aged 14, who was admitted on June 22nd, on the eighteenth day of the disease, and died on July 16th. I shall merely record here that the origin of the disease was acute, and dated from June 5th; it was referred to the child having fallen into some water and remained in her wet clothes. Certainly, she felt ill the same evening, and shivered and vomited the following day; the vomiting ceased in three days. The headache was the prominent symptom; it was seated in the occipital and frontal regions. The intellect was clear from the second or third day. The symptoms assumed somewhat of an intermittent type, but, during the last ten days of life, settled into a state of apathy, with much depression of vital power, ending in torpor and death by asthenia. The urine was very phosphatic. The temperature manifested a tendency to morning remissions and evening exacerbations, very decided in two quarter periods, very imperfectly marked in the other two quarters. The maximum temperature never exceeded 102 deg.

POST MORTEM EXAMINATION.—No external marks on the body; a loose fibrinous riband in the longitudinal sinus; fluid blood in this and in the lateral sinuses; very marked injection of the minute vessels over the entire surface of the brain; but the arachnoid and pia mater retained their normal transparency, and could be stripped off the brain with ordinary facility. To this statement there are the following exceptions.—Just at the anterior extremity of the superior vermiciform process of the cerebellum was a collection of not very recent yellow lymph in the pia mater, over a space not half an inch square; a similar deposit at the base of the cerebrum covered the chiasma, and a few broad streaks existed in the membrane at each Sylvian fissure, running for a short distance along the vessels. The lateral ventricles had plainly been subjected to distension; at the present time, they contained a moderate quantity of opaque highly albuminous fluid, in which Dr. Saundby found blood-corpuscles and small round granular nuclear cells. Their ependyma was sufficiently thickened to float in water as a consistent semi-transparent membrane. The surface of all the nervous masses in the ventricles showed minute branching vessels filled with blood, and the surface-tissue was rather soft. The blood-points throughout the white tissue of the brain were large and numerous, and on the surface of the convolutions the perivascular spaces were very distinct. The grey substance throughout the cerebrum was deeply tinged with pink; this pink colour, very apparent in the convolutions, was especially striking in the large ganglia. The ganglion-cells in the corpora striata were well formed. Dr. Saundby examined some of the minute vessels of the grey matter of the brain, and reported them simply loaded with blood. In all other respects, the brain-substance was healthy. The spinal cord presented nothing abnormal, excepting injection of the pia mater, which, though considerable, was less marked than in the brain. There was the same strongly marked pink colour of the grey matter as already noticed on the cerebrum. The tissue of the cord was of

normal tenacity; the rest of the nerves were healthy. The muscles of the back presented a granular appearance in the sarcolemma. There were fibrinous clots in the heart. The spleen was small but healthy. Nothing else was presented worthy of note. The blood was not unusually fluid.

CASE II.—The patient was 24 years of age. He was admitted for pleurisy. He had a very cachectic appearance, and gave a confused history of some foregoing illness; but neither in his description nor in the symptoms he presented was there anything to lead to the supposition of peculiarity in his case. He was recovering from his pleurisy, when, with no apparent reason, he was attacked with purposeless vomiting and retention of urine; the vomiting continued for three days and then ceased; but the man became rapidly apathetic, then torpid, and died asthenic on the sixth day of this last illness. The retention of urine passed into involuntary evacuation. Inquiry from the friends elicited a manifest history of cerebro-spinal meningitis, and ample confirmation was afterwards obtained from Mr. Bradley, who had attended the patient. Mr. Bradley described to me the symptoms of the simple form of the disease. The attack commenced on the 7th of last February; a brief relapse occurred; but convalescence was sufficiently established to permit of Mr. Bradley taking his leave on March 23rd. Of the subsequent attack of pleurisy, Mr. Bradley knew nothing; the patient came into the hospital on May 13th and died on the 29th.

POST MORTEM EXAMINATION.—The arachnoid and pia mater had undergone remarkable thickening over a limited space at the base of the brain, presenting a tough semitransparent membranous web covering the chiasma, stretching across the interpeduncular space, enveloping the pons Varolii and medulla oblongata and enclosing the cerebral nerves at their origin. The adhesion of the membrane to the pons and medulla was so close that it was impossible to separate it without damaging the nervous tissue. It covered the fourth ventricle and thence extended down the cord. The thickening extended on the under surface of each cerebellar lobe for about an inch in breadth, thence gradually ceasing; it appeared also as a broad band running across the anterior edge of the cerebellum, above the mesocephale. A very scanty deposit of firm yellow lymph existed in the pia mater, upon the chiasma and beneath the parietal layer of the arachnoid upon the basilar process. In all other parts, the membranes of the brain were quite healthy. The ependyma of the lateral ventricles was much thickened, and could be raised as a semitransparent membrane of considerable tenacity. The lateral ventricles were largely dilated, but no unusual quantity of fluid was found in them at the time of the *post mortem* examination. The tissue enclosing the ventricles had an unusually fibrous appearance, as though it had been subjected to stretching. No abnormal appearance existed in the brain, except that its tissue was generally softer than usual, but not in any one part particularly. The pia mater and visceral arachnoid of the cord were much thickened through the entire length, closely encircling the cord with a dense envelope, which bound down the roots of the nerves and adhered to the cord itself along the posterior surface only. The apex of one lung was broken up, and there were remains of fluid in the pleural cavity. No other morbid change existed in the body.

CASE III.—In a third *post mortem* examination on a patient of my colleague (Dr. Fletcher), who died after an illness of six weeks, the principal appearances consisted in the presence of a soft flocculent lymph over a very limited space extending from the chiasma to the posterior edge of the pons Varolii; of a small patch of the same material over the root of the right suboccipital nerve; and of two or three similar patches within the subarachnoid space of the upper dorsal region of the spinal cord. The cerebral arachnoid was more resistant than usual, and was opaque where stretching across the sulci: in the upper dorsal region the spinal arachnoid was also opaque. The ventricles were distended. The condition of the cerebral tissue closely resembled that in my first case. One kidney was excessively atrophied, thereby accounting for the presence of a considerable amount of albumen in the urine during life.

RECURRENT EPISTAXIS FROM MALARIAL INFLUENCE.

By E. M. SINCLAIR, M.D., Surgeon-Major Royal Artillery.

WITH reference to the paper by Surgeon-Major J. H. Porter of Netley, on Intermittent Hæmorrhage from Malarial Influence, read before the Royal Medical and Chirurgical Society in February last, the following case of intermittent epistaxis from the same cause may prove of interest.