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A SKETCH OF THE GROWTH OF THE SURGERY OF THE FRONT IN FRANCE.

An Address to the Abernethian Society of St. Bartholomew's Hospital.

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IT is about eighteen years since I addressed the Abernethian Society after my return from the South African War, where I had been in surgical charge of the "Portland Hospital."

I had at that time got to know much of the work of the Army Medical Service, and subsequently, as Consulting Surgeon to Millbank Military Hospital and in other ways, I had kept in touch with this branch of our profession. It was probably partly in consequence of this that, when the war was about a week old, I was offered by Sir Arthur Sloggett the appointment of Consulting Surgeon in France, and my friend Sir George Makins was also selected. I have never been able to learn why the B.E.F. did not require our services at once, but the fact is that it was past the middle of September before they allowed us to leave England, and it was the 23rd of that month before I sailed for Havre.

I lost no time in going to Paris, for it was there that the headquarters of the L. of C. was situated, and I was soon visiting various hospitals in or near that city. The Battle of the Aisne was drawing to a close, and our casualty clearing stations were engaged in field ambulance work and in entraining wounded. During the fighting at Mons, in the retreat, and at the Marne they had not been employed, and at the Aisne also most of their kit and stores were not being utilised. We had as yet no motor ambulance cars. Many of the wounded came into Paris, but most of them were being sent to Rouen, so after a few days I also went there, and spent my time in the two general hospitals which were at work.

Everything I saw pointed to great difficulties in dealing with the wounded at the front, and I was deeply impressed by the condition of the patients on their arrival at the base hospitals. It seemed to me that I might be of more use further forward than at Rouen, and this feeling was very much accentuated when I learnt that the British Army was leaving the Aisne and moving northwards. I therefore asked if I could not be of more service in that direction, and was much gratified to receive an order on October 12th telling me to report at general headquarters. I lost no time in obeying, and left early next morning for Abbeville. Beyond that town the roads were crowded with army transport of every kind, and I did not arrive at St. Omer till 5.30 p.m. on October 13th. It was getting dusk, but inside the town I met Major Poe, R.A.M.C., whom I had last seen at Rouen, and who had arrived in charge of our first motor ambulance convoy. He told me that he was just off "to a place called Hazebrouck," that there had been fighting on a large front that day, and that he expected to bring in 420 wounded. Little did he or I think that this was the opening day of what would ever after be known as the "First Battle of Ypres"!

I had arrived at the nick of time. Early next morning I was at the office of the Medical Department, and found that Col. (later Major-General) Tuckey O'Donnell had recently been appointed to be "D.M.S. Front," and was the senior officer at G.H.Q. at that time. I soon saw him and the A.G., Lieutenant-General Macready, and explained that I had been sent out as Consulting Surgeon, and that I wanted to stay at the front. It seemed to have been generally accepted that the only proper place for all consulting surgeons was the base, but as there were only two of us, and as Sir G. Makins was working hard at Boulogne, I did not have much difficulty in obtaining permission to stay and help with the 420 wounded who had arrived, or were arriving, at No. 1 C.C.S. in the "College de St. Joseph." I was then supposed to have come to G.H.Q. temporarily, but, as it turned out, my stay lasted for the rest of the war.

I have only a few words more to say by way of introduction, but it is necessary to mention that I found the "D.M.S. Front" most helpful in every way and most sympathetic towards my proposals or suggestions. Later on he became the D.D.G. under Sir Arthur Sloggett, and was replaced in 1916 by Sir W. Macpherson when he left us to take up the chief administrative appointment in India. From all these officers I received every assistance and encouragement throughout the war, as I also did from their successors, Sir Charles Burtchaell and Major-General J. Thomson.

I think that my work was all the easier because my previous experience in South Africa enabled me to realise from the beginning that the Army Medical Service was essentially an integral part of the whole Army, and that it must be considered always as a part which was intimately related to various other parts, and could not be considered as if it were a detached unit.

Thus, it was the considered policy of the Army before the war that no wounded should be retained near the front longer than was absolutely necessary, and that consequently they must be evacuated to the L. of C. on the first opportunity. The Army had decided to get the wounded out of its way as soon as it could, and it did not wish to have large hospitals near the front, which would require the transport of food and ordnance supplies on railway lines or roads urgently needed for military stores of every description. It had further to be realised that the "military situation" always dominated everything, and that one must not expect to be always furnished with a reason for decisions opposed to one's own opinions. It is necessary to keep these facts in view in order to realise that radical changes in the

surgery of the front could not be made by the Army Medical Service with a stroke of the pen, and that the decision on many matters did not rest with the Director-General alone, but was a concern of the General Staff also. It is not appreciated by many, for example, that the site of a C.C.S. and the arrangements for the transport of wounded are matters which can only be settled in conjunction with the "Q Branch" of an army, or that the alteration of the whole policy of evacuation of sick and wounded was a matter which interested the General Staff.

Now we come to the ever-famous "First Battle of Ypres." During this fight our army had only a comparatively small number of men in the field, namely, six depleted infantry divisions and three cavalry divisions. I am not going to describe the battle; it would take a great deal more than the time at my disposal, but it began at Hazebrouck on October 13th, and it was continued by the gradual advance of our troops until, in the north, we passed beyond Ypres. The country was at that time very pretty, with sloping hillsides and woods, and it may interest you to know that at a place called Polygon Wood a number of horses used to be trained for the "International Horse Show" at Olympia. What happened during the next few weeks was that we and the French, and north of us the French Marines at Dixmude, and north of them the Belgians, were fighting very hard to stop an overwhelming mass of Germans, with an equally overwhelming mass of artillery, who attacked on the whole front from Bethune to the sea, and the casualties that we suffered were in no way represented by the number of the wounded. In those days it happened over and over again that whole companies were practically annihilated. They stood their ground, they returned the fire of the enemy, they fought until they died, and that is why there were comparatively few wounded in proportion to the dead. But before they laid down their lives they killed by accurate and rapid rifle fire a sufficient number of Germans to ultimately stop the onset.

We had six clearing stations at work. One was in Ypres, but it was shelled out the first week, and had to be taken to Hazebrouck, which was twenty miles back, and where there was already another. One was at St. Omer, about thirty miles back, and was used as a sort of base hospital. One was at Poperinghe, which is behind Ypres. One was at Bailleul; one was at Bethune. The last three were our only C.C.S. units close to the battle, and the one in Bethune was shelled out before the year ended.

Now let us just look at the situation for one moment, and think of what the C.C.S.'s could do for the 13,000 men who were wounded in this fight. They each consisted of a staff of only six medical officers, a commanding officer, and a quartermaster, and they each had altogether eighty orderlies. They were equipped on plans made during peace, merely with the intention that they should act as places through which the wounded could be passed from the field ambulances into a train, and they were never intended to do operative surgery. They had no beds and only 200 stretchers; they had hardly any instruments; they had each one operating table; they had no sterilising apparatus and very few towels, there were no gloves, there were no gowns. So when I arrived at the front on October 13th I realised that the more numerous field ambulances must do most of the emergency operations, and that anything on a large scale in the way of front-line surgery was impossible for the moment. But it was very evident that as soon as the opportunity came there was much which might be done.

Officially, the first battle of Ypres lasted until November 17th, but it went on for a little longer than that. Towards the middle of November it was suggested that some beds might be got for the worst cases in the C.C.S.'s and we got twenty beds to start with. That was a beginning, but when we got the beds we said—"It is no good having beds for sick patients unless you have nursing sisters"! The latter were not supposed to go to the C.C.S.'s, but when we got the beds we asked for them and said: "Until you have sisters you will not get a sufficiently high ideal of work." We wanted to do things as well as they did them at any great civil hospital; so we got twenty beds to begin with, and we got five nurses to each C.C.S. That was in November, and at Christmas I came back for a few days to London, partly for leave, but I also came back with authority to obtain considerably more equipment for the C.C.S.'s.

So ended 1914, but, although the obvious changes in front-line surgery were but small, the all-important principle had been conceded, namely, that the C.C.S.'s no longer existed merely for the purpose of evacuation, but were allowed to treat, operate upon, and retain wounded men. A small beginning, it is true, but one that contained great possibilities for the future.

1915.

I returned to France early in January, and from that time onwards we began to do regular operating work in C.C.S.'s and to train surgical staffs. At this stage also we had to come to some definite decision as to the lines on which we were going to work. Were we going to ask that a large number of experienced operating surgeons should be sent out from England to take front line work at the C.C.S.'s, or were we not? I knew that there were many operating surgeons in England who were doing very hard work, and I knew that some of them who could do first-rate work at home were not young enough to stand the racket of C.C.S.'s work night and day, and, if we did get them out to France, others would have to be found to take on their work, so my impression was that we ought to train our own staffs at the front. But I pointed out that it was no good training the staffs unless it was arranged that they should, as far as possible, not be changed. There is a tendency in all armies to move people about, and you might go to a unit one day and find so and so there; go the next, and find somebody else in his place. Well, from that time onwards we started training some men and casting out others whom we did not find good enough, until we had a satisfactory, capable, energetic lot of young surgeons, and I can never sufficiently express my admiration for the way in which the front-line surgery was done by them.

The next event was that, on March 10th, there came the crowds of wounded from the Battle of Neuve Chapelle. Up to this time the British Army had expected daily to move forwards; the idea always was that we were going to advance, and the consequence was that, because of this idea, the supply of additional equipment to C.C.S.'s was postponed. The main object of the Army was, of course, to beat the Germans, and everything was subservient to that, for the wounded man necessarily takes a secondary place in war. Supplies of munitions and food for the fighting men—that is the first consideration. I did not grumble, but I only tell you the fact that, as far as front-line surgery was concerned, we were necessarily handicapped by the idea that we were going to advance. The next thing that handicapped me personally was that the General Staff had not yet learnt how far it could trust us civilians or our proposals to do operations at the front. When events were leading towards the Neuve Chapelle fight, I knew beforehand that there was going to be a battle, but I was not told anything officially until the battle had actually begun. The fact was that in March, 1915, we had not yet got to the stage when those in authority turned to us and said to the consulting surgeons: "There is going to be a fight; it is going to take place on such a day and in such a place. Make the necessary surgical arrangements, and be ready for the treatment of so many wounded." That all came a little later, when the Ds.M.S. of armies worked with the active co-operation of their respective consultants. So "Neuve Chapelle" arrived, and with it 12,000 wounded for whom there were very few C.C.S.'s. It was impossible, of course, for the latter to deal with the majority of the wounded, nor were they intended to do so, for at that time the policy of the British Army was still the same as that of all the other armies when the war began, *i. e.* "We will not in battle deal with wounded men at the front; operating work has got to be done at the base." And it must be recognised that evacuation to the base was very good and rapid in this battle.

On April 22nd the "Second Battle of Ypres" began. On May 9th our attack on "Festubert" began, and those fights overlapped. There were 60,000 wounded during April and May. During that time we had ten C.C.S.'s at work, and I felt myself that the strain on them was greater than it had been even in the First Battle of Ypres, while the surgeons at the base were no more than sufficient in numbers for their own work. And so we went on during the spring and summer of 1915, training staffs of C.C.S.'s to do the surgical work, putting the C.C.S.'s into huts or tents instead of in houses, increasing accommodation for operations, adding to the equipment, and, as a result, accomplishing all that was surgically necessary during times of comparative calm, but always overwhelmed when there was a great battle.

And then after a short rest came the next battle—"Loos," on September 25th, an attack by the First Army. Before that time my friend Col. Wallace had come out, and he took one section of the front, which was in the area of the First Army, while I carried on in the Ypres section, in the Second Army. Just before the battle of Loos, an "advanced operating centre," as it was called, was created near Bethune, and that deserves to be mentioned because this was the first time an advanced operating centre was pitched in front of existing C.C.S.'s for a battle. Unfortunately it was swamped by the number of cases brought in, and the few C.C.S.'s could not do more work for the wounded than had been accomplished by the C.C.S.'s in previous battles.

During the year 1915 we had had altogether 196,000 wounded, and of these about 50,000 were wounded at Loos, and 60,000 were wounded in April and May at Ypres and Festubert.

After the battle of Loos Col. Wallace and I felt that the time was ripe for a more definite recognition of the value of the front-line surgery, and we therefore asked for an increase of the surgeons in the C.C.S.'s, and especially for reinforcements before heavy fighting began. We pointed out that the C.C.S.'s were now able to do very valuable work at the front so long as we were not overwhelmed, and our proposals were very cordially received by the Director-General.

So the year 1915 closed. It had been a time of disappointment for the Army, because all our expectations of a general advance had come to naught, and now a period of trench warfare had become established. But as far as surgery was concerned the change was advantageous, for we had been enabled to further increase the equipment of the C.C.S.'s since Neuve Chapelle, and to make them into real front-line hospitals. The combatants themselves looked to us for help, and no one actually at the battle front questioned any longer the policy of providing the wounded with prompt surgical treatment. The C.C.S.'s had indeed already won the confidence of the Army, and now they were bound to progress yet further.

1916.

The year 1916 opened very quietly. A Third Army had been formed in the Albert region, with Col. Alexis Thomson as its Consulting Surgeon, and a Fourth Army was in process of creation. It was this increase of the Army

that brought about in April my appointment as "Advising Consulting Surgeon" at G.H.Q., and I was given a sort of roving commission along the whole front, with the duty of advising in all surgical matters. I had already the rank of Surgeon-General, and this was of very great assistance in my new post.

Preparations were beginning for our attack in the Somme region, and I accordingly spent a good deal of time in the area occupied by the Fourth Army, on whose front the fight was to take place. Here I enjoyed the fullest opportunity of hearing from the D.M.S., Surgeon-General O'Keeffe, the arrangements which were being made for the C.C.S. work, and I now had also the advantage of discussing the proposals at first hand.

The chief difficulty was that the railway communications were as yet quite insufficient for all the requirements of the army, and, as supplies and munitions had first claim, it was difficult to get sanction for as many C.C.S.'s as seemed to be necessary. But we were going into a very big fight and the wounded were certain to be very numerous, so the Director-General ultimately arranged for the provision of fourteen C.C.S.'s to hold not less than one thousand men each; some of them could take nearly two thousand, and we provided in addition a very good advanced operating centre for abdominal cases, with about forty beds, near to Albert.

Further, and most important of all, we were able to increase all the surgical staffs before the battle began, and were also allowed to bring to our help the surgical specialists from other C.C.S.'s further north, arrangements which greatly assisted the work of Cols. T. Sinclair and Maynard Smith, who were associated with me as consultants, for it should be mentioned that soon after the fight began our Fifth Army came into being. During this battle I lived at a C.C.S. near to Albert, and took charge of certain areas as a consulting surgeon.

It was well we had made large provision in the C.C.S.'s, for on the first day there were 22,500 wounded, the next day there were 16,000, the next day there were 9000. After that matters eased off, yet the total number of casualties during the battle was over 300,000. It was fortunate also that during this fight we had fourteen medical officers instead of six in each C.C.S., and instead of five nurses we had fifteen; and as the result of the increased staffs, and in spite of the pressure of battle, I had the satisfaction of reporting to the Director-General that we had done 30,000 essential operations under anæsthetics at the front during a period of three and a half months. That brings us to the end of 1916—a year in which front-line surgery made a very great advance and established itself on a sound footing.

1917.

Now we come to 1917. Great encouragement was given to us by the Director-General to materially increase the staffs of C.C.S.'s; but in consequence of the German Army retiring over a large portion of the front, arrangements had to be made in addition for an advanced operating centre behind Arras. The scene of battle had now shifted northwards to the areas of the Third and First Armies, whose consultants were Cols. H. M. Gray and C. Wallace, and whose Ds.M.S. were Surgeon-Generals Murray-Irwin and W. Pike. The surgery had already become everywhere very much more efficient than it had ever been before. The "Thomas" splint, which formed such an important feature in our work was now being universally used by the C.C.S.'s and field ambulances of every army, and it had even gone as far forward as the regimental aid posts in some areas. The best methods of applying it had been thoroughly taught during the winter by all the consulting surgeons, and its use and the use of other new first-aid splints had been demonstrated in every field ambulance as well as in the C.C.S.'s on the whole front. This personal education very soon proved of the greatest possible value.

The battle at Vimy and Arras, which began on April 9th, was fought by our First and Third Armies, and many new C.C.S.'s were provided before it began. It had to be unduly prolonged in order to help the French, who had got into great difficulties on the Aisne, and our prolonged attacking under very unfavourable conditions gave rise to many more casualties than would have occurred if we had only required to do as much as we ourselves wished. But the surgeons of the C.C.S.'s were reinforced by "surgical teams" from other units, comprising a surgeon, a sister and an anæsthetist, and good work was done everywhere.

Then came the "Messines" fight on June 7th, further north still, and when I returned to the Second Army I was glad to find that Col. Gordon Watson was the Consulting Surgeon, and he and I arranged, under Major-General Porter, the D.M.S., for the treatment of the wounded. Well, that was a most completely successful fight. The arrangements of the D.M.S. for bringing the wounded into the "corps dressing stations" and the C.C.S.'s worked most smoothly, and 18,000 men were treated very thoroughly in three days. Most of the C.C.S.'s held as many as 1000 patients and had fifteen nursing sisters. In no previous fight had the wounded done so well.

And then arrangements had to be made with the Ds.M.S. of the Second and Fifth Armies (Surgeon-Generals Porter and Skinner) for the "Third Battle of Ypres"—the "Passchendaele fight"—which began on July 31st, and we were very fortunate in being able to provide for yet larger reinforcements of surgeons than formerly. There had recently arrived a number of American surgeons, and some of them were amongst the very best surgeons in the whole of America. They were not yet required for their own army, and by getting them and a number of our own colonial surgeons—

Australians, Canadians, New Zealanders, and South Africans—we created enlarged and most efficient staffs for the C.C.S.'s, so that each of these had at least twenty-four medical officers, and we were also enabled to double the operating equipment. Each C.C.S. kept eight operating tables at work, and no less than 60,000 wounded were treated under anæsthetics during the fight. That was the best thing that we had yet done, because, as the total wounded in the three and a half months amounted to 196,000, those 60,000 represented about 30 per cent of the whole of the wounded who passed through the C.C.S.'s. It should also be noted that it was during this fight that blood-transfusion was first employed on a large scale. Almost the whole of the necessary operations were done at the front on this occasion, and the result was that never before had the wounded in the general hospitals done so well.

Before this battle had well finished another attack of ours blazed up at Cambrai on November 20th. The Germans replied by an attack on November 30th, and our C.C.S.'s, although they were very near the line of fire at one time, managed to hold on to their sites, and practically all the wounded were adequately treated.

The year 1917 came to an end soon after this battle, and the Army Medical Service could look back on its front-line work with a good deal of satisfaction. The wounded had reached a total of nearly 500,000 in the year, but in spite of such great numbers a far larger proportion of them than in any previous year had been thoroughly treated at the front. The equipment of the C.C.S.'s had become very complete, and the arrangements for reinforcing hard-worked units had been fully tried and not found wanting.

1918.

We entered next upon what proved to be the last year of the war—1918. It began very peaceably; there was nothing doing. I wandered over the front to see that all was in readiness, and found but few wounded anywhere, although we all knew that this was really the calm before the storm. There was subsequently a lot of talk about our being surprised by the German attack, but there was not a word of truth in this statement, for all C.C.S. commanders of the Fifth Army had been warned by the D.M.S., Surgeon-General Skinner, that the attack was impending, and later we got definite information that it would take place on March 21st.

On the morning of that day I started early, and from twenty-five miles away I could hear the roar of battle. I went down to the headquarters of the Fifth Army, and even after eleven o'clock there was so dense a mist on the hills that you could not see 100 yards. It was in that mist that at dawn the Germans had managed to push their way between our outposts, where our line was very thin, for the Fifth Army covered about forty miles of line with only fourteen divisions. I got down to headquarters of the D.M.S. at Nesle, and afterwards went on further forward with the Consulting Surgeon, Col. Maynard-Smith, to a place called Ham. There I found the most advanced of our C.C.S.'s working splendidly, but there had been a fire in the medical stores in the village, and the railway line between this C.C.S. and the next one at Cugny was broken by shell fire. We heard, however, that the patients had been got away to Compiègne, so I went on to a group of C.C.S.'s further north. Here also everyone was working hard, for they were close to the main road leading from St. Quentin, and great numbers of wounded were arriving. On this day and early on the next practically all the wounded were satisfactorily treated in the C.C.S.'s. Afterwards there were many who could not be brought in, because, for one reason, the roads got so blocked with traffic, retiring guns, and innumerable lorries that the ambulance cars which took patients to the C.C.S.'s from the field ambulances could not always get back to the field ambulances to pick up the next load. The result was that a certain number of wounded were necessarily left behind, although not before many of them had been carefully dressed and splinted by the field ambulance staffs. Some Units lost their all, but others saved a great deal of their kit and equipment. Every C.C.S. of the Third and Fifth Armies had to retire, but many of them were reconstituted in the neighbourhood of Amiens and within a day or two were again at work.

The Germans claimed 93,000 unwounded prisoners, but the actual number was, I believe, about 46,000 wounded and unwounded put together, and not a single patient once in a C.C.S. was captured. Wonderful stories went round the base, and even to England, as to the number of people who had been captured, and one rumour said "the whole of No. 00 C.C.S. has been captured with all the staff and the nurses," etc. It was all invention, yet, considering what had happened, it was surprising that there were not more reports of disasters. But then there was a complete absence of anything like a panic.

In only one instance were a few patients left behind, and then they were left in charge of a medical officer and some orderlies. It was the right thing to do at the time, for the capture of the whole staff would not have helped matters. But even in that case some cars and lorries were sent back, and everyone was evacuated before the Germans arrived. Meantime the train service to the base had been first-rate, and the general hospitals received the wounded with but little delay. Fortunately, we had anticipated that the latter would be heavily worked, and more operating theatres and more surgeons were waiting in readiness before the call for action came. The Ds.M.S. and the consulting surgeons of the Third and Fifth Armies, Cols. Gray and Maynard-Smith, had had a very anxious time, but the worst of the pressure was all over within a week, for by the 28th the

retreat had stopped and the German attack had already failed.

The real cause of the failure was the complete defeat of the German assault on the Arras sector on March 28th. After having rushed the south of our line they made a very determined effort to get through further north, at the junction of the First and Third Armies, but there was no mist as there was on March 21st, and our artillerymen were able to get on to their troops where they were massing behind the line, and machine gunners and rifles fired into them as they came nearer. We heard afterwards, what we did not know at the time, that after the attack had failed with tremendous losses Ludendorff abandoned the main offensive, and you will remember that the further German advance towards Amiens never came off.

Fighting continued, however, in April and May in the northern part of the line which we called the "Kemmel area," and also on the Armentières-Bethune front in the region of the Lys, but although some of the C.C.S.'s had to retire, the front-line surgery continued without much interruption in all three armies, and while the people in England were still full of anxiety, we in France were confident that before the summer was out our turn would come to advance ourselves.

You will remember that on May 27th the Germans attacked the French on the Aisne. We also had some divisions down there—divisions which were not up to strength and which suffered very severely, although they held on, and by holding on they helped to prevent Rheims from being taken. But the French were defeated and were driven back beyond the Aisne, and in consequence one of our C.C.S.'s in this region was captured, and as the staff remained so as to care for the wounded, they were captured also.

We now come to July, the month in which the tide of battle began to turn, although the full flood did not run till August. On July 4th—Independence Day—the Americans came into the battle line for the first time near Villers Bretonneux. They had been ordered by their own people to be under our command for the attack, and then at the last moment for some reason the order for them to join in the attack was countermanded. This caused great disappointment, and one section of the Americans behaved as Nelson did when he put his blind eye to the telescope, and "did not hear the counter-orders." The attack was a very successful one; there were not many wounded, and all were easily dealt with by our surgeons.

On July 15th came the last attack of the Germans. They crossed the Marne, but were violently counter-attacked by French, British and Americans on July 18th, and at that time and subsequently some of our C.C.S.'s had very heavy work near the Marne, and were so overfilled with wounded that many of the latter had to be passed on to American and French units for treatment.

It was early in August that I became aware of movements of large numbers of cavalry and guns, all very mysteriously done at night, and I realised that there was something big on foot. But it was only twenty-four hours before it actually took place that I and Col. Gask, the consulting surgeon of the Fourth Army, were told officially that there was to be a big attack by us in the area of the Fourth Army on August 8th.

The warning was short, but the C.C.S.'s were ready in every way, and ample reinforcements of surgical teams arrived in plenty of time, so that when the battle did begin on the morning of August 8th we were quite prepared for it, with plenty of C.C.S.'s and plenty of surgeons. In four days we had about 18,000 wounded.

The attack of August 8th was a complete surprise, as you may remember. It was a surprise to you over here; it was a surprise even to some of the troops who took part in it, and it was a very great surprise to the Germans. That day marked the beginning of our own great offensive, the opening of the greatest battle that has ever been fought, and the beginning of a British advance which ran the Germans to a standstill, and which practically never stopped until the enemy were completely defeated and the armistice was signed.

During the earlier part of the battle the fighting was mostly in the south, but after a short time it spread over the whole line. There was a brief interval after the end of August, and then in September we got back once more to the old position of the Hindenburg Line. When we got as far as that inquiries were set on foot to ascertain whether our troops were over-tired, now that they had fought continuously for six weeks, but all the information pointed to the fact that they were still full of go and keen to attack, so Sir Douglas Haig decided to press home the advance and to attack at all points.

The consequence was that on September 27th, 28th and 29th our great assault took place on the Hindenburg Line, and in the north the Belgians joined in with the Second Army. On the 27th and 28th the Second, Third and First Armies attacked, and finally, on the 29th, the Fourth Army. The result was a universal advance, heavy losses, but a complete destruction of the German *morale*; for now that they were driven back from what they had believed to be an impregnable position the fighting spirit was knocked out of them, although the First, Third and Fourth Armies had some strenuous opposition in very difficult country early in October.

I need hardly remind you that these advances of ours always meant a constant moving and re-pitching of our C.C.S.'s, which had now to leave their huts and some of their equipment behind them and do their work in tents. But before each fresh advance there was generally a little breathing time, and, as everything was planned and thought out beforehand by the various Ds.M.S. and their consulting surgeons, the C.C.S.'s were generally all well placed and well equipped before the fighting of the next stage began. During the earlier part of our advance the stress of the work fell successively on the Fourth, Third and First Armies, and then on the Second Army. The Fifth Army had not been in the line since the great German attack, and was only just being reinstated when our own attack opened on August 8th. It became engaged in September.

As far as the surgery was concerned there was increasing difficulty in supplying sufficient staffs as more and more of the whole Army became engaged, but almost everywhere the high standard which had been reached was maintained in spite of the difficulties.

A greater trouble was that the C.C.S.'s had often to send some patients to the base before operation or else to evacuate others sooner than was surgically advisable because of the constantly recurring calls to pack up and move on with the victorious troops. It was a penalty of success, and this evacuation to the base was really urgently necessary, because the devastated country and the destroyed railways quite prevented, at the time, the moving forward of the general hospitals.

The Great War was now drawing towards a close, but it was destined not to end until we had crowned our success by an advance in the old "Ypres salient," and here, on October 14th, the Second Army fought for the last time over the old battle-field. The D.M.S., Major-General Guise Moores, pushed up our clearing stations in preparation for this fight, now not only as far as they had been before the previous March retreat, but this time as far as Ypres itself, and we established a group of three at Brielen, just outside Ypres.

I told you that I originally arrived at the Ypres front on October 13th, 1914, and here we were back again on October 14th, 1918, after an interval of just four years. I had heard the first shells come into Ypres, and that day I heard the last. It was interesting to realise that, whereas in 1914 there was no attempt to perform surgical operations at the front on a large scale, in 1918 no less than 40 per cent. of the whole of the patients who were brought to the Brielen C.C.S.'s of the Second Army were anæsthetised and passed through the operating theatres during heavy fighting.

Extraordinary changes had taken place in the treatment of wounded men between the first battle of Ypres in 1914 and the "Last Battle of Ypres" in 1918.

You will remember that when Napoleon returned from Elba there was a campaign which was called "The Hundred Days." The great battle that the British Army began on August 8th and finished on November 11th, and which resulted in the defeat of the Germans and the ending of the war in 1918 instead of continuing through the winter, lasted just about the same time. It will very likely be known in future as "The Hundred Days' Battle of the Great War."

During this period we had more than 300,000 wounded to deal with, but the accumulated experience of many battles and the systematised methods developed by constant practice enabled the work to be done with comparatively little difficulty. It is of course true that at times the C.C.S.'s were overworked, and that the quality of the surgery suffered. This must always occur in great battles because of events beyond the control of the Medical Service. Yet, even when this is admitted, it may still be claimed that the British surgery of the Front showed a continuous improvement in each successive year of the Great War.

THREE CASES FROM LUCAS AND HENRY WARDS.

By C. F. BEYERS, M.R.C.S., L.R.C.P.

(1) CASE OF FIBRO-SARCOMA OF MUSCULO-SPIRAL NERVE.

SARCOMATA of peripheral nerves are comparatively rare, and this case is of interest in that a nerve of the upper extremity is affected. These tumours are most commonly found in the nerves of the lower extremity, more than half the recorded cases being sarcomata of the great sciatic nerve.

Frances J—, æt. 19, a book-folder, was admitted to Hospital on June 6th, 1919, complaining of a swelling of the left arm and wrist-drop. She noticed the swelling when she was twelve years old, and suffered no pain or inconvenience from it until a month before admission, when it became painful. It increased in size and she developed wrist-drop. On examination an ovoid swelling as large as a hen's egg was discovered in the left arm at the junction of its middle and lower thirds. It was situated on the outer side of the external inter-muscular septum and beneath the outer head of the triceps. The swelling was solid, and possessed a smooth surface and a clearly defined outline. It was not attached to the bone and was freely moveable from side to side but not in the long axis of the arm. The forearm was not wasted. Marked wrist-drop was present. The electrical reactions of the muscles were as follows: The triceps was normal, the extensor carpi ulnaris and the extensor communis digitorum showed partial R.D., while the other extensors of the wrist and fingers and the supinator showed complete R.D. The musculo-spiral and posterior interosseous nerves were inexcitable.

An incision was made over the swelling and a soft encapsuled tumour connected with the musculo-spiral nerve was discovered. The nerve-sheath was seen proximally to spread out over the tumour and some of the nerve-fibres could be traced into its substance. The tumour was excised

and on section proved to be a fibro-sarcoma. No nerve-fibres were observed in the section.

As the continuity of the nerve was preserved as much as possible, and owing to the fact that the tumour has probably only a local malignancy, the prognosis may be regarded as favourable.

(2) CASE OF CHRONIC INTESTINAL OBSTRUCTION DUE TO CICATRISATION OF AN OLD ULCER OF THE ILEUM.

Albert D—, æt. 26, an international footballer, was admitted to the Hospital on June 7th, 1919.

He was quite well until February, 1919, when he contracted a sore on the penis in Lagos, Nigeria. After an intravenous injection of salvarsan he became very ill, with continuous vomiting, abdominal pain and melæna. From that time he began to lose weight very rapidly. He referred his pain to the lower part of his abdomen, coming on about eight hours after meals, and accompanied by rumbling and gurgling noises. He came to England, and attended at the London School of Tropical Medicine, where an exhaustive examination of his stools, blood and urine was made, but no evidence of tropical disease was discovered. He was given salvarsan again without any ill-results. A Wassermann examination proved to be negative.

On admission to this Hospital he was found to be very emaciated, and suffering from pain and nausea after food with occasional vomiting. His abdomen was distended, and visible persistalsis with borborygmi was present. An X-ray examination was made, and showed considerable delay in the passage from the ileum to the cæcum.

A laparotomy was performed. The ileum was found to be much distended, and on tracing it downwards a constriction was discovered about 12 in. from the ileo-cæcal valve. A lateral entero-enterostomy was performed. The structure was evidently the result of the cicatrisation of an intestinal ulcer, single, circular in outline, and situated on the side of the intestine which is furthest away from the mesentery. The ileum was much distended, and for some inches on the proximal side of the ulcer it was greatly thickened and inflamed. The operation wound was closed without drainage. There was a slight fæcal discharge on the second day, but this ceased on the twelfth day, and the general condition of the patient has improved steadily.

(3) GALL-STONES OR RENAL COLIC.

The following case of repeated attacks of colic associated with a large right-sided abdominal tumour is interesting from the point of view of diagnosis. The question that had to be decided was whether the colic was renal or biliary in origin.

Mrs. Hannah J—, æt. 74, was admitted to hospital on June 26th, 1919. She has always had "bilious attacks," which consisted of headaches and discomfort after meals, but without pain or vomiting. She was slightly jaundiced on one occasion in 1916. She has had increased frequency of micturition for some years. The attacks of colic began three months before admission. The pain was felt in the right side of the abdomen and in the small of the back. There was no jaundice and no vomiting and she says that her stools appeared natural. On the other hand she found that during an attack she would at first pass very small quantities of urine and then a large amount, which appeared to relieve her pain very greatly. She says that her urine became "gritty" during the last week.

On admission her temperature was normal and her pulse 88. She was not jaundiced. Her abdomen was slightly rigid, and a large, tender, moveable tumour could be felt to the right of and slightly above the umbilicus. The tumour could be moved in an upward and side-to-side direction, but not downwards. The outline was rounded and well defined and the surface quite smooth. On palpating the right lumbar region pressure appeared to be communicated to the tumour and *vice versâ*. On percussion the tumour was dull and the dulness was found to be continuous with the liver dulness. A tentative diagnosis of floating kidney with hydronephrosis or less probably of biliary colic was made. On operating through a lumbar incision the right kidney was found to be normal in size and not displaced. The patient was therefore turned over on her back and the usual gall-bladder incision made. A much-distended and inflamed mucocele was discovered, and after evacuating the contents of the bladder a single large stone was found impacted in the cystic duct. Cholecystectomy was performed and the patient made a rapid recovery.

I am indebted to Sir D'Arcy Power, K.B.E., for permission to publish these cases, and to the dresser, Mr. L. M. Billingham, for taking the careful notes which are here summarised.

TWO CASES OF ACUTE INTESTINAL OBSTRUCTION.

By SAMUEL GREEN, F.R.C.S.(Edin.), Waimate, N.Z.

IT is almost necessary to apologise for publishing two cases of such a relatively common catastrophe as "acute intestinal obstruction." The two cases are very similar, in so far as the cause of the obstruction was situated at the terminal portion of the ileum; furthermore the actual lesions found are comparatively uncommon.

Negative signs and symptoms are not mentioned.

Mrs. W—, æt. 44, awoke suddenly at 3 a.m. with a griping abdominal pain. Seen at 6.30 a.m., by which time there had been a second attack.

She seemed to be anxious about herself. Careful examination revealed nothing except slight rigidity of the right

REPORT ON THE SURGICAL WORK with the SOUTHERN FORCES

23rd. July - 5th. Aug: 1918.

On 23rd July I went to 63 C.C.S. at SENLIS - on the 25th. to 50 C.C.S. at SEZANNE, on the 26th to 48 C.C.S. at EPERNAY.

On the 28th I returned to 50 C.C.S. and on the 29th to 63 C.C.S.

On the 31st I went to G.H.Q. South for the night, returned next morning to SENLIS and remained there till 5th Augt: when I reported at G.H.Q. and returned to Etaples.

The wounded as a whole showed a high proportion of bullet wounds Gangrene was relatively scarce - and although there was a long and trying journey in Cars between the F.A. and the C.C.S. there was less shock than might have been expected. This was probably due to the warm weather. Owing to the distance of 50 and 63 from the front very little could be done for abdominal wounds in either, but cases of this kind were operated on at 48.

63 C.C.S. at SENLIS received all the wounded from two Divisions, with the exception of about 1,500 light cases which were dressed at a F.A. post at VILLERS-COTTERET and sent direct to the Base. When I arrived there was only the Ordinary Staff of a C.C.S. (7 M.O's) and an X-Ray Officer. The Nursing and Theatre work were done by members of the French Red Cross whose help was invaluable. It was impossible to work more than one table continuously and many cases which required operation had to be sent to the Base without it.

Major-General Thompson had already telegraphed for two teams and on the morning of the 25th Colonel JONES applied for a third. Two teams arrived after 48 hours delay and Major HUGHES arrived alone on the 30th - three days later.

The materials for treatment were ample, but owing to the number of cases and the lack of personnel, the operated cases, over the whole period, were less than 10% of the total wounded (excluding Gas Cases and those sent from VILLERS-COTTERET) For the first two days less than 5% were operated on.

On the other side of the salient there were two C.C.S's. 50 and 48. - 50 which had been very hard pressed, received two teams

on the evening of the25th, and was then able to get through the work well enough.

48 C.C.S. established an advanced operating centre with part of its personnel in EPERNAY which dealt with the most urgent cases.

The Nursing in 50 was done by Volunteers from the F.A.N.Y. working with the French, until some sisters arrived.

The nursing at 48 was done by Orderlies during my stay.

The Surgical Supplies were sufficient at the time of my visit, the evacuation worked well, and the accommodation was good in all these places.

The only Surgical difficulties in both areas were due to want of personnel, which led to an unduly low proportion of the wounded being operated on - The two X-Ray Officers had to act for some time as Surgeon , and Anaesthetist respectively, and owing to the shortage of Sisters, a female Anaesthetist had to work in a Ward.

All the Officers concerned, particularly the three Surgical Specialists, worked hard and well, consequently all the most severe and urgent cases were dealt with, but it is the early treatment of the slighter cases which is of the greatest military value.

As the conditions met with were new I venture to submit the following suggestions in case a similar situation should arise again.

(1) That for every Division there should be at least one C.C.S. on the spot - even if it cannot be opened at once. A second C.C.S. Could have been opened at VILLERS-COTTERET at any rate as soon as trains began to run there. Even without trains it could have done much useful work, as 48 did at EPERNAY under similar conditions, and if it had been impossible to open it at all, the personnel could have reinforced 63.

(2) Since the greatest pressure is usually at the beginning of an engagement, and since reinforcements may take some days to arrive, each C.C.S. ~~SHOULD~~ Should take with it three or more extra teams whenever it is required to go with an isolated body of troops outside the British area. If one C.C.S. is ever required to serve two divisions, this number should be doubled, and some Officers added for Reception Room and Ward duties.

(3) That the Sisters should be at least twelve in number, and should either accompany the C.C.S. or follow it within 24 hours. In all these places there were towns adjacent where billets could be procured at short notice, but in each case there was a delay of some days, before any Sisters arrived, and the heaviest nursing work had then been done, as well as possible, by outside help.

Colonel.
Consulting-Surgeon.

H.Q., Etaples.
7th Augt: 1918.

TREATMENT OF WOUNDS IN REGIMENTAL AID POSTS AND FIELD AMBULANCES OF THE SECOND ARMY.

June 1917

1.—Dressing of Wounds.

Picric Acid Solution (2% in methylated spirit) may be used in preference to iodine for skin sterilisation, to avoid the risk of blistering the skin. If iodine be used, Cyanide gauze should not be employed.

Time will be saved if the gauze is previously cut into squares (8-in.) and packed in ration tea tins having circular detachable lids. Wool should be cut into larger squares and packed into biscuit tins. The tins may be sterilized by "flaming" with methylated spirit. As an alternative, gauze may be cut into squares, boiled in saline and packed in "marmite" pots ready for use.

"EUSOL" is recommended as a standard lotion.

All extensive flesh wounds should be immobilised by splinting.

2.—Minor Cases.

Minor cases who will not require re-dressing at a Casualty Clearing Station should have their card envelopes marked with a large "O," before leaving the Main Dressing Station.

Within the circle of the "O" the time of the last dressing and the date should be stated.

3.—Operations.

These should be mainly restricted to the arrest of hæmorrhage and the removal of shattered limbs.

4.—Hæmorrhage.

Tourniquets should be removed at the M.D.S. and the hæmorrhage dealt with before the patient is sent on to the C.C.S. When it is considered essential to send a patient with a tourniquet still applied to a C.C.S., steps should be taken to secure immediate attention to the patient on arrival there, if possible by sending an orderly with him.

Hæmorrhage should be arrested:—

(i.) By ligature of bleeding vessels when possible.

(ii.) Failing this, by application of pressure forceps, which should be protected by adequate dressing, from displacement during transport.

(iii.) By gauze packing into the depth of the wound, when the bleeding point cannot be localised. When a wound is packed it must be well opened up on the surface, so that the plug is cone shaped, with the apex of the cone towards the bleeding area.

Anæsthetics should only be used in exceptional cases.

Fluids should be given freely and morphia sparingly.

5.—Amputations.

Amputations should only be performed for completely shattered limbs.

These cases seldom require, and do much better without, an anæsthetic.

The limb should be "lopped" off at the seat of injury, and a set amputation be avoided.

No attempt should be made to close the stump, but its surface should be slightly smeared with B.I.P.P.

These cases should, if possible, be retained for 24 hours before removal to C.C.S.

6.—Fractures.

Thomas' Splint should be applied as the initial treatment for all fractures of the femur, all wounds of the knee joint and all fractures of the upper third of the leg (if possible this splint should be applied in the Regimental Aid Post). The splint must be applied *over* the clothing, and extension be secured by two loops of bandage round the ankle *over* the boot (one on either side), tied off to the foot end of the splint. As an alternative method the boot upper may be slit close to the sole on either side in front of the heel, and a loop of bandage, passed by means of forceps between the sole of the foot and the sole of the boot through these slits, be used to extend the limb by tying to the foot of the splint.

The wound should be dressed *after* extension has been secured, by cutting away the necessary amount of clothing to expose the injury.

A bandage should then be applied round the splint in such a manner as to prevent movement of the limb, but great care must be taken to avoid constriction of the thigh. If there be extensive comminution, Gooch's or Fibre splinting of adequate length should be applied at the site of fracture.

The splint should be slung to a suspension bar, or supported by sandbags on the stretcher.

If the Thomas' splint cannot be employed owing to the situation of the wound a strong interrupted Liston should be used.

Wood fibre splints, made according to the patterns circulated to Divisions, should be employed for walking or sitting cases with fractures of the upper extremity.

When other varieties of splints are used they should be well padded and fixed to the limb by plaster *before* the limb is bandaged. The proximal strip of plaster should not encircle the limb.

7.—Abdominal Wounds.

Abdominal wounds should be sent to the C.C.S. with the least possible delay.

Large doses of morphia (more than ¼ gr.) increase operation mortality, and should be avoided.

Wounds of the buttock, loin and lower thoracic region often involve the abdominal cavity.

If there are signs of intra-abdominal hæmorrhage a binder should be applied to the abdomen over wool, and thirst should be relieved.

Ambulance cars with spring stretcher suspension should be used whenever possible.

Patients with abdominal wounds usually travel more comfortable in a semi-prone position than flat on the back.

8.—Wounds of Thorax.

Severe cases, except during gas attacks, should be retained at the M.D.S. and kept absolutely at rest until shock or other urgent symptoms have subsided.

The semi-recumbent position will usually be found the best for travelling.

Wounds should be dressed with gauze which is retained in position by strapping. Where a wound is bleeding freely it should be cleaned and, if possible, sutured (without a general anæsthetic). If air be entering freely the wound must be stitched, or plugged with gauze held in position by strapping, so as to render the wound air-tight. Great care must be taken to prevent displacement of the plug during transport.

9.—Shock.

To prevent the advent of shock during the transit to C.C.S., the patient must be kept warm by means of plenty of blankets placed under and over him. If he be restless these blankets must be secured by safety pins.

A patient profoundly shocked on admission should be retained and resuscitated before further moving. Hypertonic saline infusions are preferable to normal saline infusions for this purpose and may be prepared according to the following formula :—

Sodium Chloride	...	180 grains.
Potassium Chloride	...	4.5 grains.
Calcium Chloride	...	4.5 grains.
Boiled Water ...	...	1 pint.

Hypodermic injections of camphor will be found helpful, using 10 to 15 minims of the following solution :—

Camphor	...	1 grain.
Ether	...	5 minims.
Olive Oil	...	5 minims.

10.—Gassed Cases.

Absolute rest is essential.

The outer clothing should be removed as soon as possible to prevent further inhalation of gas which is absorbed by the clothing. Orderlies engaged in this duty should wear respirators.

Cases at all badly affected may be treated by early venesection, 10 to 15 ozs. of blood being removed. (To be noted on Field Medical Card.)

Restlessness may, if the patient be conscious, be treated by ¼ gr. of morphia hypodermically. (Hour of administration to be noted on F.M.C.)

Fluid diet only to be given, and in small quantities.

An emetic of salt and water is helpful *in the early stages.*

Many cases are collapsed and require plenty of blankets and stimulants, e.g., camphor or pituitrin hypodermically, or brandy by the mouth.

Where oxygen is available, the severe cases, both the cyanosed and those in a state of pallid collapse, should be treated by a continuous inhalation.

11. Morphia.

The time of administration as well as the amount of morphia given must invariably be noted on the F.M.C.

2nd F.S. Co. 3080—1500—1-6-17

Rules for the Surgery of Regimental Aid Posts and Field Ambulances of the Third Army.

All Officers, especially those who have recently come from home, are instructed that as far as possible the treatment advocated in the "Memorandum on the Treatment of Injuries in War" should be carried out, unless this is not in accordance with the treatment advocated in official memoranda issued later and which are founded on more recent experience.

Special stress is laid on these points :—

1. The following are the only operations of magnitude which are sanctioned as routine procedures :—

(a) Completely smashed limbs should be removed and the patients retained, if possible, for at least 24 hours before being sent to a Casualty Clearing Station.

(b) Hæmorrhage should be arrested by ligature of bleeding vessels whenever possible. If this cannot be done, application of forceps left in situ or direct pressure by gauze packing *in* the wound itself should be resorted to. In the latter case, the superficial part of the wound must first be incised so that it is made wider than the deeper part, and clot or visible foreign bodies rapidly removed. "Corking" of the wound must be avoided. Special attention must be given to wounds which have been, and are, steadily oozing. A general anaesthetic may be dispensed with in most cases.

Patients should never be sent on to a C.C.S. with tourniquets controlling hæmorrhage. Tourniquets have often caused ordinary gangrene, they predispose to gas gangrene and they always cause severe pain.

2. In cases of fracture of the extremities, splints should always be applied before the limb is bandaged and prevented from slipping by fixing each end to the skin with strips of sticking plaster. The upper strip should not encircle the limb. All large flesh wounds should be supported by a splint. All wounds of joints should be immobilised by a splint which extends to the whole length of the bones entering into the articulation. This is of especial importance in the case of injuries of the kneejoint.

3. Thomas' splint is to be applied as early as possible in all fractures of the femur unless a wound very high up prevents its use, in which case an abduction frame or Liston's interrupted splint may be used. At R.A.Ps. the Thomas' splint should be applied *over* the clothing and strong extension made at once by a clove-hitch over the boot (knot on the outer side). Clothing necessary to allow dressing of the wound should be cut away. The limb should be hung in a "ham" splint, or short piece of Gooch, to the Thomas' splint and a short anterior splint bandaged on. The foot and leg should be fixed by a figure of 8 round the boot and splint. If applied in the field or in the trenches, the lower end of the splint must be made to clear the stretcher by some means, e.g., the foot-piece reversed. At the A.D.S. the stretcher suspension bar is to be used. If the boot has been removed extension is made by a clove-hitch round the ankle, which must be well padded with sphagnum moss and great care must be taken to protect the limb from cold. Such cases must be thoroughly inspected at the A.D.S. or Main D.S. to see especially that extension is efficient. The minimum of handling the limb must be made.

4. Abdominal wounds require treatment at a C.C.S. as soon as possible, and, although penetration be doubtful, should be at once sent on by special motor ambulance. All wounds of the lower part of the chest, loins or buttocks, which are associated with abdominal pain, are probably penetrating wounds of the abdominal cavity and should be treated as such.

Operation on the abdomen are to be done at the C.C.S. only.

5. Chest wounds penetrating the lungs and having large openings admitting free passage of blood and air, should be treated by cleansing the wound, plugging it with gauze, and applying rubber plaster so as to close it hermetically. Thereafter, urgent symptons frequently subside rapidly. All chest cases should be propped in the position most comfortable for them (usually semi-recumbent) and kept absolutely quiet. An injection of morphia may be given to relieve distress. All severe cases should be kept until shock and very urgent symptoms are ameliorated, usually 24 hours. All chest cases must be immediately evacuated in case of a gas attack.

[P.T.O.

6. Neither amputation wounds nor any other wounds should be closed by sutures. They should be left completely open, except for the dressing. "Exteriorisation" of wounds must be aimed at as a general rule. Clot and gross infective material should be rapidly removed, and the walls and lips of the wound separated by the insertion of loose folds of gauze, or even a shell dressing, wrung out of very weak antiseptic or 5% saline solution. In amputation stumps and minor wounds "Bipp" (recommended by Prof. Rutherford Morison) may first be smeared on. Small entrance or exit wounds must not be opened up, unless considerable oozing is occurring ((1) (b)).

7. The applicaiion of iodine to the skin, followed by the use of cyanide gauze, results in severe blistering, therefore this combination should be avoided. Much time may be saved by having gauze cut into 8" squares and boiled in salt solution in a "marmite." When a small wound is to be dressed, one or two layers are lifted off and folded to the requisite size. Picric acid in spirit (2-3%) is to be used instead of tincture of iodine in A.D.Ss. and Main D.Ss.

8. *Visible* foreign bodies, or displaced *loose* fragments of bone should be removed, especially in the neighbourhood of large vessels, or projecting from joints or from the surface of the brain.

9. All severe cases requiring early operation should be sent at once to the C.C.S by a special motor ambulance. They should not be kept waiting for the regular convoys. No solid food should be given. Camphor solution (camphor 1, olive oil 4, ether 5 parts) may be injected intramuscularly (10—20 minims) in collapsed cases.

10. C.Os. must ensure that the hot water bottles of the ambulance cars are properly filled and used for all serious cases. Blankets should be tied on if the patients are restless.

11. At Main D.Ss. and certain A.D.Ss., minor wounds should receive special care so that they may not require attention at the C.C.Ss. The envelope of Field Medical Cards of such cases should be marked with a large "O." Time of dressing should, in all cases, be noted on the card. The nature of the wounds, *e.g.*, whether small or large, etc., should be indicated. Waste of dressings must be avoided.

(Signed) J. M. IRWIN,
Surgeon-General, D.M.S.

Headquarters, Third Army.
6-3-17.

3rd Field Survey Co., R.E. 1939 7-3-17

O.H.M.S

Colonel Sir Anthony Bowlby Chief
Consulting Surgeon
G.H.Q
France

CiK


WAR OFFICE

War Office,
Whitehall,
S.W.

Feb. 15

My dear Dorothy

I suggest we will put forward proposals for you & Watkins to be S.Ms.

Regarding eye cases

at Clearing Stations -
would an ophthalmologist
be useful at front
rather than at
Boulogne? If so
advise in that
direction - Yrs Ever
A Keogh

War Office,
Whitehall,
S.W.

Jan 24. 1915

My dear Bentley

Your letter regarding promotion came at a time when I was revolving the matter in my own mind. I am not of opinion that a consulting surgeon should be a Surgeon-General, but I think that

he should not be debarred from being one.

I think promotion to the very highest grade of the service should be very sparingly given, and I gather from your letter that you would probably agree with these two principles.

I think that you & Watkins

men of mature years, of recognised positions in the profession & with definite experience of active service in previous years (I will say nothing about your known friendliness to the Lords). should be promoted. I have not done anything about it here, I mean in the way of sounding people who will have to do with it. It must in any

case be a proposal from G.H.Q. & Mozzetti should put it forward. I will propose it to him if you like, or leave you to do so, whichever you prefer. If I do so, would you mind my quoting from your letter? – Reply to me as soon as possible.

Yours sincerely
Aspinall-Oglander

Oct 24
'17

May I draw your attention to a matter which is a cause of much dissatisfaction among the civilian medical officers now in the R.A.M.C.

The following quotation from a recently received and unsolicited letter will put the matter before you as it appears to the writer, who is one of our best Surgical Specialists at a C.C.S., and who has been either at the Base or the Front for three years.

He writes:-

> "I would like to interest you in the question of "promotion for Surgical Specialists. In every "other branch of the Army promotion is going on "except on the surgical side of the R.A.M.C. Work. "I do not believe it would be wise to promote every "Surgical Specialist, but I believe that every "Surgical Specialist of, say, two years standing "should be given his Majority. I am not "particularly interested in the question of pay, but "there again, there is a grievance. An officer "(in charge of surgical or medical divisions gets "10/- and 7/- per day charge pay, at a General or "Stationary Hospital) but if he goes to a C.C.S. "where he does much more work, he forfeits that".

The writer of this letter expresses the views of many others, and there is a growing feeling of discontent at what is considered a very real grievance, and this spirit is, in my opinion, thoroughly justified by the facts.

It is a fact that no one has ever been promoted for the way in which he has performed his duties as a Surgeon. That alone is almost inexcusable, It is also a fact that the work of a Surgical Specialist, both front and the L. of C. has been of the most arduous and responsible nature. He has one of the most important positions in the Corps because of the immense increase in the surgical work and of the thousands of patients whose lives and limbs are entrusted to his care. It is common knowledge that the work of the operating surgeons has been widely and fully appreciated throughout the whole Army, and there is no need

for me to express my own appreciation of the self-sacrifice and fine spirit which has characterised the performance of every duty. There is not a branch of the service but would acknowledge that this is true.

The feeling of grievance has recently been accentuated by the fact that in the Colonial Medical Service there is not this arrest of promotion, and men who do good work obtain promotion in recognition of it. The result of this is a most regrettable anomaly, for, when Australian or Canadian Surgeons, with rank of Major or Lt.Col. come up in "Surgical" Teams to C.C.S's., they invariably find out that the "surgical Specialist" under whose directions their work is arranged, is of no higher rank than Capt.

It is also very trying to a man who has worked out here for the whole of the war to find, as he often does, that a Surgeon who has just arrived from England has come out with the rank which is denied to him, in spite of his services in France.

As my correspondent truly says "In every other branch of the Army promotion is going on except on the surgical side of the R.A.M.C.". The officer who enters the Army "for the duration of the war" and is serving in the Artillery, the Infantry, the A.S.C. or the Intelligence, may reasonably expect that good work will be rewarded by promotion. Why is the R.A.M.C. to be the sole exception?

I should like to point out that this want of recognition of surgical ability and hard work is very prejudicial to the reputation of the whole R.A.M.C.. There is a feeling that, no matter how good a man may be in Medicine, Surgery or Pathology, he will not get promotion for work of a purely professional nature, and that it is only by giving up these and applying for an administrative post that he will even get promotion. I am quite certain that such a spirit is most unfortunate, if the R.A.M.C. is to continue to receive the support of the Medical Profession, and, if, at the end of this war, it can be truly said that no one has throughout its years of stress been promoted for excellence of

work as a Surgeon, nothing will ever be able to excuse such an injustice, and the position and reputation of the Corps will inevitably suffer.

I feel sure that you will understand that I bring these matters before your notice because, now that the war is in its fourth year, the need of promotion for professional work is more than ever felt. It was not to be expected that promotion should be given within the first year or so of the war, but, as time goes on, it is more and more a subject for complaint that there is still no promotion for surgical or medical work in the R.A.M.C., and I hope that the Authorities in whose hands these matters are placed will see that the grounds for complaint are removed.

aaw

RAMC 365/7

Dictated.

GENERAL HEADQUARTERS,

BRITISH ARMIES IN FRANCE.

*No.*_____

7th March, 1918.

Dear Sir Robert Hudson,

First. May I congratulate you on the most interesting report of the Finances of the Britihh Red Cross Society. I read it with great appreciation of the work you have all been doing in England, to help, both us in France and others elsewhere.

To-day I went to one Stores at Boulogne and I heard from Major Guise that you are feeling that there is need of more caution in spending your money. Well, I don't propose to try and teach you anything about finances, but I do want you all to feel that the "Red Cross" has become so valuable a support to us all in our Daily Work that I think that nothing should be done to impair the confidence which everyone feels in it; and if it were said that the B.R.C.S. had to curtail the expenditure on the innumerable things it does to help the British soldier I think it would be a bad thing all round.

May I suggest that, in the first place, the British Public will "see us through", and that we may rely on their coming to the rescue if we are really pressed.

In the next place, I would suggest that we can more easily save on certain gross expenditure than on the innumerable smaller things which constitute the more "personal" part of Red Cross Work. For example - I don't think it is our job to build huts for Hospitals; and I think that Motor Ambulance Cars can be just as well bought and maintained by the Army as by the Society even if we run them. I think that the supply of Hospital Trains and Ships and Motor Boats is rather a Government concern and not in the Regular line of work of the British Red Cross Society. These things would certainly now be done by the Government if we did not do them ourselves, so that no one would suffer if we left them alone in the future.

On the other hand, the work that the Society does at every seat of War which is concerned with the personal help of individual sick and wounded is on a completely different footing. The provision of all sorts of stores and articles to supplement the Government supplies makes all the difference between "necessaries" and "luxuries". It does not matter whether we get more hot water bottles than can be indented for, or bed socks or extra towels and

GENERAL HEADQUARTERS,

BRITISH ARMIES IN FRANCE.

*No.*_____

operating gowns, or linoleum for a floor or pulleys for a splint. The all important thing is that we can rely on getting all these, and a hundred others, from the B.R.C.S., and also that we can get them quickly. There are also lots of articles which the Army does not pretend to supply andwhich the B.R.C.S. does supply for that very reason. And I am quite clear in my own mind that these smaller things are the things that really matter. It is for these that the soldiers look to us - the Red Cross - and not for the gross things which are more Government concerns.

You know that I have been at the front since September,1914, and no one has had more experience than I have had in that time of all that our men have gone through, and all that the Casualty Clearing Stations and Field Ambulances have done for them. You at home know that you have done much to help us, but you really don't know or fully realize <u>how</u> much you have helped us, or <u>how</u> much we have relied on the B.R.C.S. for support which has never failed. My own feeling is that we ought to save in every other possible way before we curtail expenditure on those stores and supplies which are in so special a way the very things for which everyone looks to the Red Cross, and never looks in vain.

I confess that I feel almost selfish in writing to ask you not to curtail your expenditure in France, because I amconscious that I have become so accustomed to turn to the B.R.C.S. for help that I should be much handicapped if I know that we had to be more economical in the requests for stores of various kinds.On the other hand I am sure you would not like that I should not tell you how invaluable has been the help we have always had and how much we should feel it if expenditure had to be cut down.

Yours sincerely,

Sir Robert A.Hudson,Kt.,
83 Pall Mall,
LONDON.

BRITISH RED CROSS SOCIETY
Incorporated by Royal Charter, 1908.

THE ORDER OF ST. JOHN OF JERUSALEM IN ENGLAND
Incorporated by Royal Charter, 1557 and 1888.

JOINT WAR COMMITTEE.
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Chairman of Joint Finance Committee, Sir ROBERT A. HUDSON, G.B.E.

Telephone No
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Telegraphic Address:
"Assistance, Charles, London."
Please reply to
Sir ROBERT HUDSON,
Room 72.

85, PALL MALL,
LONDON, S.W. 1.

13th March, 1918.

My dear Sir Anthony,

I am really obliged to you for your letter of the 7th instant. It is most helpful to have the views of one who is at once so good a friend of the Red Cross and so qualified to advise us.

I may tell you privately that, in the main, we take your view, and are resolved that, if reduction of expenditure has to be effected, Stores shall be the last branch of our work to be cut down.

I imagine you have on your file a copy of your letter of the 7th. Do you mind telling me whether you would have an objection to our printing it for circulation among our people? I admit that this involves the high probability that it might be quoted in the Press. Would you object to this?

If we could publish it I think it would be a material help to us in our task of persuading people to give us the money necessary to carry on our work. Everyone has confidence in your judgment, and when you tell us what a vital part our Stores play, I think the public would resolve to see us through.

With warm regards,

I am,
Yours sincerely,

Robt A Hudson

Surg.-Gen. Sir Anthony Bowlby, K.C.M.G., K.C.V.O.,
G.H.Q., 2nd Echelon,
British Armies in France.

Sir,

It is with great regret that we learn of the proposed retirement of Sir Arthur Sloggett, the Director General of the Army Medical Service. We venture to place our opinions before you, because we consider it is right that you should be informed of the views of some of the civilian members of the Royal Army Medical Corps, and these civilians constitute more than 90% of the whole of the officers of the Corps now serving in France.

Had time permitted we could have obtained a very large number of other signatures, but we are confident that we express the opinions of the great majority of all the civilians with the Royal Army Medical Corps in France.

We have all served under Sir Arthur Sloggett since the years 1914 or 1915 and we wish to point out that under his control the greatest possible advance has been made in the treatment of the sick and wounded, and further, that the greatest advances of all have been made during the past twelve months.

He has always been most sympathetic in the reception of any suggestions for the benefit of the British soldier and has consistently placed the welfare of the soldier before all other considerations. We are fully conscious of the difficulties with which he has had to deal; of the unprecedented numbers of wounded for whom hospitals and new methods of treatment have had to be provided; of the constantly increasing demands of surgeons and physicians for the employment of new and improved methods of treatment; of the previously unknown causes of invaliding for which remedies have had to be found; and of the needs for developing an entirely new school of surgery at the front.

All these difficulties and many others have been met and faced by the Army Medical Department under Sir Arthur Sloggett in the best possible spirit. He has never failed to support and press forward everything that has seemed likely to be of benefit to our Army, and he

has supported all proposals for the scientific investigation of various forms of illness.

We are of the opinion that it is greatly to the interest of the Army in France to retain the services of Sir Arthur Sloggett, and we believe that this is also the opinion of the great majority of all the other civilian members of the medical profession now serving in the Royal Army Medical Corps. It seems to us that the present moment, when a great battle and a prolonged summer campaign are imminent, is not the time when a change should be made in the command of the Corps to which is entrusted the welfare of our wounded soldiers, for all such changes must involve a re-arrangement of other important appointments and must necessarily create difficulties.

~~It is impossible to believe that such a proposal can be supported on the ground that it is likely to be beneficial to the Army and we~~ We believe that ~~the public as well as~~ the Medical profession would be opposed to changes, made at a critical time, which might interfere with the efficiency of an administration which has won the confidence and approval of our Troops.

John Rose Bradford.
Major General
Consulting Physician. Etaples & Abbeville
Areas L of C.

CONFIDENTIAL.

55577/84. (A.M.D.1). 15th May, 1918.

Sir,

In reply to your confidential letter S/43, dated 1st May, 1918, I am commanded by the Army Council to inform you that in view of the long and arduous strain which has been placed upon Lieut.General Sir A.T. Sloggett, K.C.B.,K.C.M.G., K.C.V.O., in the performance of his duties during the last 3½ years, the Council are of opinion that his case is not one in which special exception should be made to the rule that it is not advisable for officers who reach the age for retirement to be retained in the positions they hold on such dates.

While fully sensible of the distinguished part that the Officers, Nursing Sisters, and men of the Medical Services have played during the period Sir A.T. Sloggett has held his important position, a result which reflects much credit on his personal exertions, the Army Council have decided that Major General G.H. Burtchaell, C.B., C.M.G. will succeed Lieut. General Sir A.T. Sloggett as Director-General Medical Services, British Armies in France, as from the 1st June, 1918, and that he will be granted the Temporary Rank of Lieut. General while holding the appointment.

I am,
Sir,
Your obedient Servant,

Sd/ B.B. CUBITT.

The Field Marshal,
Commanding-in-Chief,
General Headquarters,
British Armies in France.

D.A.G.
Original to M.S. Branch Intlld/ W.S. 17/5/18.

THE DEVELOPMENT OF BRITISH SURGERY AT THE FRONT.

BY

SURGEON-GENERAL SIR ANTHONY BOWLBY, K.C.M.G., K.C.V.O., A.M.S.,

AND

COLONEL CUTHBERT WALLACE, C.M.G., A.M.S.,

CONSULTING SURGEONS, BRITISH ARMIES IN FRANCE.

IT is not possible in a few pages to do full justice to the developments of British surgery during the war, but it is reasonable to place the more salient facts on record, and to summarize, however briefly, the present position of surgical work in the British Expeditionary Force in France and Belgium.

THE REGIMENTAL MEDICAL OFFICER.

It is unnecessary to write at length on the work of the regimental medical officer, for his duties in this war are much the same as they have ever been. He shares the dangers common to the combatant officers and men, and stays with his battalion or brigade, as the case may be. His treatment can only be that of first aid, but he and his orderlies have saved innumerable lives, both by the rescue of wounded comrades from dangerous situations and by careful and rapid transport to the field ambulance sections in the support line.

THE FIELD AMBULANCE.

At this, the "advanced dressing station," there is a personnel of two or three medical officers, non-commissioned officers, and orderlies, and it is here that the first-aid dressings can be supplemented by additional dressings and by suitable splints, so as to ensure a more easy transit to the "tent section" of the field ambulance, a mile or two further back.

The field ambulance has not needed to undergo any very radical changes during the war, because its constitution and personnel proved it to be thoroughly well suited to its duties. But its surgical equipment has been very greatly improved and increased, so that it is in all respects well supplied for the performance of any urgent operation undertaken for conditions which do not require that the patients should be retained for any length of time.

The following instructions, which are amongst those issued in all the "armies" at the front, will best indicate the limitations of their work:

"(1) Only operations of emergency should be performed in field ambulances, but the following exceptions must be noted:

"(*a*) Completely smashed limbs should be removed, and the patients retained for at least a day before being sent to a casualty clearing station.

"(*b*) Haemorrhage should be arrested by ligature of bleeding points whenever possible. If this is not possible, then plugging or direct pressure on the wound itself should be resorted to. Patients should never be sent down with tourniquets on their limbs.

"(2) Abdominal wounds and all severe cases requiring early treatment at a casualty clearing station should be sent there by a special motor ambulance direct from the advanced dressing station. They should not be kept waiting for the regular convoys."

A further development of the tent section resulted from the conditions at the battle of the Somme, where, on account of the small area and the few good roads, "corps dressing stations" were created by joining up some members of the staffs of various field ambulances, so as to supply tent accommodation for a thousand or more wounded, with a staff of about thirty medical officers. A unit such as this performed the duties ordinarily performed by several separate field ambulances, and proved very successful as well as economical in medical officers and orderlies.

Motor Ambulances.

It is unnecessary to write much on a subject which is already thoroughly well known to all, but it is the supply of motor ambulances alone that has enabled us to deal adequately with the surgery at the front. One aspect of this subject, however, is very commonly overlooked, namely, the use of motor transport in saving the wounded from capture, for there can be no doubt that, had motor ambulances been supplied in large numbers, the tale of British prisoners after Mons and Le Cateau would have been very small. The first complete convoy came to the front in the middle of October, and at the first battle of Ypres was of the utmost possible value, both in getting patients quickly to the casualty clearing stations and also in saving wounded from falling into the hands of the enemy during our retirement to the ground we subsequently held.

The motor ambulance, indeed, is the very foundation on which all our surgery at the front is based. Without it the whole system would break down, for no horsed vehicles could possibly deal with the numbers of a heavy fight unless they were so numerous that they would practically block the roads for all other transport, and even then their slowness would result in such delays in delivery that surgery would be of little use. In addition, the well hung and well driven motor causes the patient infinitely less distress than the old ambulance wagon, and so delivers him in a much better condition for recovery.

THE QUESTION OF TIME.

This is a matter of so much importance to surgery that it is well to explain the time that is required to take a patient from the front trenches to the casualty clearing station. It is, in the first place, not sufficiently realized that the chief cause of delay, if it occurs, is "the enemy," for there have often been, and there still are, localities from which the wounded can only be moved under cover of darkness, so that a man may have to be kept in a dug-out the whole of a long summer's day before he can be carried to the rear. Again, in the desert of mud behind the firing line on the Somme stretcher-bearers sometimes took hours to carry a wounded man at night for several miles to the nearest point to which, in the absence of all roads, an ambulance wagon could approach. In yet other cases men lie out in the open ground on the so-called "No Man's Land" for many hours, or even for several days, before they are rescued. But supposing that none of these difficulties exist, the time occupied is very short, for, if communication trenches are good, and if a man is able to walk, he will often get to the advanced sections of the nearest field ambulance within an hour. If the communication trench is long and muddy, it may take twice that time. If he has to be carried it may take another half-hour or more, but as soon as he has got to a good road another hour will see him safely delivered to the place where his injuries can be thoroughly treated and where he can be well nursed under excellent conditions.

All this is comparatively simple if no great battle is in progress; and as great battles occur at infrequent intervals, it is evident that in most parts of the line of trenches evacuation is easy and rapid except for unusual local conditions. But in very heavy fighting, and especially when troops are advancing, it is often impossible to find sufficient stretcher-bearers in proportion to the great numbers of wounded, for only a limited number are attached to each regiment, and it is therefore necessarily true that the greater the number of the wounded who have to be carried, the longer must it be before the last of them can be brought in. No work is heavier than stretcher carrying for long distances and on difficult ground; and as men become exhausted their pace becomes slower, and they are obliged to rest at more frequent intervals. But even when all difficulties have been surmounted and the patients have arrived at the tent sections of a field ambulance, there are many who are too much exhausted for further immediate moving; and while the staff may have their hands full with dressing the wounded, they have also to care for the needs of the many men who need to be rested, fed, and warmed. While they are thus engaged on these patients, all those who require urgent treatment by operation have been taken direct to the casualty clearing stations, and thus have avoided delay.

The speed with which even patients who have to be carried can be brought in is best shown by taking the case of a consecutive series of abdominal wounds at one of the more advanced units. The following are the figures, and they show both how quickly men can be brought in when there are no unusual difficulties, and also how long it may be before a man can be rescued when an attack has been temporarily driven back.

Time of Evacuation to Casualty Clearing Station.

Under 3 hours	24		
Between 3 and 4 hours ...	50	74 in first 6 hours.	134 in first 12 hours.
,, 4 and 5 ,, ...	24		
,, 5 and 6 ,, ...	26		
Between 6 and 9 hours ...	24	56 in second 6 hours.	309 in first 24 hours.
,, 9 and 12 ,, ...	32		
Between 12 and 18 hours	25	25 in second 12 hours.	320
,, 18 and 24 ,, ...	16		
Over 24 hours	31		

THE CASUALTY CLEARING STATIONS.

The development of the casualty clearing stations has been the most important factor in the creation of a new school of surgery at the front, and it is not too much to say that they have saved many thousands of lives which would have been lost but for the surgical opportunities which they have provided.

Before the war the "C.C.S.'s," as they may be named for brevity, appeared only on paper and as untried units, for they did not exist at the time of the South African war. They were originally called "clearing hospitals," and their proposed function was merely to clear the field ambulances and pass the patients on to the base hospitals. Their equipment, therefore, was only very slight, and their staff of eight officers, including the command officer and the quartermaster, was less than the staff of a field ambulance. They carried 200 stretchers, and were supposed to be able to deal with the same number of patients.

It is not necessary to enter into details to show how the six casualty clearing stations, which came with the original Expeditionary Force, were overtaxed, for, in spite of this, it became very evident during the first battle of Ypres that the casualty clearing stations might well be made the nucleus around which to build an efficient organization for much more complete surgical treatment than had been contemplated when they were first planned. The first change was the supply of bedsteads and bedding and the appointment of trained nurses; the next was the addition of more surgical equipment in the way of instruments, splints, sterilizing apparatus, etc. The selection of special surgeons was a natural consequence, and before the end of the year 1914 good surgical work was being done at eight centres. Since that time there has been further development and progress, and by the end of 1916 more than fifty casualty clearing stations were at work.

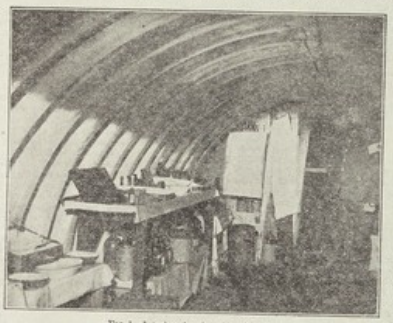


FIG. 1.—Interior of regimental aid post.

These hospitals, for such we can call them, are situated behind the line of trenches along the entire front, and certain local conditions are essential for the success of their work. First, they must be at or near to railway sidings, so that evacuation by train is easy. Secondly, they must be where good roads can connect them with the front. Thirdly, they must have a good water supply.

They are arranged in practically two series: (1) Those nearest the front are at a distance of from six to nine miles from the front trenches; (2) those of the second line are from three to six miles further back, and act as a reserve during active operations, or as units for special cases during quieter times.

The casualty clearing stations vary greatly in their accommodation, according to the size of the buildings they may occupy, or to the amount of ground available for huts or tents when they are encamped. The smallest accommodate 400 to 500, and the largest from 800 to 1,200. Their staff is reinforced, as may be required, from other casualty clearing stations less actively employed, and from the staffs of the field ambulances.

Wherever possible the casualty clearing stations at the front are linked in pairs, and take in the wounded alternately. In this way it can be arranged that, after admitting as many as can be adequately treated, the wounded are diverted to the other casualty clearing station, and the staff is left free to treat those they have admitted, without being disturbed by fresh arrivals.

Operating Theatres.

When a casualty clearing station is housed in buildings these theatres must, of course, vary in size with the accommodation afforded. In the hutted or tented hospitals, however, which are the most numerous, the operating theatre is a hut about 60 ft. by 20 ft., giving space for four tables, and for sterilizing and store rooms. Large theatres are essential in dealing with large numbers.

The Treatment of Wounds in the Casualty Clearing Stations.

It is the object of every casualty clearing station to treat and retain all patients until they can be safely sent down by ambulance train. In times of comparative quiet there is no difficulty in attaining this ideal, and consequently, whatever standard of treatment is required from the surgical standpoint can ordinarily be attained. In times of heavy fighting, and especially when there is the certainty that many more wounded will arrive during periods extending over days or weeks, it is evident that the provision of empty beds necessitates sending patients away who might, with advantage, be retained a little longer. This pressure, however, does not prevent the performance of all really necessary operations, and these are now always performed. If the requirements of our army did not place a limit on the number of surgeons, nurses, orderlies and patients who can be retained in close proximity to the fighting line, there would be no reason why all patients should not be kept near the front, but it must be clearly appreciated both that there is this limit in every war, and also that casualty clearing stations are maintained everywhere in as great numbers as the military authorities can permit. It must also be remembered that if many hundreds of patients were kept in every casualty clearing station the staff of nurses and orderlies would be so much occupied in dressing and caring for them that they would not be free to attend to the wants of the recently wounded men coming in convoys from the field ambulances.

For more than two years it has been the deliberate policy of the British Army Medical Service to make the casualty clearing station the chief place for the treatment by operation of the dangerously wounded man who requires prompt treatment, rather than the field ambulances. The latter is too mobile and too frequently moved a unit to be thoroughly well equipped surgically, and, in addition, it has been proved to be much better to move a patient before an operation to a place where he can be kept and nursed for several days rather than to move him directly after he has been operated upon.

Dressing and Distribution of the Wounded at a Casualty Clearing Station.

It is now the custom of all casualty clearing stations to dress their patients in large reception huts or tents as soon as they arrive, and to distribute them from this place in three classes: (1) For immediate evacuation; (2) for retention; (3) for operation. In the first class are included chiefly the slightly wounded. In the second class are patients suffering from shock, from the effects of bleeding, from wounds of the lung, from exposure to cold, etc. In the third class are all serious wounds of the soft tissues which require thorough dressing, and especially lacerated wounds due to shells and bombs; most fractures; many injuries of vessels; all perforating abdominal wounds, etc.

The proportion of cases requiring operations to the whole number of wounded will depend on many conditions —for example, the larger the proportion of shell wounds to bullet wounds the larger is the number requiring operation, and if a train is waiting to go to the base, men may be sent by it who would require operation if they had to be kept for thirty-six hours. But it may be stated in general terms that the proportion of patients treated under anæsthetics may be as high as one in four, but is more often about one in six.

The following table, compiled by Captain Hey, who is the Surgical Specialist at one of the forward casualty clearing stations, will give a very good idea of the operating work of a particular unit, and it includes a period of heavy fighting during a recent battle:

Table of Operations Performed at a Casualty Clearing Station.

A. Ligature of arteries:		
Carotid	...	5
Vertebral	...	2
Subclavian	...	2
Axillary	...	15
Brachial	...	39
Radial	...	18
Ulnar	...	8
Ext. iliac	...	2
Femoral	...	51
Popliteal	...	31
Ant. tibial	...	16
Post. tibial	...	58
Various	...	30
		277
B. For treatment of fractures:		
Skull	...	189
Vertebræ	...	18
Humerus	...	298
Forearm	...	153
Femur	...	299
Leg ...	...	379
Jaws	...	38
Various	...	119
		1,403
C. For treatment of joints:		
Knee ...	...	183
Other joints ...	...	64
		247
D. Amputations:		
Shoulder joint	...	14
Upper arm	...	77
Forearm	...	31
Thigh	...	186
Knee ...	...	10
Leg ...	...	76
Ankle	...	6
Various	...	31
		431
E. For drainage of pleura	...	49
F. For wounds of the abdomen	...	106
G. Removal of testis	...	35
H. For ruptured urethra	...	9
J. Enucleation of eye	...	43
K. Plastic operations	...	35
L. Tracheotomy...	...	17
		280
M. Excision and cleansing of wounds:		
Head and neck	...	95
Trunk	...	309
Upper limb	...	249
Lower limb	...	765
Multiple	...	398
		1836
N. For conditions not due to gunshot wounds:		
Appendicitis	...	34
Strangulated hernia	...	1
Cellulitis	...	55
Various	...	13
		101

It will be seen that the total number of operations performed for gunshot wounds amounts to 4,554, and the total number of wounded admitted during the period in question was 20,589 in this particular unit. It will be noticed that a very large majority of the operations were for fractures of the limbs and wounds of the soft tissues which required complete surgical clearing. The proportion of abdominal operations would have been higher but for the fact that an "advanced operating centre" was near at hand, and took charge of many cases of this class.

During heavy fighting, operating work such as the above goes on continuously day and night, and consequently necessitates relays of surgeons, nurses, and orderlies. The work is exceedingly trying, and it must be reckoned on that not a few of the staff will be more or less knocked up after three or four weeks of it. But it is also quite certain that the early and thorough treatment of a very large proportion of all wounds has done more than anything else to save both much suffering and many lives.

ADVANCED OPERATING CENTRES.

It has sometimes been found that difficulties of locality have prevented the placing of so large a unit as a casualty clearing station exactly where its position should have been when heavy fighting has been expected, and in such cases a smaller unit has been placed so as to deal with the most urgent cases, and especially with those which required prompt operation. These small special hospitals of fifty to sixty beds have done excellent work, and a very large proportion of their cases have been abdominal wounds. The large number of the casualty clearing stations has prevented any necessity for creating many such units, for the casualty clearing stations are usually as well placed as is the special hospital, and the greater number of all the abdominal operations have been performed in them.

SPECIAL HOSPITALS.

Special Hospitals for Head Cases.

Operations for wounds of the head are dealt with in a subsequent section, and all that need be said here is that it has been found advisable to retain a considerable number of these cases near the front either in stationary or general hospitals, or else in a casualty clearing station of the reserve. They do not need the immediate operations required for abdominal cases, and are consequently provided for further back.

Special Hospitals for Shell Shock.

It is very desirable to remove such cases from the sound of shelling, and, as they require special treatment for some time, they also are dealt with in the rear of the front line of casualty clearing stations.

Special Hospitals for Diseases of the Skin.

These deal mainly, but not exclusively, with scabies, and the work is usually undertaken by the casualty clearing stations of the second line.

Stationary Hospitals at the Front.

A few of these units, which normally belong to the line of communication, also find a place at the front. So much of the work which would previously have been done in them is now performed by the casualty clearing stations that, in proportion as the latter have increased, the need for the stationary hospitals has diminished. Those that are at the front are commonly engaged more in the treatment of the sick than of the wounded, or else in treating some special class of case, such as injuries of the head or shell shock.

X Rays.

At the beginning of the war *x* rays were not supplied at the front, but, coincidently with the development of operating work in the casualty clearing stations, the need of these became apparent. At first mobile *x*-ray vans were supplied, but, as demands for these increased, it became necessary to supply stationary plants as well, more especially to those casualty clearing stations to whose share it fell to do most of the operations; and, not only have *x* rays been of great service in guiding the operator, but in many of the abdominal wounds where the missile has been retained they have been of the greatest service to the surgeon in deciding whether or no operation should be done at all. In many other cases, such as some of the wounds of the head or of the knee-joint, it has been found better not to undertake an operation without a preliminary *x*-ray examination, so that in the present stage of development of surgery at the front the *x*-ray plant has become essential for the work of the casualty clearing stations.

Anæsthetics.

At the beginning of the war chloroform was in general use, but it was evident that there were many objections to its universal application, and other agents were soon employed as well.

Ether has been largely used, and was formerly administered by the open method, but experience has shown that it is often inadvisable to use it thus because of its tendency to irritate the air passages. For at least six months of the year the men who are exposed to the wet and cold in the trench area are suffering in very large numbers from catarrhs of varying degrees of severity, and in many of them these are accentuated by the further exposure which follows on a wound, especially when a man falls or lies in mud or water. The result is that the administration of any anæsthetic commonly sets up so much bronchial irritation that the patient's life is endangered by an attack of bronchitis or bronchopneumonia. These complications are specially dangerous in cases of abdominal wounds where abdominal respiration is difficult and where coughing up of mucus is often impossible because of pain or intestinal distension. It is indeed a fact that a very large proportion of all the deaths following abdominal wounds and operations are due to lung complications, and these injuries are at least twice as fatal in the winter as in the summer.

Fig. 2.—Handling a stretcher round a corner of communication trench.

Dr. Shipway's apparatus for the administration of warm ether vapour has been of the greatest value under those circumstances, and it is in common use in all the clearing stations. We have found that it possesses the following advantages:

1. There is very little secretion of mucus or saliva, and the patient is very quiet during the operation.
2. There is less sickness, probably because of the lessened quantity of mucus swallowed.
3. There is much less tendency to bronchitis and pneumonia.
4. The ether used is not more than one-third of that employed by the open method, and, as a consequence, it bulks less largely in transport.
5. Patients suffering from shock or haemorrhage can be pulled through an operation with less collapse than by other methods.
6. It can be connected with an oxygen cylinder, and the ether vapour can be administered in combination with oxygen in cases of shock.

The subject of the administration of anæsthetics at the front is described more fully in the paper by Captain Geoffrey Marshall printed on a later page.

The Use of Antiseptics.

It may be stated in general terms that it is the custom at the front to use antiseptics in the treatment of wounds, both at the field ambulances and the casualty clearing stations. No attempt is made to use antiseptic agents to disinfect the wounds on the field at the time of injury, for all who know the character of the wounds and the conditions of the wounded men, are agreed as to the complete futility of all such efforts, even if this had not been completely demonstrated during this war. But experience has also shown that in France and Belgium the wounds are so heavily infected from the soil that it is most necessary in all but the smallest wounds to excise very freely all the exposed and torn tissues which have been killed or else partially devitalized by the injury, and which are ingrained with dirt or portions of clothing. If this treatment is not carried out very thoroughly and carefully, and if free drainage is not secured, the gravest forms of sepsis may commence in serious wounds in a very few hours. It is common experience that if a badly wounded man cannot be rescued and brought into the field ambulance until after the lapse of twenty-four or thirty-six hours, the wound is often already so badly infected and the patient himself is in so toxic a state that surgical treatment has but little chance. It may be said truly that the most important alteration in treatment since the early days of the war is that excision of damaged tissue has become the routine method and that the earlier it is carried out the more likely it is to be successful.

"Eusol" and "Dakin's Fluid."

Very many antiseptic agents have been employed, and there is naturally some diversity of opinion as to which is the best. There is no doubt, however, that at the present time hypochlorous acid in the form known as "eusol," or the hypochlorite of soda in the solution known as "Dakin's fluid," are more extensively used than any others. The method of Dr. Carrel has been increasingly employed for the past year, and wounds treated in this way have done exceptionally well, although it is not always possible to employ the method universally at a time when the wounded are in very great numbers. At other times there is no difficulty, and in order to establish continuity of treatment Dr. Carrel's method is freely employed on every ambulance train taking wounded to the base hospitals.

Hydrogen Peroxide.

This is not highly esteemed as a potent antiseptic, but it is of great service in loosening adherent dressings, and so preventing pain and injury to the soft tissues by forcible separation of gauze or wool.

Carbolic Acid.

At an early stage of the war, and in consequence of representations made by surgeons in England, attempts were made to sterilize recent wounds by pure carbolic acid. They entirely failed to achieve this object, but solutions of a strength of 1 in 20 or 1 in 40 are in common use, and many surgeons have had a very favourable experience in using equal parts of solutions of carbolic acid and hydrogen peroxide.

Sodium Chloride.

The hypertonic salt solution has not proved successful at the front, and at the present time is hardly used at all. The wounds treated by it were usually very slow in healing, and the granulations were generally pale, flabby, and much overgrown. There has also been a good deal of evidence to show that secondary haemorrhage is not nearly so frequent an occurrence since hypertonic saline has been displaced by other antiseptics. This is not at all surprising when it is considered that rapid cicatrization is the best safeguard against this complication.

The salt pack largely used at Rouen is also to a great extent supplanted by the employment of "eusol" and "Dakin's fluid." It is, however, at the front a useful method of treatment of large open wounds in patients who are in transit by train. It does not need to be disturbed for several days, and when there are large numbers of wounded to dress this is a very great advantage.

B.I.P.

The mixture of bismuth subnitrate, iodoform, and paraffin, recommended by Professor Rutherford Morison for suppurating wounds (B.I.P.), has also been used for the past few months on recent wounds of the soft tissues, and also in cases of fracture. The results have been good, and encourage the further use of this remedy at the front. The fact that the wounds do not need dressing for several days gives it the same advantage as the salt pack, while its use permits of an early closure of the wound, and this is an additional advantage.

Shock, and the Condition of Wounded Men.

The condition of wounded men necessarily differs as wounds are more or less severe, but in even slightly wounded men there may have been much bleeding, exposure to cold, want of sleep, or want of food. If to these are added severe pain and the exhaustion due to a hazardous journey over broken roads, it is easy to appreciate that very many patients arrive in a state bordering on collapse. Experience has shown, as a result of knowledge of these conditions, that it is not possible to estimate accurately the real condition of the patient until he has been rested and warmed, and has taken food; and especially in winter time the most important of these remedial measures is undoubtedly warmth. This may be applied by warm blankets after the removal of wet clothes, or by hot bottles. But in more severe cases we employ a "light bath" of electric lamps beneath a cradle, or else a "hot-air bath" extemporized by leading under the bedclothes a pipe connected with a primus stove. Hot liquid food is good if the patient can take it, but he is often nauseated or actually sick in the worst cases of shock, and then small enemata with brandy are very useful. Warmth and rest are, however, of more importance than nourishment, and if the patient goes to sleep, as he very often does, it is best to leave him undisturbed for some time.

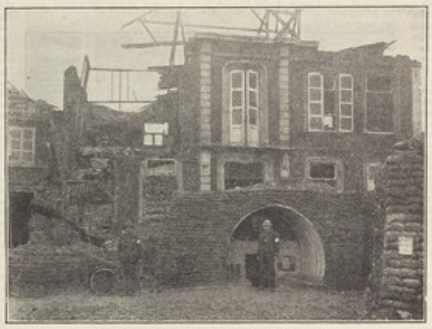


Fig. 3.—Advanced dressing station of field ambulance.

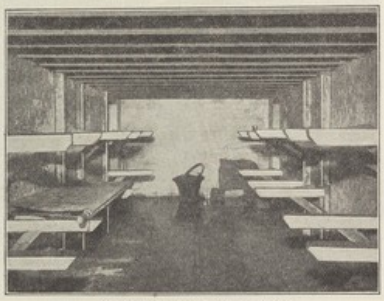


Fig. 4.—Interior of advanced dressing station.

Primary Amputations.

Unless a man is bleeding it is usual to treat him as has just been described before any operation is performed, but it is often necessary to postpone amputation for as long as a day, or even two days, if the removal of the limb is to be done at the thigh. Many men will survive if they are allowed sufficient time to get completely over the shock of the injury and its attendant conditions, who would certainly die if subjected to immediate operation, and the more experienced the surgeon the less is he likely to hurry on a severe primary amputation.

It is, of course, evident that delay in removing a badly smashed limb may result in dangerous sepsis, and there is no doubt that the threat of gas gangrene may necessitate operation earlier than might be wished. Much must therefore of necessity be left to the discretion of the surgeon in

each case, and, as it is only after a considerable experience at the front that really sound opinions can be formed, it is very necessary that those who have not had this experience should seek the advice of those who have before a decision is come to in a doubtful case.

Other questions concerning the treatment of shock and the use of saline infusions are dealt with in Captain Marshall's communication on anæsthetics at the front.

When the condition of the limb and of the patient permit, a primary amputation should be performed by one of the recognized methods practised in the usual circumstances of civilian surgery, suitable flaps being provided. It is, however, never right to neglect drainage of the stump, and this should always be secured by the use of a large drainage tube, at any rate for a period sufficient to ensure that no serious sepsis exists.

FIG. 5.—A wheeled stretcher.

The seat of amputation has been much discussed, but in our experience the best general rule is that as much of the limb as possible should be saved, quite regardless of the typical "seat of election" as prescribed in former years; primary amputations through joints are, however, as a rule to be avoided.

Departure from these ideals may be necessary, either because of the condition of the patient himself or of his limb.

If the patient is desperately ill from the combined effects of loss of blood and other complications his condition may be such that the additional shock of a high amputation may be quickly and inevitably fatal. In a pulseless patient who has a numbed and still oozing limb the best thing is to remove it as quickly as possible by cutting through the soft tissues at the site of fracture, subsequently clipping away torn and ragged tissues and tying the main vessels.

FIG. 6.—To show how compact the wheeled stretchers are when closed.

Not more than ten minutes need be spent on such an operation, and, if it is conducted under the influence of gas and oxygen anæsthesia, many apparently hopeless cases can be saved, for there is very much less shock than would be entailed by either a longer operation or by the cutting though healthy and sensitive skin and muscle higher up the limb. In such a case the making of a suitable stump must be left to a future time.

In another class of case the leg or the forearm may be smashed beyond recovery, while the thigh or the upper arm is the seat of other severe wounds complicated by the presence of mud, of portions of shell, or of clothing. It is quite unwise in such a case to amputate high up the limb, and it is best to perform a "flush amputation" close above the fracture, and again leave to the future the formation of a useful stump at a time when the damaged tissues have recovered. If this is not done, not only is the patient exposed to more severe shock by a high amputation, but his stump may slough and a yet higher up removal may be necessary if he ultimately does survive.

WOUND INFECTIONS.

It is well known that in France wounds are liable to be very heavily infected by numerous pathogenic organisms, and inquiry from surgeons who have had experience in other theatres of warfare enables us to say that, especially in Egypt and in the Dardanelles, the gas gangrene and tetanus infections were notably much less common than they are in France.

While no time of year or condition of weather brings immunity, it is very evident that wet weather and mud are far more dangerous than summer weather and dust; and this danger is much increased when patients are wounded in very cold weather and are thoroughly chilled before they can be brought in. Most surgeons are also agreed, that the coldness and lowering of vitality caused by severe haemorrhage have a similar predisposing effect on microbic infection, and it will be found that wounded men are attacked by tetanus and gas gangrene in proportion as the various conditions exist which are inimical to the human organism. It has also been noted that gas gangrene has often affected wounds in patients who have subsequently developed tetanus also.

GAS GANGRENE.

This disease appeared very early in the war and was a very unpleasant surprise to the surgeons. It had not been described as a usual complication of gunshot wounds, and though seen occasionally in civil life, so that its etiology was known to a certain extent, it was sufficiently unfamiliar to render an accumulation of experience necessary for its proper treatment.

Two clinical types of the disease were recognized early and were named "gaseous cellulitis" and "massive gas gangrene." The former term was applied to the milder cases in which the cellular tissue round the wound was considered to be the primary seat of the disease; the latter term to those cases in which the whole limb was rapidly affected and died. The milder type of the disease was treated by incisions and drainage, the severer type by amputation.

From a clinical point of view it was found that the conditions that favoured the onset of the disease were: (*a*) The retention of extravasated blood and wound secretions, (*b*) interference with the circulation, (*c*) the presence of large masses of partially devitalized or dead tissue, (*d*) extensive comminution of long bones, (*e*) the presence of particles of clothing in the depth of the wound. Each of these observations was quickly turned to account in the treatment of cases in which the disease might appear.

FIG. 7.—Overhead railway ambulance trolley.

RETENTION OF BLOOD AND SECRETIONS.

The avoidance of the retention of blood and secretions necessitated the employment of some sort of dressing that would not dry and cake during the transit of the patient to the casualty clearing station and from there to the base. Thus the dry gauze and wool dressing was abandoned for one that would keep moist and favour the discharge of blood and serum. It did not seem to matter what chemical was used so long as the dressing remained moist.

INTERFERENCE WITH THE CIRCULATION.

Interference with the circulation was brought about in several ways. First there was the tourniquet. Every effort was made to dispense with this instrument, and where this was not possible the patient was taken with all celerity to the nearest place where the haemorrhage could be stopped. Circular bandages were found also to be a source of trouble, especially when the bandages took the form of a gauze dressing wrapped round and round the limb, which mode of application was very tempting in treating multiple wounds.

FIG. 8.—Two light railway ambulance trolleys.

In simple flesh wounds it was easy to arrange that the bandages and dressings should be loosely applied, but in the case of fractured lower limbs it was necessary to obtain some fixation of the limb, for the movement of the bones was not only painful to the patient, but calculated to produce further damage to the soft parts. The adoption of the Thomas splint largely solved this part of the problem, but there were and still are difficulties in the way of its adoption as far forward as is desired. Some fractured lower limbs are still sent to the casualty stations with the old Liston splint; the rapid evacuation of all wounded that now pertains has, however, lessened considerably the disadvantages of this splint.

The arrest of the blood supply to a segment of a limb by the rupture or thrombosis of an artery has so far baffled the surgeon. Attempts were made by suture and the employment of Tuffier's tube to restore the circulation, but, so far, have not met with the success that was hoped. All that can be done is to favour the collateral circulation in every way.

DEVITALIZED TISSUE.

The devitalized tissue that formed a nidus for the development of the gas-producing organism was got rid of by excision through the opened wound, and as the attention paid to this mechanical cleaning of the wound became greater so did the results improve.

BACTERIOLOGY.

While surgeons were working out the best methods of treatment the bacteriologists were studying organisms found in the wounds, which were nearly all infected with many varieties of amœbic bacilli. Many bacteria were found, but the blame could not be definitely fixed on any one organism, and in many cases there was a mixed infection. The *Bacillus aërogenes capsulatus* of Welch was found present in the greater number of cases. The interesting and important observation was, however, made that the numbers of gas-producing organisms steadily decreased with the lapse of time, whilst the pus-producing organisms increased. This bacteriological fact corresponded with the clinical observation that the likelihood of gangrene occurring became steadily less as the wound became older and suppuration more obvious.

Our knowledge of the disease, both from a bacteriological

McNee and Dunn have shown that the *B. aërogenes capsulatus* is found in healthy contractile muscle far beyond the gangrenous edge. As the only clinical test we have of healthy muscle is its normal colour and its contractility, it may happen that an amputation through such muscle may still leave numbers of bacteria in the stump.

This explanation does not seem sufficient. The fact that metastatic infections appear from time to time shows that bacilli may be floating in the blood. Should this happen in a case submitted to amputation it is possible to conceive that they may find a resting place in the muscle damaged by the amputation and thus start the disease afresh.

(g) At present the nature of the poison and its mode of action are unknown.

TREATMENT.

The treatment in vogue at the present moment, and based on the above observations, may be summarized as follows:

Preventive.

The wounds are opened up and all dead tissue and foreign bodies removed and adequate drainage provided. The circulation is encouraged in every possible way.

When the Disease is Established.

(a) When gangrene appears in a segment of a limb where the main blood supply has been interrupted higher up the only treatment is amputation.

(b) When the gangrene appears in the muscles or muscle groups actually wounded. Here the treatment must depend on the condition of the patient. If this is good the wounds are freely opened and the affected muscles or muscle groups removed. The test employed to distinguish dead from healthy muscle is the want of contractility or the presence of the brick-red colour.

Even with the gangrene localized to certain muscles amputation is the safest course if the general condition is bad, and it is seldom possible to save such a limb if the bone is broken.

FIG. 13.—Interior of an advanced dressing station: Operating theatre.

Some believed that wounded intestine healed sufficiently often to warrant abstention, others believed that small gut lesions were practically always fatal, and that the success obtained by the "wait and see" policy was due to the escape of the bowel from injury, although the belly had been penetrated. The opinion that it is possible for the small gut area to be traversed by a rifle bullet without injury has been proved to be correct in this war. A study of the literature of the South African war, both private and official, makes the real reason for want of success in operating at once obvious—the cases arrived too late. It was not so much a question of the success of the expectant treatment as failure of the operative, and the two strikingly successful cases of resection of small gut (Neale and Take) were operated on within six and twelve hours of injury respectively.

The reason for the late operation was the nature of fighting in an unsettled country of great distances. The wounded could not be quickly brought to a hospital with the necessary appliances. To operate in the veld with what appliances were at hand was too disheartening. It was impossible to get even moderately good conditions. There was little or no water, and what there was was often too filthy for words—the water of dams. In addition, there was the plague of flies that settled on everything.

FIG. 14.—Operating theatre at a casualty clearing station.

The conditions were utterly different from those that pertain at the present time. This is the first time since the rise of abdominal surgery that a great campaign has been fought in a settled country, and, what is more important still, with a fixed fighting line.

ABDOMINAL WOUNDS.

SURGICAL OPINION WHEN THE WAR STARTED.

For many years it had been held that the operative treatment of abdominal wounds was not to be advised under war conditions. This was partly due to want of success, as in the Spanish-American war, and partly to the fact that many military surgeons were opposed to extensive operating anywhere near the firing line; as abdominal surgery, to be successful, must be done at once, it is obvious that it could not be undertaken with success where all operations had to be postponed to a late period. Although the expectant treatment was the orthodox one when the South African war broke out, many surgeons at that time hoped to prove that it was wrong. Surgeon-General W. F. Stevenson even issued an appeal for the trial of operation. The result was, however, only to confirm former opinion, though this opinion was now held on two somewhat different grounds. One school held that the expectant treatment was in itself the right procedure, the other that it was the best that could be done in war.

The small number of cases dealt with in the South African campaign was also a source of error, for in order to form an adequate idea of the efficacy of any treatment it is necessary to strike an average over a large series of cases.

The statistics of the South African campaign are very defective. Surgeon-General Stevenson in the official history of the war was only able to collect 207 cases of abdominal wounds. Among them it is stated that there were 26 laparotomies with 18 deaths, a mortality of 69.2 per cent., and according to Stevenson the mortality was really even worse. The total death-rate of all abdominal wounds quoted—operated and unoperated—is given as 30.4 per cent.

In the same author's most recent work, *Wounds in War* (1910), the mortality is shown as 51.6 per cent. for laparotomies, the total of cases remaining the same—namely, 207. In any case the figures are really too small to have any real value.

In this present war one of the difficulties of establishing the operative treatment was the run of bad luck which any operator might have to face. Even now, with conditions as nearly ideal as possible, a series of nine consecutive fatal cases may be met with. This must have a very depressing effect on any surgeon, especially on one who is not yet convinced that the operative treatment is in the main the best of all. Now nine abdominal cases means roughly about 600 wounded men, taking a moderate estimate of the proportion of abdominal wounds to total wounds.

As a matter of fact, in the South African campaign a casualty list of 600 wounded was considered a large one, and if an operator happened to encounter such a series of fatalities, it is not a matter of surprise that he should have had doubts as to the correctness of his procedure.

Statistics in the present campaign show that an operative mortality of 50 per cent. is a good result, but such a mortality in civil practice would be considered an awful death-rate to face. And yet it means, looking on the bright side, many lives saved.

The South African campaign may, then, be said to have left surgical opinion opposed to operation, but it must always be remembered that not only were there practically no shell wounds in that campaign, but also that the ogival bullet was a much less harmful missile than the sharp-pointed bullets of the present war.

METHOD OF TREATMENT IN THE EARLIER PERIOD OF THE WAR.

In the retreat from Mons and on the Aisne adequate provision for the performance of abdominal operations near the front was well-nigh an impossibility, and all that could be done was to send the wounded to the base with the least possible discomfort to them. When, in the ensuing winter, the line became fixed the circumstances were very different, and there soon developed a possibility of operating under good conditions. It was no longer a question of whether a man could be operated upon, but whether he should be operated upon. Still, however, a good deal of the old belief in the efficacy of the expectant treatment obtained for some time longer. A man wounded in the abdomen was sometimes kept in a dug-out in the trench system; often he was kept at a field ambulance, usually he was transferred to the casualty clearing station and there treated.

The customary mode of procedure was to put the man in the Fowler position, to improve the general condition by rest and warmth, to withhold food and water for three days and to administer morphine. The thirst, which was a distressing symptom of this treatment, was combated to a certain degree by rectal salines and mouth washes.

A tribute must here be paid to the great care and attention which the medical officers lavished on the patients. Certain officers were told off day and night to attend to them and everything possible was done to alleviate their suffering and to make them as comfortable as possible and to cheer them up. If anything could have got these men well the attention that they received would have done so, and it must be remembered that the medical officers who conducted the treatment were convinced of its efficacy.

This belief was strengthened by the behaviour of many of the patients, for some who were at first gravely ill, went through a period of improvement which often was very striking. It was in a way unfortunate, but there is no doubt that improvement did take place, and so well were many of them that after several days they were evacuated to the base and arrived there sometimes in fair condition, although more often gravely ill. But the surgeons who had seen the cases leave the casualty clearing stations apparently on the way to recovery could not at first bring themselves to believe that they did badly at the base, and if evacuation had not been necessary and it had been possible to keep patients at the casualty clearing stations the expectant treatment would not have survived as long as it did, for medical officers would have seen many such cases become worse and worse, and in the end—die.

COMMENCEMENT OF THE OPERATIVE TREATMENT.

Although rest treatment was the rule, some attempts at operation had been made as early as November, 1914; but it was only when the more complete development of the casualty clearing stations provided satisfactory conditions that surgeons felt that their opportunity for operating had arrived, and during the winter of 1914–15 operations were done by several medical officers. But the early results were undeniably bad—so bad that most people abandoned the attempt, and the reasons for failure were no doubt both the late arrival of the patients at a place where an operation could be performed and the want of knowledge which later on was acquired by experience alone, for there was no literature which dealt with such injuries as the surgeons were now called on to treat, and each man had to learn the best methods for himself.

Owen Richards was the first to publish results of operative treatment in the British army.[1] His first operation was performed on January 28th, 1915, and the first successful operation, that of a resection of 2½ ft. of the small intestine, was performed on March 18th, 1915, thirty-six hours after the injury was received.

In May, 1915, an inquiry into the causes of death after abdominal wounds established the following facts:

1. That the injuries were as a rule of such a nature that recovery must be a very rare event.
2. That haemorrhage was a chief cause of early death.
3. That bullets produced very extensive injuries.

It had always been granted that haemorrhage was the chief cause of early death, but the advocates of expectant treatment seem to have focussed their attention more on the danger of peritoneal infection and the possibility of its localization or disappearance than on the possibility of spontaneous arrest of haemorrhage.

The discovery that bullets produced extensive gut injuries was also of great importance, as much stress had been laid on the smallness of the lesions produced by the modern small bore bullet, and the expectation of spontaneous recovery of gut lesions had been based on the quite erroneous assumption that such projectiles were comparatively innocuous.

The re-establishment of the fact that haemorrhage was the chief cause of early death was of great importance, as it showed that only rapid evacuation afforded any hope of combating such a condition. Arrangements were accordingly made to ensure that all patients suffering from abdominal wounds, and who were not too ill for transport, should be sent by special motor ambulances to the clearing station and not retained in the field ambulance. At the same time meetings of the medical officers of field ambulances and regiments were held at different centres, so that it could be demonstrated to them that the lesions of the hollow viscera were much more extensive than they had believed, and that in such conditions early operation gave the only chance of recovery. The result of this diffusion of more accurate knowledge was soon seen in the much earlier arrival of patients, and the greatest praise is due to all those who combined in the effort to rescue the men and convey them to the rear as rapidly as possible. The consequences of these improvements soon became apparent in the saving of many lives, and the operative treatment, now that it was placed under favourable conditions, very soon won for itself the confidence of the medical service, and quickly became universally adopted.

Where to Operate.

The British practice has been to operate a short distance behind the line, and the wisdom of this has been demonstrated. Here it is possible to operate under good

conditions and to nurse the patient among cheerful surroundings for a week or more subsequently.

The casualty clearing stations have, as a rule, been used for this purpose. If for some local reason it has not been possible to put one sufficiently far forward at any one part of the line, a small operating centre has been opened for

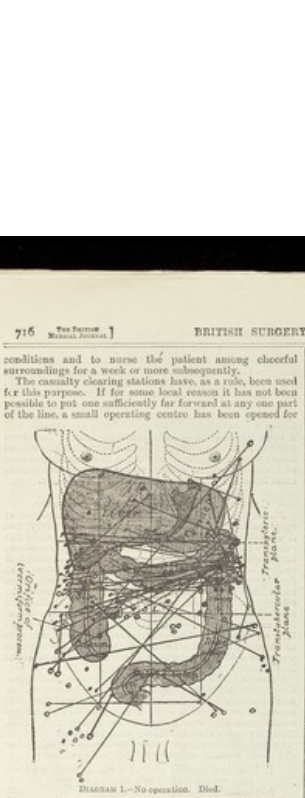


DIAGRAM 1.—No operation. Died.

the reception of abdominal and other urgent cases. The influence of time is shown very clearly in Table I.

TABLE I.—*Effect of the Time Elapsed between Receipt of the Wound and Arrival at the Operating Centre.*
Total number of cases 591.

Hours:	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20
To base ...	3	30	75	55	34	19	7	4	11	4	27
Died ...	2	30	53	99	41	23	10	13	15	11	56
Total ...	5	60	128	154	75	42	17	16	26	15	83

A very significant fact comes out from a study of the next table (II)—namely, that of 145 patients with a pulse above 120 only 16 recovered.

TABLE II.—*Prognosis from Pulse-rate.*
Total number of cases 577.

Pulse up to:	60	70	80	90	100	110	120	130	Over 130
To base... ...	1	7	23	30	108	27	37	7	9
Died	1	2	13	18	39	38	68	37	92
Total... ...	2	9	36	48	147	65	125	44	101

Table III shows that bullet wounds are highly fatal.

TABLE III.—*Relative Mortality of the Different Projectiles.*
Total number of cases 629.

	Bullet.	Shell Fragment.	Shrapnel.	Bomb.
To base	91	305	15	60
Died	106	154	40	58
Total	197	259	55	118

TABLE IV.—*Relative Number of Different Projectiles and Proportion Retained.*
Total number of cases 836.

	Bullets.	Shell Fragments.	Shrapnel.	Bombs.
Passed out ...	203	30	15	6
Retained	151	254	67	128
Total	354	284	82	134

The Most Dangerous Wounds.

The chart (Diagram 1) shows the entrance wound or the course of the projectile in cases that arrived too bad for operation.

Possibility of Escape of Hollow Organs after Penetration of the Abdomen.

Diagram 2 shows the course of the projectile or its place of entrance in those cases in which coeliotomy proved that no hollow alimentary viscus had been penetrated. In some such cases many organs were bruised.

A certain number of cases of rupture of a hollow viscus without abdominal penetration have occurred, and have made it advisable to explore the intestine in some instances even when the whole thickness of the abdominal wall was not penetrated by the missile, but where the symptoms have pointed to the probability of a lesion of one of the hollow viscera.

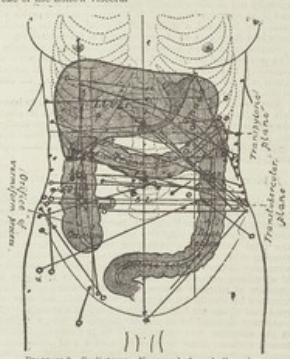


DIAGRAM 2.—Coeliotomy. No wound of any hollow viscus.

General Line of Treatment.

The practice is now to operate on all cases unless there is some reason to the contrary, and to operate on principle rather than on the indications by symptoms.

The cases on which operation has been found, as a general rule, to be inadvisable may be divided into two classes—(1) those in which solid organs alone are wounded and in which there are no signs of continuing haemorrhage, and (2) cases arriving after thirty-six hours.

The liver furnishes by far the greater number of cases in Class (1). This organ is the only solid organ in which it is possible to say from inspection that no other organ is wounded. In the other solid organs, such as the kidney and spleen, the likelihood of hollow visceral injury nearly always compels exploration. Were it not for this contingency, the solid organs would require little operative attention.

In Class (2) the time for successful interference in the case of hollow viscera has as a rule gone by, and the bleeding, from whatever source it came, has ceased spontaneously.

Before operation a period of rest has found favour with most people. This period is used to combat shock, for which purpose heat in various forms has proved by far the most efficient means.

When the missile is retained the position of the projectile should be ascertained by an *x*-ray picture, as its localization will influence the site of the exploratory incision. The incision should as a rule be placed by the side of the mid line and be of ample length. A transverse incision is much favoured by some for exploring wounds which traverse one side only of the body.

The question of the administration of saline is important. The subcutaneous injection of saline has found favour in the past, but it is coming to be recognized that very little is absorbed in a shocked man, and that this method presents no advantages over its administration by the natural orifices. If these are not available the intravenous method should be used.

Axioms of Operative Procedure.

Celerity is of great importance. The body heat must be preserved in every way. There should be the least possible exposure of the viscera, and the intestines should be kept inside the abdomen as much as is compatible with the necessary manipulation. The least possible should be done. All the intestine should be examined. Suture of the intestine should always be preferred to resection unless the latter is inevitable, or saves time, and experience has shown that a single continuous suture, applied so as to invert the peritoneum, is quite sufficient and perfectly secure. Linen thread or thin silk are both preferable to catgut, and care is required not to draw the stitches too tight. If resection is unavoidable, end-to-end anastomosis is preferable to lateral apposition as a rule.

Solid organs should be disturbed as little as possible, unless vessels have been opened. Excision of spleen and kidney should be practised with great reserve.

Through-and-through wounds of the liver are best left alone, but if the *x* rays show a large piece of shell or bomb in an accessible position it should be removed, for if left it generally causes dangerous sepsis in the organ.

Abdominal drainage is most probably of little use except in local lesions.

Artificial anus in the colon are to be avoided if possible.

Wounds of Special Organs.

Stomach.—Wounds of the stomach, though less severe than those of the small and large intestine, have proved decidedly more dangerous than was supposed. The fatal result has largely been caused by haemorrhage and shock and by complication with other visceral injury.

Small Intestine.—In the small intestine the multiplicity of the lesions and haemorrhage from the mesentery have been the chief causes of failure. As many as twenty lesions have been met with. In one case a successful result followed a resection of 6 ft. for twenty perforations (Captain Owen Richards). In another case fourteen lesions were sutured and followed by recovery (Captain John Fraser).

Large Intestine.—The large intestine wounds have been mostly fatal from sepsis of the retroperitoneal tissue in the case of the ascending and descending colons and from complicated injuries in the case of the transverse colon.

Rectum.—The rectum proper has not been wounded so often as would be expected, but has a high mortality.

Liver.—The liver shows a large proportion of recovery after operation, but many patients would have got well without operation.

Spleen.—The spleen injuries have not been very dangerous except where the lesions have necessitated excision, and the same may be said of the kidney.

Bladder.—Intraperitoneal wounds of the bladder show a mortality of 56 per cent. where uncomplicated, but those associated with small gut injury have proved exceedingly dangerous.

Causes of Failure.

Haemorrhage, sepsis, and shock have been the chief causes of death.

Haemorrhage has come from every vessel in the abdomen except the aorta. Principally it has proceeded from the mesentery and the pelvic vessels. On two occasions a rent in the vena cava has been closed—in one by the application of forceps (Captain Taylor), and in one (by Captain Sampson) by suture. The former recovered. In one instance the vena cava was ligated, but the patient survived only ten hours.

Sepsis.—Under this head are included peritonitis, retroperitoneal sepsis, and wound infection. It is unnecessary to say much about peritonitis. It causes death in the same way as seen in civil practice. Many attempts have been made to combat the so-called obstructive symptoms by enterostomies and short circuits, but with little if any success. It must be mentioned here that a certain amount of evidence has accumulated showing that some obstructive cases have as their basis a nervous traumatic paralysis. Retroperitoneal sepsis, accompanied or not by gas formation, has proved a great source of mortality. This has been obvious in the case of the colon injuries, but a recent series of *post-mortem* examinations by Captains McNee and Dunn has proved that such sepsis is frequently the cause of death where that death has clinically been put down to shock.

Shock.—This subject is dealt with in another place by Captain Geoffrey Marshall, but a word may be added here. It is very difficult to trace any definite relation between the amount of injury and the amount of shock. It can only be said that multiple injuries produce, as a rule, much shock. A severe intestinal lesion will not in all cases prevent a man from completing the task on which he was engaged or even from walking one or two miles, and many who subsequently die arrive at the hospitals in good condition. The pulse-rate table gives some indication of the patient's condition. Prolapse of the small gut seems to cause less disturbance than that of the stomach and colon. Haemorrhage is by far the most frequent cause of death, and as it is nearly always present, it is difficult to determine how much shock is due to this cause and how much to the accompanying injury. There is a certain amount of evidence to show that comparatively slight injuries of both kidney and liver will cause intense collapse, but such cases are not common. Sepsis of the retroperitoneal tissue without severe injury does cause the most intense shock.

Results.

The following table gives the results obtained by the operative treatment in a certain sector of the British line over a period of eighteen months. Practically every case that got to hospital is included, so that a true picture is presented, and the varying results produced by locality and different conditions are eliminated as far as possible.

TABLE V.—*Abdominal Wounds operated on in a Sector of the British Line during Eighteen Months.*

Total number of cases	...	...	1,288
Arrived moribund	...	...	250
Total mortality, excluding moribund	...	...	50.06 %
Total mortality, including moribund	...	...	60.02 %
Considered with view to operation	...	...	1,038
No operation advised	...	...	73
Total operations	...	...	965
Total operative mortality	...	...	53.9 %
Total hollow viscera mortality	...	...	64.7 %
*Stomach mortality	...	...	52.7 %
*Small gut mortality	...	...	69.8 %
*Colon mortality	...	...	58.7 %

* Uncomplicated by wound of other hollow alimentary viscera.

It is very difficult to compare the present mortality with that of the pre-operative period. The whole method of evacuation has completely changed. The operative treatment has attracted to the casualty clearing stations all men wounded in the abdomen, so that those who would have died in dug-outs, at the advanced dressing stations, and at the field ambulances, now reach an operative centre.

Neglecting the more forward positions, a calculation made in the pre-operative days showed that the mortality at field ambulances and clearing stations was 70 per cent. In addition there were the deaths at the base, which raised the mortality to about 80 per cent.

There would therefore seem to have been an improvement of from 15 to 20 per cent.

WOUNDS OF THE HEART.

There has been one successful suture of a heart wound. It was performed by Captain John Fraser. The details are as follow: A bomb fragment entered immediately internal to the left nipple. There was a persistent and pulsing escape of rather dark blood. A probe passed upwards and towards the mid line evidenced a cardiac rhythm. The pulse was small and irregular; the patient distressed and cyanosed. A portion of the fifth rib and its cartilage was removed, and the fourth costal cartilage detached from the sternum. The pleura and fat were retracted, and the pericardium incised. The latter contained a quantity of dark blood. A small hole, the size of a pea, was found in the right auricle. By a suture the auricle was pulled up into the wound and the hole closed by two linen sutures. The progress was good, and the pulse, which had been 120, dropped to 90 on the fourth day.

The patient nine months later reported his health as excellent.

WOUNDS OF BLOOD VESSELS.

It may in the first place be noted that the conception of many surgeons of the size of the lumen and of the thickness of the wall of arteries in general has undergone a change in this war, and it has often been remarked by medical officers that the arteries are smaller and have slighter walls than was expected. No doubt the class of subject from which one gained an idea of the size of the normal blood vessels is so different from the class met with in war surgery that there was an exaggerated idea both of the size of the artery and of the thickness of its walls in healthy young adults.

Surgeons, knowing that they would have to deal with healthy arteries, hoped that many opportunities would present themselves for arterial suture, but unfortunately the opportunities have been few, and the injuries have rarely been of such a nature as to offer any prospect of success or even of trial of such treatment. Lateral suture both of veins and arteries has been done in a fair number of cases, and in two instances a lateral rent in the vena cava itself has been closed, although the only successful case was one in which the sides were brought together by artery forceps and not by suture. The opportunity of end-to-end suture of arteries has rarely offered itself at the front, and as far as the writers know has only been even temporarily successful in one case, that of a bullet wound of the brachial artery; and this vessel gave way and formed an aneurysm some three weeks later. In a few cases the femoral artery has been sutured, but in no case has the operation saved both the limb and the patient.

Although so far the results have been disappointing, this is not a matter for surprise if the condition of the wounded vessels is examined. The class of case in which it was hoped to try this method at the front was that of open wounds such as are generally caused by shell; but unfortunately the ends of the artery are commonly so far apart that it is found that they cannot be brought into apposition after the necessary dissection of the vessel has been done. Even in the popliteal space, where some approximation of the arterial ends can be obtained by flexion of the knee, no case has yet occurred in which arteriorrhaphy has seemed feasible, while small wounds of the limbs or neck with an arterial haematoma seem hardly suitable for this method of treatment.

It was under these circumstances that "Tuffier's tubes" offered some hope of saving limbs from gangrene when arterial suture was out of the question. They have been employed at the front on many occasions, and are, it is believed, well worth trying, as, although they become blocked within about twenty-four hours, they have appeared to tide a limb over this the most critical period before the establishment of the collateral circulation. In one case it was noticed that the tube itself remained unblocked although the artery below became obstructed by clot, and it may be that this distal clotting in the artery will always be a difficulty in practice as opposed to experimental surgery. It must be remembered that in actual practice the limb below the lesion has been deprived of blood for some time before the opportunity occurs of inserting a tube and re-establishing the circulation, and it may be that this period of starvation produces changes in the vessel walls that favour clotting.

There is another observation which may have a bearing on this subject. In civil practice, after the interruption of the main blood supply of a limb and the consequent occurrence of gangrene in its lower part, one looks for and sees the formation of a definite line of demarcation. But in the present campaign it has been found that after the destruction and ligation of an artery this line of demarcation fails to appear in the majority of cases, and the seat of the amputation has to be chosen by noting the place where the limb becomes cold and discoloured, on the one hand, and, on the other, where the capillary circulation is still active, as shown by the return of the skin blush after pressure. No doubt the primary loss of blood has something to do with the frequency of gangrene in the first place, and in the second it would appear that the nature of the injury so upsets the blood supply of the limb that the collateral circulation is slow in being re-established, and that sufficient blood does not reach the part to bring about the rapid and healthy reaction that is necessary for the formation of a distinct line of demarcation.

It is a fact at once curious and important that the arrest of the blood current at a point that is considered a favourable one for the application of a ligature in civil practice is often followed by gangrene when that arrest is caused by a gunshot wound. It may be that the laceration of muscle that so often accompanies such injury is the cause to a certain extent, but there must be other factors at work, as gangrene may follow even a small perforating wound. Wounds of certain arteries stand out as especially dangerous to the vitality of the limb, notably those of the popliteal and the anterior and posterior tibials.

INJURIES OF JOINTS.

A great change for the better has taken place in the results obtained in the treatment of wounded joints.

Experience was chiefly gained on the knee-joint, for it is the joint most frequently hit, most easy of inspection, and its infection is followed by disastrous consequences more often than in the case of other articulations.

In the early days two lines of treatment were followed. The small perforating wounds were left alone and allowed to heal, the progress of the joint being tested by aspirations if necessary. The larger wounds with escape of synovia or actual laying open of the synovial sac were drained, and at first the drains were often introduced into the joint cavity. The results of this treatment were undeniably bad, and all sorts of heroic measures were adopted for the arrest of the septic processes which ensued. But continuous irrigation or an acute flexion of a widely opened articulation gave equally poor results, and the patient was lucky if he escaped with a stiff leg.

The first improvement was the abandonment of the intra-articular drains. The next was the excision of the wound, the removal of any foreign body, the flushing of the joint, and in some cases the closure of the capsule and the insertion of a superficial drain. Closure was especially advocated by Colonel Gray in the year 1915.

The next step was perhaps a bold one. As soon as possible after the receipt of the injury—that is, in the casualty clearing station—the wound was excised, the joint opened, cleaned, and irrigated, and then the whole wound in the synovial sac and the superficial tissues was tightly closed. It was certainly astonishing how seldom infection followed such treatment, even when fragments of shell or pieces of clothing had been removed from the joint; but for its success it is essential that the incisions around the wound edges should be carried quite clear of all infected tissue, and that the strictest asepsis is assured.

Now, every knee-joint with such a wound is given the chance of healing by first intention, although the closure of the joint defect may entail the performance of a plastic operation to provide an adequate cover with a flap of synovial membrane or skin. Even if some infection does follow the closure of the joint, it is well not to be in too great hurry to lay the articulation open, for a certain number of such joints do settle down and provide a better limb than if submitted to more active treatment.

When the joint wound is complicated with fracture of bone it may still be possible in some cases to close it with success. In cases of compound fracture of the patella with loss of substance, partial or complete

removal of the fragments, and the provision of a skin flap, will often be followed by primary healing.

When the tibia or femur are involved the case becomes more serious. Of the two fractures that of the tibia is the most to be feared.

In cases of only partial loss of the articular surface of either the tibia or femur, and also in linear oblique fractures of both bones running up into the joint, it is often worth while to try to close the joint and to obtain primary union.

Where there is much comminution of bone, however, and a dirty wound it is better to abandon all hope of saving the joint and perform a limited primary excision. After such an operation the joint surfaces are usually kept apart by extension on a suitable splint, and Carrel's treatment adopted until the wound cleans, when the bone surfaces may be allowed to come into contact.

The knee is the only joint in the body in which penetration of the synovial sac is at all commonly seen without damage to the bony constituents of the articulation. It is therefore not common to have the opportunity of closing other joints, but the opportunity should be taken when it is offered.

More often the surgeon has to treat a greatly disorganized articulation, and in such cases a primary excision is most probably the best course, especially in the case of the shoulder and the elbow.

The primary treatment of wounded joints may be summarized as follows:

1. Fixation on a suitable splint. In the case of the knee this splint should be one of the varieties of the "Thomas" as used for fractured thigh.
2. Beyond this treatment nothing more is required in simple perforating wounds.
3. The taking of an *x* ray picture in cases where there is a possibility of the retention of a missile or of fracture of the bones.
4. The excision and cleansing of the damaged tissues and the exploration and lavage of the joint.
5. The closure, if possible, of the joint cavity.

HEAD INJURIES.

At the beginning of the war surgeons called upon to treat head injuries applied the ordinary rules of civil practice and operated on them at once. They were confirmed in their opinion that operation was right, since, apart from the mere physical defects, many patients seemed to be suffering from compression.

These operations were done both at casualty clearing stations and field ambulances, but the best method of operative treatment was as yet undeveloped, and the result was that many septic complications were seen at the base. Next, it was noticed at the base that cases which, from force of circumstances, arrived there unoperated upon, did better than those operated on at the front. This was attributed at first to faulty technique, and within limits this criticism was just, as the right operation was as yet undeveloped, both at the base and the front.

The observation was next made that if patients were kept quiet at the place where they were operated upon they did well, while cases operated on and apparently doing well were reported to have arrived in bad condition at the base when evacuated early.

It thus became obvious that there were two reasons for head cases doing badly: (1) The want of a good operation, (2) early evacuation of cases well operated on.

There were then two alternatives: The cases must be either operated on at the front and kept, or else evacuated as soon as possible to the base before operation; a patient must not be operated upon and evacuated forthwith. Two procedures were therefore adopted. In times of pressure head cases were cleaned up and sent to the base at once, provided they were fit to travel, and in quiet times they were operated on and kept at rest at a casualty clearing station for a week or ten days. Even this period of rest after operation proved too short, though the results were better than in earlier evacuation.

The next step was the establishment of special hospitals for head cases at the front. Advantage was taken of the fact that a head case before operation travelled well, and the special hospitals were placed in the back part of an army area. These hospitals were never subjected to the sudden pressure that may fall on an advanced casualty station, and consequently the cases could remain there for a long time. By this means patients experienced the advantages both of early operation and prolonged rest. The actual method of evacuation is as follows: The patients are brought from the trenches to the casualty clearing station as rapidly as possible. Here they are examined and dressed. If the pulse is slow they are sent on to the special hospital. If the pulse is rapid they are put to bed and evacuated later, should they improve. No special attention is paid to the type of wound—reliance is placed on the slow pulse as a sign that the patient will bear the journey.

The type of operation that has eventually been found most beneficial has been arrived at after many changes. Workers, comparatively far apart and not in direct communication, have evolved very much the same operation. At the front a small conservative operation was formerly practised which experience has shown to have been a little too limited in scope. At the base there were two schools—one favoured an extensive removal of bone and a scalp flap, the other an enlargement of the scalp wound and a limited removal of bone. Gradually the types of operations have approximated. It has been found that the removal of bone sufficient to expose half an inch square (1.27 cm.) of uninjured dura is best suited to most cases. Opinions still differ, perhaps, as to the comparative merits of making a flap or enlarging the scalp wound. On the whole, the flap is the best as a routine, unless the wound, as in the case of a horizontal one, is so situated as to compel the use of a very large one.

The recognition of the fact that a slow pulse is not necessarily a symptom of compression (for it may occur with a wide exposure of the brain), and that the symptoms, paralytic and otherwise, are not due to depression of fragments but to a destruction or commotion of the brain matter which is not remediable by operation, has also had an effect upon procedure. In the first place, a slow pulse is welcomed as a sign that recovery may follow, and it is not taken as a sign that operation is urgently needed, but rather that it is worth doing. The recognition that depression of fragments is not the usual cause of the symptoms has also done away with the notion that their removal must be immediately undertaken.

It is true that the sooner a dirty wound is cleaned up the better, but immediate operation is in many head cases followed by a great drop in blood pressure, so that some delay may be actually beneficial on this account, and Colonel Sargent has pointed out that for at least twenty-four hours after injury the brain is liable to be oedematous, and to extrude unduly if operated on while in this condition. A moderate delay has also been said to do good in that it allows adhesions to form between the dura and the pia mater, thus lessening the chance of a spread of infection over the brain surface.

At the same time that the best type of operation as regards the scalp and bony defect was being evolved many other points were in the process of settlement.

1. Excision of the wound was soon decided on.
2. There was at first considerable discussion as to how far the brain should be explored for bone fragments on the one hand and the projectile on the other. Every one was agreed that an *x* ray picture had become a necessity, and the opinion was gradually formed that a limited and intelligent search for bony fragments and other foreign bodies was beneficial, but that attempts to reach a missile which was deeply embedded in the brain was not justifiable. Results seem to have proved the correctness of this line of treatment, for fragments of shell are reported to have caused little trouble provided their weight was not enough to cause pressure on the surrounding brain during movements of the patient.
3. The fact that many patients with head wounds suffered from septic complications, and the general demand for the drainage of all wounds, led at first to the employment of drainage in most cases of cranial surgery, not only of the scalp but of the brain also. The results of drainage of the brain were not satisfactory, and gradually it was abandoned, at any rate as a primary measure. The introduction of tubes was first omitted, and subsequently, systematic attempts were made to cover in the exposed brain, the scalp being brought together over the defect in the bone and dura, either by simple suture, pericranial flaps, or relieving incisions formed by undercutting the scalp. A drain introduced under the scalp is still generally

employed. This covering up of the brain seems to have been a decided success, and, although septic complications are still too often met with, they are less frequent than in former times. There has consequently been a great decrease in the number of cases of hernia cerebri.

4. There is still some difference of opinion as to whether small cranial depressions and linear fractures with slight inequality of surface, uncomplicated by symptoms, should be operated on in the first instance.

5. Most surgeons have accepted the recommendation of Sargent and Gordon Holmes that depressed fractures over the longitudinal sinuses should be left alone in the first instance.

6. Most operators are of the opinion that the dura mater should not be opened if found intact. The recognition that true compression of the brain is seldom seen has helped the formation of this opinion.

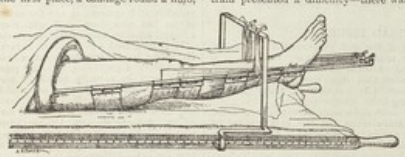
7. A general anæsthetic may with advantage be replaced by the local use of novocain and adrenalin. If this method is adopted the patient is given either hyoscine and morphine or omnopon and scopolamine an hour before the operation.

Thus, by careful individual observation, and by the comparison of results, a method of treatment has been evolved which is applicable to all cranial wounds, and capable of modification in individual cases. It may be summarized as follows:

A primary cleansing of the wound. The transmission of the patient as soon as possible to the hospital where he will convalesce. The taking of *x*-ray pictures. The excision of the scalp and bone wound. A limited and careful removal of foreign bodies. The covering of the exposed brain. The closure of the wound, with superficial drainage, and a prolonged rest in bed.

FRACTURES.

The tendency throughout the war has been to abandon all constricting splints and to trust to extension for fixation of fragments. In the first place, a bandage round a limb, which might from swelling or movement cause constriction, was found to favour the onset of gas gangrene, and in the second, the various forms of Thomas's splint, in which the limb lies on a cradle, gained more and more reputation as a means of efficient splintage. Few other splints are now used on the lower extremity. It is curious that while plaster splints, both as emergency contrivances and as a means of permanent fixation, have steadily increased in use in the French army, in our own they have as steadily fallen into disuse.



Fractured femur, with Thomas's splint and stretcher suspension bar.

The treatment of a compound fracture must be divided into two parts: (*a*) The cleansing of the wound; (*b*) the setting or reduction of the fracture, followed by its maintenance in good position. In the early stages the first is by far the most important, and on its attainment depends, within limits, the success of the second.

Total immediate reduction is good and to be aimed at, provided it can be carried out without prejudice to the cleansing of the wound, but an incomplete reduction, or even no reduction at all, may be advantageous by aiding the disinfection of the wound. Surgeons working at the front are therefore mainly concerned with the primary cleaning of the wound and with the means to transport a patient to the base with comfort and without detriment to the wounded limb.

The organisms that infect a compound fracture may be roughly divided into two classes: (*a*) Anaerobic or gas gangrene producing infection; (*b*) infection due to pus-producing organisms.

Anaerobic or gas gangrene producing infection affects chiefly the muscles, is sudden in onset and development, but tends to die out if not fatal in the early stages.

Infection by pus-producing organisms affects all the structures of a limb, is generally of slower development, and fatal at a considerably later period. The first (*a*) is the chief cause of death at the front, the second (*b*) of death at the base.

From the fact that it affects muscles, the first is more amenable to treatment by mechanical means—the excision of the affected part or part likely to be infected; but the second, giving little indication of its presence, cannot be so easily removed by such means.

At the beginning of the war fractures were treated very much as they were in South Africa. It is true that fragments of projectiles and clothing were removed, but more attention was paid to the solution of continuity of the bones than to the cleansing of the wound.

The occurrence of gas gangrene quickly called for a remedy, which was found in amputation or incisions into the limb. Then came the demand from the base for free drainage. At first small tubes were used; as these proved inefficacious, large tubes were substituted. At the same time came a more systematic search for foreign bodies. This produced an improvement, and it was reported that the cases that came down with adequate drainage, especially those with dependent drainage, stood a far better chance than those in whom such measures were not taken.

About this time attention was drawn to the fact that many flesh wounds, if freely excised, could be sutured with success. The application of this principle, though it could not be applied *en bloc* to fractures, led to more extensive opening up and to better mechanical cleaning by the excision of all dead tissue and the more efficient removal of foreign bodies. These measures greatly reduced the occurrence of gas gangrene and produced an improvement in the suppurative infections. At the same time as these improvements were taking place in operative technique the adoption of the Thomas splint for the lower extremity in one of its many forms was steadily working its own good. The stretcher in the ambulance car and the cot in the train presented a difficulty—there was nothing on which to rest the splint. This difficulty was overcome by two methods. (1) A form of Thomas's splint (devised by Captain Max Page) provided with an attached foot piece or prop was used so that the splint was raised off the stretcher and the limb lay slung, as it should, in the splint. (2) Two forms of iron bracket devised respectively by Lieutenant-Colonel Frankau and Captain Richards, attached to the foot of the stretcher, allowed the Thomas splint to be suspended above the canvas of the stretcher.

Patients thus travelled easily in the motor ambulances, and the difficulty of the cot in the train was easily surmounted by sending the patient down on the stretcher. This latter expedient has been of great benefit to the wounded, as once placed on his stretcher at the casualty clearing station he can remain undisturbed until he reaches his bed at the base.

The fixation in a Thomas splint depends upon the extension. An efficient extension is therefore of prime importance. Sinclair's glue has provided the means. It is easily and quickly applied, and has the additional advantage that it produces no constriction of the limb. It has another advantage, it can be used when only a short portion of the leg is available, a very great gain when dealing with limbs covered with multiple wounds.

There are, of course, a few fractures of the femur that cannot be treated with Thomas's splint—namely, those in which a wound has been received on the part covered by the ring. For these the old Liston splint is used, or in some cases the abduction frame of Jones, though the bulk of the latter makes it unsuitable for work at the front.

Below the knee the Thomas splint can nearly always be used, except in those cases in which the fracture is near the ankle. Even here it is often possible to use it by the aid of the sole extension as devised by Sinclair.

In the case of fractures of the upper extremity the Thomas splint has not proved so satisfactory, but only for the reason that the straight posture of the arm is unsuited to transport except under special circumstances, as in transit by barge. The form of Thomas splint for the bent arm has not proved a success. For transport the form of internal angular splint, with a hinged back piece for the upper arm as devised by Captain Colin Clarke, is probably the best.

The development of the operative side of the casualty clearing station and the provision of *x* rays has been of inestimable benefit to the patient. There can be no doubt that the chance of the patient recovering with a good limb and of escaping a long period of suppuration depends on the attention that can be paid to his wound in the first instance. No amount of after-care can ever make up for the want of it at the first moment. A thorough and deliberate operation is all-important. There must be a free opening; the cavity must be explored by the eye, and not only by the finger, otherwise dead tissue and possibly foreign bodies will be passed over.

When first received, the wound is dirty, but the number of pus-producing bacteria is comparatively few. In a few days it is probable, no matter what treatment is adopted, that they will have greatly increased in number. If the first operation has been incomplete, a second may be necessary at the very time that the wound is in the worst possible state, and the procedure necessary to supplement the primary operation may be disastrous in exposing fascial planes to infection from a wound teeming with bacteria.

The early, deliberate and efficient cleansing of the wound is the basis of success, no matter what chemicals are used after it is completed.

REFERENCE.

BRITISH MEDICAL JOURNAL, August 7th, 1915.

PENETRATING WOUNDS OF THE CHEST AT THE CASUALTY CLEARING STATIONS.

BY

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THE number of chest wounds admitted to the clearing stations is about 2 per cent. of the whole number of wounds admitted. The most favourable cases are those in which a bullet has gone right through the chest; the least favourable, those made by a piece of shell which is retained within the chest.

In cases where the missile has involved both the chest and the abdomen the prognosis is very unfavourable. Occasionally the whole stomach, or part of the intestine, is drawn up into the pleura through a wound of the diaphragm. In other cases the abdominal viscera are so injured as to prevent recovery. In any case the addition of a wound of these organs to the temporary loss of the use of one lung, which is the usual result of a wound of the chest, produces a condition from which very few recover. Injury to the spinal cord is a still more fatal complication.

The following notes are chiefly drawn from a consecutive series of 211 cases, of which careful observations were made and recorded at the time.

The patients are often much collapsed at time of admission, so that in many cases the heart cannot be felt, and in some cannot even be heard for the first twenty-four hours. With warmth, rest, and morphine, they improve greatly by the second day.

Few cases bleed dangerously from the external wound. When this occurs, it can usually be stopped by plugging the wound. There is often much distress if the external wound admits the free entry and exit of air in respiration. It is almost at once relieved if the wound be made air-tight with strapping over the dressing. For these large openings into the pleura, in which sometimes three or four ribs are smashed, and infection from the open air would be almost inevitable, a form of procedure has recently been adopted which promises well. After careful paring of the wound, removal of loose bone, and blunting of sharp edges, the skin and, where possible, the muscles are drawn together and stitched over the aperture, leaving either only a small hole for a drainage tube or none. If a tube is left in, the cavity is then filled with an antiseptic. One surgeon is using emerald green, 1 part to 1,000 of solution of gum tragacanth, for this purpose.

In all but fourteen of the series there were signs of hæmothorax. It is rare for the effusion to increase in extent under observation. The chief safeguard against continued haemorrhage is collapse of the lung. In one case which died from repeated external haemorrhage the lung was found adherent to the pleura throughout. Collapse had not in consequence taken place. In another (not in this series) that died with an increase of the hæmothorax, by repeated internal haemorrhage, a piece of metal was found lodged in a large pulmonary vessel which it had partially but not completely severed. The retraction of the vessel was thus prevented.

When the effusion is moderate in size, reaching not above the middle of the scapula, nor further forward than the mid-axillary line, it does not cause serious distress. These cases form the great majority. In them by the third day the pulse falls to 84, the respirations to 28, and the temperature will be falling also. Since the observations of Bradford have shown that fresh haemorrhage hardly ever occurs after the lapse of seventy-two hours from the wound, such cases were, as a rule, evacuated at the end of that time. Information from the base showed that this policy was not attended by any bad results.

When the effusion is greater than this, specially if it is complicated by pneumothorax, the patient usually shows distress. The heart is displaced, the pulse is above 100 and the respiration is over 32. Such cases are not fit to travel. They should be aspirated, and about a pint of blood and as much air as possible should be withdrawn. Some were rendered comfortable by this procedure and were able to travel without damage on the fourth or fifth day. It must be noted that the hospital was close to the train, and that though the journey might last even to thirty hours the conditions were comfortable.

It was not thought desirable at the early a stage to remove the fluid completely with the aid of oxygen replacement; that procedure was therefore left for the base hospitals.

In the latter part of the year 1916 a new method of treatment was adopted in a limited number of cases, especially in patients in whom a missile was found by *x* rays to be retained in the chest. On the second day after the injury, ribs were resected or a costal flap turned back, the pleura opened, and the missile removed. The pleura was then thoroughly washed out, and the whole wound carefully closed. The number of cases so treated is as yet insufficient to enable definite conclusions to be drawn, but experience is so far favourable.

The complications, other than mere size of the hæmothorax, which prevented early evacuation, were either septic infection of the effusion on the wounded side, or some disease of the lung on the opposite or unwounded side. In many cases a missile rakes the chest and enters both pleurae. Neither lung can then be called unwounded. The term is confined to cases where one pleura alone has been injured. These complications will now be considered.

In some cases the patient may be comfortable while at rest and have no fever, but on examination there may be the signs of consolidation of the unwounded lung, and movement may produce shortness of breath and some cyanosis. In such cases the condition is that of massive collapse of part, usually at the base, of the unwounded lung. The side is often contracted, the heart is drawn over, and the *x* rays, if available, show the diaphragm raised and motionless. This condition, familiar after abdominal operations in civil life, was found by Bradford to be a frequent complication of chest wounds. It clears up in about a week.

In other cases there may be an increasing cyanosis and distress, even at rest, for which the condition of the wounded side does not account. On the unwounded side there may be the signs of bronchopneumonia. Some of these are true cases of that disease. But more of them are due to engorgement of the unwounded lung which affects the back and the lower lobe chiefly. The whole of the affected part is solid with blood, and on section presents a glistening surface of dark crimson colour. Its

causation is not clear, but the situation argues failure of the pulmonary circulation.

Unquestionably, however, if the cases be followed through, the most common complication of chest wounds is infection of the haemothorax. When cases are sent down on the fourth day not many infected cases are seen at the clearing station. It is, however, important that the medical officer should be quick to mark its symptoms. The face is pale, though there may be a local flush, the expression anxious, the tongue dry, the appetite bad, and there may be vomiting. The pulse and respiration usually quicken and the temperature rises. In many cases gas formation within the thorax is shown by the alteration of the physical signs and the displacement of the heart. But this does not always occur, nor are any of the other symptoms constant.

Briefly speaking, whenever the medical officer is dissatisfied with the progress of the patient and cannot otherwise explain it, he should always suspect septic infection. If suspicion is aroused, aspiration should be performed at once. Sometimes the fluid will be found to stink, or it may be seen to contain pus, or the froth may remain permanently crimson from haemolysis. Any of these signs is sufficient to indicate that a free opening should immediately be made. If doubt remains, it is well, after drawing off a pint of the effusion, to leave the patient for a day, and, unless he has by then obviously improved, to operate. Bacteriological evidence, when forthcoming, is valuable as a confirmation, but it is on the one hand uncertain, for the infection may be confined to a certain part only of the pleura, and on the other, may cause considerable delay. Clinical evidence should always be trusted, and action taken upon it without hesitation.

Five cases of septic infection occurred before the fifth day after the wound in the present series of cases. In all a free opening was made at the clearing station, and all these patients, though some of them were very ill for a time, recovered sufficiently to be evacuated.

In the whole series there were twenty-two deaths, of which two were due to wounds of the heart, ten to conditions of the pleura and lungs, and ten to wounds of the spine or abdomen. The remainder were evacuated.

THE ADMINISTRATION OF ANAESTHETICS AT THE FRONT.

BY

CAPTAIN GEOFFREY MARSHALL, R.A.M.C.(S.R.).

FROM the point of view of the anaesthetist, wounded men may be divided into three main classes:

1. The lightly wounded.
2. Those suffering from serious wounds with more or less shock and haemorrhage, the two factors being commonly associated.
3. Those suffering from a severe degree of sepsis, especially anaerobic infection.

The choice of anaesthetic depends on which of these classes the patient belongs to, as well as on the region of the body injured.

I. THE LIGHTLY WOUNDED.

These patients are good subjects for anaesthesia, so that the chief desiderata are safety, speed, and convenience. The ideal anaesthetist is one with which induction is rapid, and recovery complete a few minutes after operation, so that the patient is in fit condition for early evacuation by ambulance train.

Gas and oxygen anaesthesia meets these requirements best. With its help a greater number of these cases can be dealt with satisfactorily in a limited time than with any other anaesthetic. When this method is not available, ether should be used. The ether is best administered as a warm vapour by "Shipway's apparatus," as both induction and recovery are more rapid than with the open method.

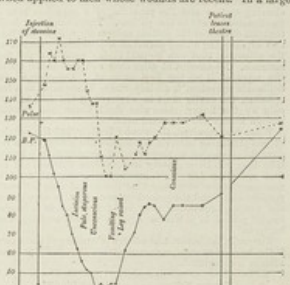
Local anaesthesia can only be employed in a small number of cases, on account of the multiplicity of wounds and their lacerated and soiled condition.

II. THE SERIOUSLY WOUNDED.

In the more serious cases the one consideration is safety. In other words, we require an anaesthetic which will not be harmful to a patient who is still suffering from the shock of injury, and one which will minimize the shock of operation.

Spinal Anaesthesia.

It has been urged that spinal anaesthesia would meet these requirements, especially in wounds of the legs and thighs, and would therefore be of great value in military surgery. In practice, however, it is found that the intrathecal administration of stovaine has dangers of its own when applied to men whose wounds are recent. In a large



In the charts the continuous line represents blood pressure in millimetres of mercury. The dotted line represents pulse rate per minute.

CHART I.—Spinal anaesthesia. Group A. Stovaine 0.075 gram. Wounds of leg and buttock twenty-one hours. Haemoglobin 80 per cent. Operation conservative. Death twenty-four hours later from gas gangrene.

proportion of these cases the administration is followed by a great fall of blood pressure and symptoms of cerebral anaemia, that is, pallor, vomiting, loss of consciousness, and occasionally convulsions. The syncope is sometimes fatal. It is in the man who has lost blood, and whose wounds are less than forty hours old, that spinal anaesthesia is

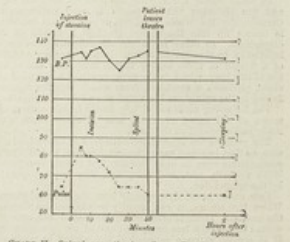


CHART II.—Spinal anaesthesia. Group B. Stovaine 0.1 gram with glucose. Wounds of thigh sixteen hours. Haemoglobin 103 per cent. Operation conservative. Recovered.

dangerous. This is shown by an analysis of fifty consecutive cases operated on at a clearing station under stovaine spinal anaesthesia.

All the patients had wounds of the lower extremities. In each case the percentage of haemoglobin in the patient's blood was estimated before operation: a low percentage of haemoglobin in a man whose wounds are recent may be taken to indicate that the patient has bled. The fifty cases fall into three groups:

Group A.—Men operated on within forty hours of receiving their wounds, and whose blood was dilute (indicating haemorrhage).

Group B.—Men operated on within forty hours of receiving their wounds, whose blood was not dilute.

Group C.—All cases in which a greater interval than forty hours had elapsed between wounding and operation.

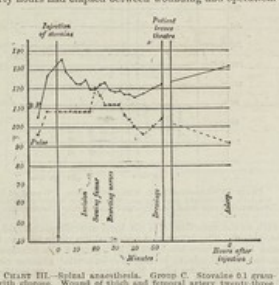


CHART III.—Spinal anaesthesia. Group C. Stovaine 0.1 gram with glucose. Wound of thigh and femoral artery twenty-three days. Haemoglobin 45 per cent. Gangrene of leg. Amputation lower third thigh. Recovered.

In Group A there were twenty-two cases. Of these, nineteen showed symptoms of collapse after injection of the anaesthetic. The average fall of blood pressure was 57 mm. of mercury; in only three cases was the fall of pressure less than 35 mm., the greatest fall was 99 mm.

In Group B there were sixteen cases. Of these, only three developed any untoward symptoms after injection, and these were trivial—in one case nausea and in the other two pallor only. The average fall of blood pressure was 17 mm., the greatest 33 mm.

In Group C there were six cases. None showed any symptoms of collapse. The average fall of blood pressure was 19.7 mm. and the greatest 35 mm.

For the prevention or combating of the collapse the most important factor was found to be the position of the patient; the symptoms are alleviated by raising the legs and lowering the head. It is safe to lower the head fifteen minutes after injection. Neither strychnine nor pituitrin were of any use in combating the collapse, nor did preliminary injection of strychnine prevent it. The dose of stovaine given varied from 0.05 to 0.1 gram, and within these limits the fall of blood pressure was not proportional to the dose of the drug. Some of the greatest falls of pressure were associated with the smallest doses of stovaine and vice versa. With doses smaller than 0.05 gram, the anaesthetic effects were so slow and uncertain as to make the method impracticable at a clearing station.

Wounds of the Limbs Necessitating Amputation.

There are few more unfavourable subjects for anaesthesia than the man who is suffering from the shock of a recently shattered limb, and who has to undergo the further shock of amputation. The mortality of these cases can be greatly reduced if correct procedure be followed.

In the first place, the patient must be put to bed and surrounded with hot bottles or a hot-air bath. However urgent operation may be surgically, it is useless to perform it before the patient has been thoroughly warmed up.

In the second place, morphine should be withheld before operation or given only in small doses.

In the third place, gas and oxygen should be the anaesthetic used for operation. Results are so much better with this mixture that no other anaesthetic is justifiable.

If chloroform be used, the patient's condition will deteriorate during the administration, and he will not rally afterwards. With inhalation ether the condition may improve and the blood pressure rise during operation, but there will be a collapse during the next two hours. With intravenous ether the temporary improvement is more striking and the after collapse more profound and more often fatal.

Shock.

Shock is a condition which still evades precise definition, although seen so commonly in wounded men. The injuries which cause it are almost invariably severe in themselves, that is, they involve important structures or extensive areas of tissue. In a typical case there is dusky pallor of the face, the radial pulse is flickering or imperceptible, and the surface temperature low. There is repeated vomiting, but the patient shows remarkably little mental disturbance, and may be fully conscious and intelligent within a few minutes of death. The arterial blood pressure is often higher than might be expected from the character of the pulse, and shock is usually profound if associated with a systolic pressure lower than 80 mm. of mercury; we refer to readings taken by means of a Riva-Rocci sphygmomanometer with auscultation over the brachial artery. The blood in the capillaries of the extremities is dark and cyanotic. In cases of shock unassociated with haemorrhage we have found the blood to be more concentrated than normal.

Treatment of Shock before Operation.

We have stated that, however urgent it may be, operation should not be performed on a patient suffering from shock until means have been taken to mitigate this condition.

The one measure which commonly produces definite improvement is the application of external warmth. Excellent results have been obtained by the application of heat from electric light lamps or by the use of an improvised hot-air bath, and if such a patient as we have described be put to bed and treated by these methods, or surrounded with hot bottles, his surface temperature rises, his colour improves, and his arterial blood pressure will as a rule go up steadily for several hours. He will then be much less likely to succumb if subjected to a severe operation.

Fluids are best given either by mouth or rectum. Subcutaneous infusion produces no measurable effect in this type of case; and if death occurs as late as thirty hours after infusion, the bulk of the fluid will still be found in the subcutaneous tissues. The intravenous administration of saline is of little use before operation. It causes a temporary rise of blood pressure and slowing of the pulse rate, but does not render the patient less susceptible to further shock. The blood pressure falls again as soon as operation is begun. Transfusion is best done towards the end of operation; it will then often cause a lasting improvement in the patient's condition. We have found that hypertonic saline produces a more lasting elevation of blood pressure, slowing of the pulse, and dilution of the blood than does the normal solution. Transfusion with blood gives still better results. The use of artificial viscous fluids is still under trial.

The Limitation of Shock during Operation.

The recently injured patient is particularly susceptible to further shock, and this susceptibility is increased by certain drugs used in the production of anaesthesia, for example, chloroform, ether, and morphine in large doses. These drugs should therefore be avoided in dealing with a patient who is suffering from recent wounds and who has to undergo a severe operation such as amputation through the thigh. Chart IV shows the serious fall of blood pressure which occurred an hour after amputation under ether vapour anaesthesia. Charts V and VI illustrate the

still greater collapse after intravenous ether. Chart VII shows how trivial is the effect on pulse rate and blood pressure when the operation is done under gas and oxygen.

We have already indicated that amputation is a much

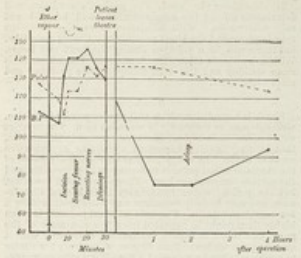


CHART IV.—Anæsthesia by ether vapour. Wound of leg thirty-six hours; tibia shattered. Hæmoglobin 62 per cent. Amputation lower third thigh. Recovered.

less dangerous procedure to a patient who is not already suffering from shock or hæmorrhage. Chart III was an example of amputation under spinal anæsthesia, and Chart VIII under intravenous ether, both in cases of severe sepsis but in which the initial shock of injury had passed off. Chloroform is dangerous even in this type of case; Chart IX illustrates a fatal example.

Wounds of the Head.

Operations on the head may be performed under local anæsthesia. All tissues of the scalp are infiltrated in a circle surrounding the site of operation with a solution of

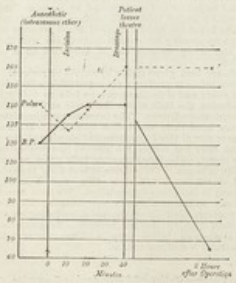


CHART V.—Anæsthesia by intravenous ether. Wound of thigh twenty-two hours; femur fractured. Hæmoglobin 88 per cent. Operation conservative. Recovered.

novocain and adrenalin. No pain is felt even when bone and dura are dealt with. On the other hand, the forcible cutting of bone is disturbing to the patient, so that where mentality is unimpaired, hyoscine and morphine should be given an hour before operation. If general anæsthesia is preferred, this may be obtained safely and conveniently with Shipway's apparatus. A warmed mixture of ether and oxygen is administered through a catheter passed down the more patent of the two nostrils.

Wounds of the Chest.

Ether should not be administered to a patient with a perforating wound of the chest, as it usually provokes fresh intrathoracic hæmorrhage. For small operations,

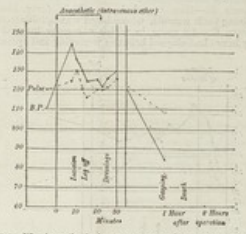


CHART VI.—Anæsthesia by intravenous ether. Wound of leg six days. Secondary hæmorrhage seven hours before operation. Amputation mid-thigh; collapse and death eighty minutes after.

such as the resection of a rib, local anæsthesia should be employed. The intercostal nerves of the rib to be resected and the rib above are blocked by injection of a solution of novocain and adrenalin into the subcostal grooves close to the angles of the ribs. For more extensive operations, requiring general anæsthesia, we give a preliminary injection of morphine gr. $\frac{1}{4}$, hyoscine gr. $\frac{1}{150}$, and atropine gr. $\frac{1}{150}$, and follow this with a minimal amount of warm chloroform vapour with oxygen.

Wounds of the Abdomen.

For these cases we have found the most satisfactory anæsthetic to be a warmed mixture of ether vapour and oxygen. Compared with "open ether," we find that the warm vapour gives a more rapid and quiet induction, easier breathing, and diminished heat loss during operation and less vomiting afterwards.

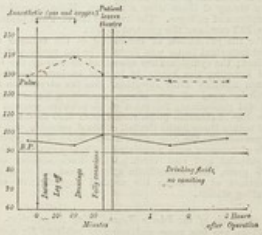


CHART VII.—Anæsthesia by gas and oxygen. Wound of thigh twenty-one hours; femur shattered. Patient pale and vomiting. Hæmoglobin 62 per cent. Amputation mid-thigh. Recovered.

Men wounded in the abdomen are especially liable to develop bronchitis, perhaps owing to deficient movement of the lower part of the chest. In a series of these cases anæsthetized with open ether, 54 per cent. developed bronchitis after operation. In a comparable series anæsthetized with warm ether vapour, the percentage of bronchitis was only 14.7.

Blood Pressure during Operations on the Wounded Abdomen.

During the course of an ether vapour anæsthetic the blood pressure shows a tendency to rise, but if there is much manipulation of gut and mesentery, it will gradually fall. The process may be continued for hours without the pressure falling to a dangerous level. Exposure of gut

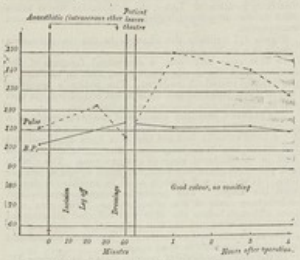


CHART VIII.—Anæsthesia by intravenous ether. Wounds of both thighs fifteen days. Left thigh amputated thirteen days. Severe sepsis, purulent bronchitis and vomiting. Amputation lower third right thigh. Recovered.

outside the abdominal cavity produces a much more serious effect. If more than two or three feet are exposed, the blood pressure will commence to fall after a few minutes, and will continue to fall rapidly until the gut is replaced. This effect is seen when stomach and omentum are exposed, and even with great omentum alone. The indication is that surgeons should make big incisions, and work as far as possible with the gut lying inside the abdomen. Covering the exposed gut with pads wrung out in hot saline does not prevent the fall of blood pressure.

Exposure of gut produces far less effect if the patient is not under an anæsthetic. We have seen men arrive from

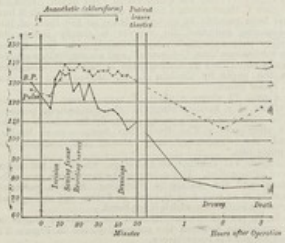


CHART IX.—Anæsthesia by chloroform vapour. Wound of leg seven days. Secondary amputation lower third thigh. Death ten hours after operation.

the line with several feet of intestine prolapsed through a wound, yet their blood pressure was within normal limits. In one case more than two-thirds of the small gut had been outside the abdominal cavity for at least four hours, and this man's blood pressure was 142 mm. of mercury, and his pulse rate only 108. The patient recovered.

Apart from copious hæmorrhage, there is one other procedure which causes rapid fall of blood pressure in abdominal operations. This is turning the patient on his side. The effect is only seen if the patient has been under the anæsthetic for a considerable time before being turned. At the end of an abdominal operation the patient may be in good condition. He is then turned on the right or left side so that the surgeon may excise a wound in the back. In a few minutes there is a great fall of blood pressure, and the radial pulse disappears. It may be hours before the patient recovers this lost ground. If possible, wounds of the back should be dealt with before laparotomy, as turning the patient has no ill effect during the first half-hour of an ether anæsthesia.

If chloroform be used in these abdominal operations, the blood pressure will fall during administration and for some hours afterwards. This drug is therefore to be avoided except where ether is contraindicated, as in cases in which projectiles have penetrated the chest as well as the abdomen.

The intrathecal administration of stovaine is unsafe, and should not be employed.

III. Patients with Sepsis.

The patient whose condition is rendered grave by sepsis will stand an amputation far better than the man who is suffering from shock. In the septic case, gas and oxygen again gives excellent results, but spinal anæsthesia, warm ether vapour, and intravenous ether are also comparatively safe. Chloroform, however, is to be avoided, as it is often followed by a slow fall of blood pressure which ends in death during the twelve hours succeeding operation.

THE COLOUR CHANGES SEEN IN SKIN AND MUSCLE IN GAS GANGRENE.

[With Coloured Plates.]

BY
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A short time ago[1] I ventured to support Kenneth Taylor's statement that gas gangrene was primarily and mainly a disease of muscle. Further work and observation have only strengthened this belief. It is the object of this paper to describe the naked-eye alterations in the appearances of the skin and muscle in the sequence in which they occur.

Through the kindness of the Medical Research Committee I am able to illustrate some of the changes by the reproduction of coloured drawings made by Sergeant A. K. Maxwell, R.A.M.C. I should like to take the opportunity of congratulating him on the skill he has displayed in catching the delicate tints in the colour changes.

Colour Changes in the Skin.

The changes in the skin of an affected limb may share in the general icteric tint that affects the whole body in some cases. This has been well portrayed elsewhere,[2] and need not detain us here. Coming to the more local lesions, it is first necessary to state that the skin of an affected limb may appear, and usually is, perfectly normal in the early stages; even under a normal skin, however, the disease in the muscles may be so far advanced as to necessitate amputation. The first essential change in the colour of the skin is due simply to the swelling of the limb. At this stage the skin looks somewhat tense, just as it does over any deep-seated swelling, and is paler than normal, owing to the blood being driven out of it by pressure. Resonance to percussion, and even crepitations, may be perceptible at this stage. Simple pallor of the skin is succeeded by a dirty cream tint, which may be taken to indicate that gangrene is certainly established. Up to this stage examination through an incision may reveal only partial or complete involvement of a single muscle, or of a limited group of muscles, so that the condition may be suitable for treatment by local excision.

The subsequent changes in the skin are quicker and more dramatic. Areas of purple staining appear, which enlarge and coalesce. The margins of these are fairly distinct but irregular, and the intervening skin is greyish-white in colour. Soon there appear blebs filled with fluid

which is stained by altered blood; removal of the cuticle from these exposes a shiny purple-red area of dermis. When this condition of the skin is reached it may safely be inferred that the gangrenous process is so far advanced as to necessitate amputation.

In the last stage to which reference need be made, the purple is succeeded by a dark yellow-green tint. It will be seen that these later changes are identical with what may occur in any limb after death, and are essentially *post-mortem* phenomena due to bacterial action. The late colour changes may be influenced according to the relative parts played by bacterial action on the one hand and by arrest of blood supply on the other. Thus, near an infected wound the yellow-green tint may develop early, whereas in a segment of limb infected only after its blood supply has been cut off, the stage of purple discoloration may still predominate at operation.

Figure I is a drawing made from a forearm which was amputated on account of gas gangrene. The projectile passed across the flexor aspect of the forearm, causing great laceration of the muscles. The whole of the muscles on the flexor aspect were gangrenous, the change being most advanced in the deep flexors and the supinator brevis, which were diffluent. There was in this case ample opportunity for direct infection of the different muscles. The main arteries were intact, so that the gangrenous process was entirely due to infection; in other words, it was not a case of infection after arterial death, but of infection producing total destruction of the muscles and consequently of the skin and subcutaneous tissues. The drawing speaks for itself and requires but little explanation. It shows the purple mottling of the skin, and the contrast between the infected flexor muscles seen through the wound and the normal-coloured muscle by the side of the cut humerus.

There is another change in the skin—namely, "bronzing," to which allusion must be made because it has attracted considerable notice. It is regretted that no example of this could be obtained while the artist was present, but a coloured drawing of the condition has been published elsewhere.[1] The plate was merely described as "multiple shell wounds," but the bronzed area can be well seen over the hollow part of the man's back. This colour change is not common, in my experience, on the limbs, but is seen more often on the body, especially in connexion with wounds of the extraperitoneal part of the colon. Sometimes it is accompanied by crepitations of the subcutaneous tissue, but is often found without this manifestation. The tissue beneath is sometimes normal, or only slightly oedematous, sometimes distinctly oedematous, sometimes yellow-green in colour. At one time this discoloration is the herald of a violent infection which cannot be controlled by incisions, at another time it will disappear without treatment. The causal agent is, so far as I am aware, unknown.

Colour Changes in the Muscles.

Figure II represents a dissection of the thigh of a man who died from multiple injuries and gas gangrene of the thigh. A wound is present over the vastus externus, part of which has been carried away. The resulting dirty cavity can be seen, as can also the infected subcutaneous tissue, which is of a dirty yellowish-green hue. The vastus externus, although wounded, did not become gas-gangrenous; this may be attributed, perhaps, to the open nature of the wound. The missile passed behind the rectus tendon, and was found lodged against the fibres of the vastus internus. The point of interest lies in the condition of the latter muscle, which was gas-gangrenous throughout. The change in the colour of the muscle is a subtle one, but can be easily seen. Although not so apparent in the reproduction, the same change was present in the outer edge of the lower part of the sartorius, just where it lay in apposition to the vastus externus. The colour of the vastus externus is altered from the normal red-purple to a brick-red. The whole muscle was dead and non-contractile, and some bubbles of gas were visible between the fasciculi. It is to this stage that I have given the name "red death." The other muscles of the thigh were not affected. Death occurred in this case fifty-six hours after the wound was received, and the condition of the thigh was found at the *post-mortem* examination.

The intermuscular connective tissue showed but little alteration in this specimen. This is often the case, but at other times there are distinct alterations. Gas may be found abundantly along the great vessels, and also commonly in the subcutaneous tissues. It is important to note that cultures from such gaseous tissues may prove sterile. At other times the connective tissue is oedematous without being discoloured, and occasionally the appearance is distinctly gelatinous. Later, the oedematous tissue takes on a yellow or yellowish-green colour, but still remains transparent.

Figure III exhibits the changes in the subcutaneous tissues in a striking degree.

In this case there was a compound fracture of the humerus just above the elbow-joint, and, in addition, a penetrating wound of the chest. The patient's condition was so precarious that amputation was considered the best course, especially as there was no radial pulse.

The case is a beautiful example of the involvement of a single wounded muscle, and would have been an ideal one for a local excision had not the arm been shattered and the man's condition dangerous. The supinator longus is seen in the diffluent stage of gas gangrene. The muscle was yellowish-green in colour, and quite devoid of form or tone. It was so soft that it could be moulded or dented with the finger. The greenish-yellow coloration and oedematous state of the subcutaneous tissue are well seen, although before the skin was reflected the external appearances were not marked. The other muscles of the forearm, as can be seen in the drawing, were normal and still readily contractile when examined.

In the small segments of muscle shown in Figures IV, V, VI, and VII it is possible to trace the colour changes in greater detail. All the pieces shown were taken from the gluteus maximus muscle, except one (Fig. VII), which is a portion of a tibialis anticus muscle.

Figure IV is drawn to represent the normal colour of gluteus maximus muscle, the actual specimen being taken soon after death from a patient who died of acute peritonitis. The normal colour, sharpness of outline, and general appearance of the fasciculi, show that the muscle was healthy.

Figure V shows a piece of muscle which was dead, non-contractile, crepitant to the touch, and brick-red in colour. The bubbles of gas, or rather the spaces once occupied by them, are distinctly seen. In this stage the muscle is very friable, and the gas can, by gentle stroking, be pushed about from place to place between the fibres.

Between the normal contractile muscle, as represented in Figure IV, and the condition of "red death" seen in Figure V, there occurs a zone of demarcation which it has not been possible to portray. Here, at the limit of the advancing gangrene, the muscle is simply lighter in colour than normal, but not definitely red. It is firmer in consistence than the normal, and no crepitation can be made out. This advancing edge is more fully discussed in the paper by Captain J. W. McNee and Captain J. Shaw Dunn.

Figure VI shows a piece of muscle from the tibialis anticus at a further stage in the gangrenous process. The colour is now passing gradually from brick-red to an olive-green. The tissue has become more friable, and the consistence may almost be described as "putty-like."

Figure VII exhibits an end-stage, which is not often seen at operation. The colour of the muscle is a greenish-black, and the surface is glistening. Such a piece of muscle is so soft that it tends to flatten out and spread over the surface on which it is placed.

In Figure III the condition of the supinator longus is intermediate between the stages depicted in Figure VI and Figure VII respectively.

I must thank Captain J. W. McNee and Captain J. Shaw Dunn for the care and trouble they have taken to prepare the specimens from which the drawings were made.

Lieutenant-Colonel Frankau and Captains Neligan and Drummond in their paper demonstrate the clinical use that can be made of the pathological fact—namely, the involvement of single muscles in early cases of gas gangrene.

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THE METHOD OF SPREAD OF GAS GANGRENE INTO LIVING MUSCLE.

[WITH COLOURED PLATE.]

BY

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AND

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(A Report to the Medical Research Committee from a Mobile Laboratory in France.)

This contribution to the pathology of gas gangrene deals primarily with the method of spread of the acute disease into living muscle.

In our experience gas gangrene is essentially a muscle disease, and we have never seen it commence where injury of muscle could be excluded. The somewhat rare cases of "metastatic" gas gangrene, such as those described by Mullally and McNee,[1] Kenneth Taylor,[2] etc., come into the same category, the primary focus in every instance being in damaged muscular tissue. No example of gas gangrene beginning in, and remaining localized to, the subcutaneous tissue has been met with, and a condition spreading below the skin which is met with in base hospitals would appear to merit some special investigation before a relationship to the general type of gas gangrene can be established.

Clinically, the rapidity of spread of gas gangrene into living muscle, once the disease has begun, is so remarkable as to demand some definite explanation such as has been sought for by histological methods and is suggested here.

The varieties of the acute disease investigated in this way are sufficiently indicated in the articles published by Cuthbert Wallace, and by Frankau, Drummond, and Neligan. Part of our histological material, indeed, was obtained from the actual cases described by these writers.

The disease may commence in a wounded limb within an extraordinarily short time after the injury. The earliest case of gas gangrene examined histologically showed the condition already established three and a half hours after the wound was received, and we have seen massive gas gangrene of a limb lead to a fatal issue twelve hours after a wound of the thigh.

A point worth notice is that death may occur quickly, following a comparatively slight wound, when examination *post mortem* shows gas gangrene involving only a small bulk of actual muscle tissue. No example of gas gangrene by the bacilli, therefore, whether it be a true toxin or not, is at any rate a powerful systemic poison. Sir Anthony Bowlby has pointed out to us that cases of this kind may very readily be mistaken for death from shock alone.

Wounds involving main blood vessels—for example, the popliteal artery—are notorious for the frequency with which gas gangrene develops in the distal segment of the limb, and it is necessary to point out here that there are differences between the spread of gas gangrene following such an injury and the invasion of living muscle. Where the main artery is cut, massive or "group" gangrene generally occurs, whole groups of muscles being involved from end to end simultaneously by the growth of organisms throughout the muscles from which the blood supply has been cut off.

The spread of gas gangrene into living and healthy muscle, with an intact blood supply, is a different and less easy problem, with the solution of which this paper is mainly concerned. With regard to this, two facts must here be briefly brought to mind. One of these is the clinical observation, now well established and borne out by the microscope, that gas gangrene tends to spread in the longitudinal axis of muscles, so that single muscles are involved from end to end while neighbouring ones are untouched. It must also be remembered that individual muscle fibres stretch without interruption from one tendinous attachment to the other.

It is essential, in investigating the spread into muscle, to work on material which is absolutely fresh. Most of the examinations have been made on limbs amputated for gas gangrene, and brought at once to the laboratory while the healthy muscles were still contractile. Other tissues examined were either from single muscles removed by operation or from *post-mortem* examinations carried out within an hour or two at most after death. Unless fresh material is used, quite fallacious conclusions may be drawn, since, especially in summer time, the organisms proliferate and produce gas with extreme rapidity in the warm body after death.

In amputated limbs, and in the stumps left at operations, we have had ample opportunity of proving that the anaërobic organisms are present in the healthy muscle at a considerable distance from the actual seat of the gangrene. Thus the presence of the organisms in the muscles, even though abundant, does not constitute gas gangrene, and, indeed, such infected muscles may never become gangrenous. This is well seen in amputation stumps, known to be infected, but in which no reproduction of the gangrene occurs after the operation, in a majority of cases.

DESCRIPTION OF COLOURED PLATE.

Figures VIII, IX, and X represent the conditions found at different levels in a single block of tissue from the advancing margin of gas gangrene. Between Figure VIII and Figure IX there is an interval of 2·5 mm. of length, and the same distance between Figures IX and X.

FIG. VIII.—Normal muscle in transverse section. Just beyond the edge of the spreading gangrene. (Haemalum and eosin.)

FIG. IX.—Muscle from as nearly as possible the visible advancing edge. Note the marked contrast between the dead coagulated fibres, which are separated off from their sheaths, and the paler normal fibres. (Haemalum and eosin.)

FIG. X.—All the fibres are here degenerated, but their sarcolemmal nuclei still appear intact. Separation of the fibres from their sheaths is every where complete. (Haemalum and eosin.)

FIG. XI.—This shows the distribution of organisms at a comparatively early stage. There are large numbers of bacilli in the reticulum, but they have not yet invaded the fibres. This stage is slightly more advanced than that depicted in Fig. X, and the nuclei of the sarcolemma have disappeared. (Leishman's stain.)

FIG. XIII.—Phagocytosis of anaërobic bacilli in a zone where the process of gas gangrene has been arrested. The leucocytic reaction is in remarkable contrast with the previous figures. (Leishman's stain.)

FIG. XIII.—A late stage of gas gangrene, showing complete disintegration of muscular fibres and reticulum, in this material organisms were present in large numbers, and frequently in the substance of the fibres. (Haemalum and eosin.)

Bacteriology.

The bacteriology of the acute disease will be referred to only briefly, as so much has already been published on the varieties of anaërobic bacilli to be found. It is enough to say that all our work has been done on acute and often fulminating cases, such as are seen in casualty clearing stations on the front. In these cases mixed anaërobic infections are the rule, but sufficient work has been done in isolating the different organisms to incriminate the *Bacillus aërogenes capsulatus* (*B. perfringens*) as the commonest and most abundant organism present. It appears often to be the only organism which is isolated from the spreading margin of the gangrene at a distance from the wound. The biology of this organism, with its powerful fermentative action on sugars and resulting evolution of gas, fits in very well with the extraordinary rapidity of spread of acute gas gangrene.

A number of experiments to reproduce a spreading gas gangrene have been carried out in animals to amplify and confirm the findings in human tissues. These will be referred to again later on.

Histological Changes.

The material examined histologically was almost always embedded in paraffin, after fixation in 10 per cent. formalin, or in corrosive sublimate; frozen sections and tissue fixed by boiling were also used for the investigation of certain important points. Muscle taken for examination must be handled with great care or fallacies from artificial separation of the fibres may arise. The histology of single muscles, removed at operation and necessarily pulled on in the act, required, therefore, careful consideration before conclusions could be drawn from the sections. The best material was obtained from amputated limbs, in which the individual muscles could be carefully dissected, and pieces cut out with a sharp knife or razor, all pulling being avoided.

In a few cases only we have had the good fortune to

obtain a muscle with fairly long fibres, in which the advancing edge of a spreading gas gangrene could be clearly recognized. It is from these fortunate instances, however, by the examination of serial sections, that most of the information has been obtained of the method of spread. Macroscopically the appearance of this spreading margin is interesting. It is sometimes fairly sharp, but in other instances is irregular, from the process having spread further along some fibres than others. The muscle fibres at the margin are paler and duller than the normal, but the colour change is little more than might be accounted for by total absence of blood in the part involved. The outer limit of the process, while indefinite, can be mapped out fairly closely if the healthy muscle beyond is still contractile (in tissues examined very soon after amputation), as contractility is lost in the part becoming gangrenous. At the advancing edge also the muscle tissue is very much firmer to touch than the healthy fibres beyond, and this firmness passes back into the obviously gangrenous muscle behind.

When the whole of the advancing edge is cut out, along with a margin of tissue on either side of it, and examined in serial transverse sections, the appearances presented are very striking, and are shown in the first three microscopic drawings (Figs. VIII, IX, and X).

Figure VIII represents the muscle in transverse section just beyond the furthest limit of the advancing gangrene; the muscle here was still healthy and contractile. The muscle fibres appear normal, and are seen to be made up of fibrils which show as dots in the transverse section. The cracks in the fibres are artefacts produced in the cutting of the paraffin sections. They occur so constantly in transverse sections of normal fibres that they can almost be taken as characteristic of healthy muscle. The flattened nuclei of the sarcolemma are well seen, and also the interstitial tissue between the fibres, which carries the blood vessels, lymphatics, etc.

Figure IX is from a section taken from as nearly as possible the advancing edge, as seen by the naked eye. The muscle here had lost its contractility. Various normal fibres are seen, with characters as above, while others exhibit a very striking change. The staining reaction is different, being an almost uniform eosin tint, while the dots indicating the individual fibrils are lost. These fibres are not shrunken, but on measurement are often found to be somewhat swollen. In spite of this, however, these fibres are well separated off from the interstitial connective tissue, to leave what appears in the section as a clear space. Occasionally the separation of reticulum from fibre is partial, and confined to a sector only; but even in such instances the fibre still shows the uniform eosin tint indicative of degeneration. The sarcolemmal nuclei of the separated fibres still stain brightly. The contents of the spaces between the altered fibres and the interstitial meshwork will be discussed later, and it may simply be noted here that such fibres are obviously cut off from their blood supply in the interstitial tissue.

Figure X is from a section taken from the tissue 2½ mm. behind the one just mentioned, and in it all the fibres have undergone the degenerative change described above. The fibres are all separated off completely from the interstitial tissue, which forms a regular network between them. The regularity of the network is in no way exaggerated in the drawing, and no difference would be observed in a colour photograph of many of our sections. The nuclei of the sarcolemma are at this stage stained as in the normal fibres.

In longitudinal sections of tissue taken to include the advancing edge, the process is less striking to the eye, as it is impossible to get complete lengths of fibres in any one longitudinal section. The appearances are quite easy to follow, however, having in mind the information obtained from the transverse sections. A fibre which stains normally can often be traced to a point where, quite suddenly and with a very definite edge, the colour change to the strong uniform eosin tint is met with, and the normal striation disappears. Practically coinciding with the colour change, which no doubt represents the margin of death of the fibre, the interstitial tissue is seen to separate off and leave the clear space which is so obvious and striking in the transverse sections.

The significance of these observations may now be briefly dealt with.

In transverse sections stained for organisms these are found far beyond the edge of the gangrene in the interstitial tissue between the healthy fibres. What, then, determines the advancing death of the individual fibres? The whole question seems to us to be bound up in the contents of the spaces left between the degenerated fibres and the meshwork of interstitial tissue. The altered fibres are not shrunken, and the muscle at the spreading margin is tumid and increased in bulk. This swelling is evidently due to the extra room taken up by the spaces described. It was a tempting view to take, that these spaces might be filled by gas alone, which, by the mechanical effect of pressure and by cutting off the fibres from their blood supply in the interstitial tissue, might lead to their speedy death. Attempts were made to prove this view correct by cutting thick frozen sections of fresh unfixed tissues, and looking for evidence of gas under the microscope, but none could be detected. On the other hand, in tissues fixed in corrosive sublimate, and more especially in material fixed by boiling before being embedded in paraffin, evidences of amorphous deposit in the spaces were found, which seemed to point to the contents being a fluid. In tissues fixed in formalin, from which the drawings were made, the spaces almost invariably appeared quite empty, and free from anything which stained. We therefore are of opinion that a toxic fluid, perhaps similar in constitution to the oedema which always accompanies gas gangrene to a greater or less extent, spreads along between the interstitial tissue and the fibres, killing off the latter as it advances. Once the fibres are killed, the anaerobic bacilli live on them practically as saprophytes, breaking down the sugars and producing abundant gas. This process is in strong contrast to what occurs in healthy muscle, where the presence of the organisms is without effect on the living fibres.

The rapid spread of the disease into living muscle can, we think, be explained on these lines. Fibres, each of which stretch without interruption for a considerable distance, are killed in the manner which has been described, and the dead tissue is then rapidly broken down and gas formed. The circle is a vicious one, for the toxic fluid which spreads between the fibres is no doubt formed in the gangrenous tissue behind, and so the condition spreads until the ends of the fibres are reached. This view also gives a satisfactory explanation of how single muscles may be found gangrenous, no spread having occurred to others close at hand. No opinion can yet be given as to the nature of the toxic fluid, which may either be a true bacterial toxin or something dependent on the breaking down of tissues.

Other points brought out by histological examination may now be referred to. With regard to the route followed by the organisms, these are, at the spreading edge, never found in the muscle fibres themselves, but are practically confined to the reticulum (Fig. XI). When the fibres are dead and being broken down, the bacilli invade the disintegrating fibres in numbers. At a later stage (Fig. XIII) all definite muscular structure becomes lost and gas is present abundantly between the remnants of the fibres. It is interesting to note that in muscle at this advanced stage of the disease the number of organisms appears much less than in the spreading zone. This is evidently partly due to many organisms staining badly, so that ghost forms are numerous. It seems probable that this stage, once reached, is inimical to the life of the bacilli, so that many are destroyed and disappear.

In rapidly spreading gas gangrene leucocytes are generally conspicuous by their absence in the muscular tissue involved (although they may be present in some number in the interfascicular planes). The mere speed of progression of the process in muscle may probably account for this, as a leucocytic reaction takes some time to develop. Where the spread of gas gangrene is being arrested in muscle, great leucocytic invasion is present. This is well shown in Fig. XII, taken from a muscle in an amputation stump. Here a recrudescence occurred in the stump, but was arrested after spreading a few inches only. Macroscopically a very definite pale zone was visible, and in section abundant phagocytosis of bacilli by polymorphonuclear leucocytes was found.

Control Experiments on Animals.

A considerable number of experiments have been carried out in animals to control the conclusions arrived at by the study of human tissues. Large rabbits were used, because of their long hind legs, in which the spread of the disease could be watched at different stages. Gas gangrene being a disease of muscle, all the inoculations were made intramuscularly into the gastrocnemius or soleus. Several facts of considerable interest were brought out:

1. A spreading gas gangrene of the limb, quite comparable with the same disease in man, could be produced in rabbits, sometimes leading to a fatal result.

2. The surest method of inducing this result was by the injection of about one cubic centimetre of the fluid expressed from a human muscle showing fairly advanced gas gangrene. This fluid contained abundant bacilli, and all the products of tissue disintegration.

3. When the fluid obtained in this way was first passed through a Berkefeld V filter to remove the organisms, intramuscular injection led to marked local necrosis of muscle fibres, accompanied by considerable leucocytic reaction. No spreading oedema or separation of muscle fibres at all comparable with that described in human tissues could be brought about.

4. A rapidly spreading fatal gas gangrene was produced in one instance only by the injection of a pure culture of *B. perfringens* isolated in culture from a fulminating human case. In this experiment a haematoma of considerable size had been caused in the muscle at the site of inoculation, and this may have provided the dead tissue necessary to start the spreading disease. In tissues from this animal all the changes noted in the spreading margin of the disease in man were perfectly and completely reproduced. In some sections normal fibres were seen lying side by side with others of a deep eosin tint and separated off from the reticulum. At another place the appearances corresponded exactly with those shown in Fig. X, the sharpness and regularity of the interstitial network being very striking.

5. Other experiments carried out with pure cultures of *B. perfringens*, isolated from human cases, led only to a local gangrene at the seat of inoculation, round which a zone of granulation tissue quickly formed, completely walling off the damaged tissue.

Conclusions.

1. The rapidity of spread of gas gangrene into living voluntary muscle is so remarkable as to require explanation by a different process from that which governs ordinary septic invasion of tissues.

2. It is suggested that the facts are accounted for by the peculiar anatomical structure of muscular tissue. The sheaths enclosing the long individual fibres are so easily detachable as to form potential spaces into which toxic material can readily pass, causing necrosis of the fibres.

3. The early selective invasion of single muscles is consistent with the above view.

We wish to thank Colonel Cuthbert Wallace, C.M.G., consulting surgeon, for his help and interest in this work. The drawings from microscopic sections were made by Sergeant A. K. Maxwell, R.A.M.C., working under the auspices of the Medical Research Committee.

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THE SUCCESSFUL CONSERVATIVE TREATMENT OF EARLY GAS GANGRENE IN LIMBS BY THE RESECTION OF INFECTED MUSCLES.

BY

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AND

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Among the points brought forward by Colonel Cuthbert Wallace in an article on gas gangrene[1] published in this JOURNAL some months ago were the following:

1. It is rare to meet gas gangrene without muscle injury.

2. It is chiefly a disease of muscles, and is rarely dangerous unless muscle is involved.

3. The lesion in its early stages may be described as a longitudinal one, running up and down the wounded muscles from the seat of the lesion. Muscles, or groups of muscles, are involved, while others escape.

4. It is rare to find all the muscles of a segment of a limb involved, save in a segment distal to one in which the main blood supply has been cut off. Thus the whole leg dies and becomes gaseous when the femoral artery has been blocked in the thigh.

5. There is little tendency for the infection to pass from one muscle to another. This is well shown in amputation stumps, where one muscle dies and becomes gaseous, while the rest of the cut muscles remain healthy.

From our own observations in clearing stations over a period ranging up to twenty-one months it is abundantly clear that these points cannot be controverted. In no case have we seen gas gangrene commencing as a subcutaneous infection; injured muscle is in all cases the initial focus, the appearance of crackling in the subcutaneous tissues being a secondary phenomenon, due to extravasation of gas from the infected muscles below.

Resection.

In view of this, it has been our aim to model our treatment on the following lines as soon as the condition is diagnosed: To explore the primary focus with a view to attempting to arrest the infection in the muscle, or group of muscles, involved by resection of the infected areas. Such resection may, as will be seen from the cases, involve a part or the whole of single muscles, or groups of muscles.

Resection should be limited to cases in which the main vessel of the limb is intact, and should be replaced by amputation where the operation must be so extensive as to be likely to give a limb which would be of less value than an artificial limb. Extensive resections, however, may be performed regardless of the ultimate utility of the limb as a life-saving operation, it having been quite clear in some of the cases recorded below that an amputation, as in Case XIII, or a further amputation, in Cases VII and IX, could not have been carried out without very grave risk to life. Resection should extend until muscle is reached which has the following characteristics:

1. The colour is unchanged.
2. The contractility is normal.
3. A good blood supply is present, as indicated by free bleeding from the cut surface.

Experience has shown that even if such muscles are, as they may be, slightly infected, free drainage and an open wound will arrest further development of the condition.

After-Treatment.

The treatment of cases after resection is carried out on the following lines: (1) The dressings are reduced to the absolute minimum—that is, one or two layers of gauze only are placed over the wound so as to allow free access of air and, if possible, sunshine to the wound region; (2) constant or intermittent irrigation of the wound by some modification of the Carrel method—ensol, saline, or hydrogen peroxide being used as the irrigating fluid.

In connexion with the cases described below, the point must be specially emphasized that gas gangrene had already developed in some patients, though they were admitted a very short time after being wounded. In fact, in units at the front established gas gangrene has to be treated *ab initio*, in addition to gas gangrene developing at a later stage.

We are indebted to Colonel Cuthbert Wallace, consulting surgeon to this army, for advice and assistance in the treatment of these cases, and to Captain J. W. McNee and Lieutenant J. S. Dunn, of No. 3 Mobile Laboratory, R.A.M.C., for the bacteriological and pathological investigations they have made in the cases.

Case I.

Lieut. F., wounded 4 p.m. on November 2nd, 1916, by rifle grenade fragment; admitted at 7.15 p.m. the same day, that is, three and a quarter hours after being wounded.

When admitted he was clearly very ill, although he arrived as a walking case; his pulse was 120, of poor quality and irregular, his tongue was furred, and his features pinched and worn. There was an irregular wound the size of a threepenny-piece (that is, about 1.6 cm. in diameter) on the posterior aspect of the right arm just above the internal condyle of the humerus; there was no exit. The whole upper arm appeared

swollen; it was crepitant to the touch, and gave a tympanitic note on percussion. The crackling was most marked on the inner aspect of the arm, and extended as high as the anterior axillary fold above in front, but to not quite so high a level behind.

He was given a general anæsthetic at 8 p.m. The wound of entry was first excised; much damage to the triceps was found locally, and the projectile could be felt to the inner side of the vessels in the front of the arm at the junction of the lower and middle thirds; a second incision was made over this, when the subcutaneous tissues were found to be œdematous, and the biceps muscle showed evidence of gas infection. A further incision was accordingly made along the whole length of the biceps muscle from its origin to attachment; this showed the following conditions: some bruising of the inner border of the muscle at the situation of the projectile; discoloration of the inner half of the muscle, varying from a dull red colour at either end to a deep plum colour in the centre. Over the discoloured area bubbles of gas were present under the fascia covering the muscle. This half of the muscle did not react to tap stimulation, whereas the outer half was normal in colour, and contracted sharply on stimulation. As this appeared to be an infection localized to the inner half of the muscle, the latter portion was resected in its entirety.

A tube drain was inserted into the posterior wound; the anterior wounds were left open, small tubes being inserted for continuous eusol irrigation, which was commenced immediately after the operation was completed. The pulse dropped to 88 six hours afterwards and never rose above this again. The wounds remained clean without pus formation, and on November 9th were closed by secondary suture and the eusol irrigation discontinued. The wounds remained healthy and were practically healed when he was evacuated to the base on November 17th. He had already very fair power in his arm and the remaining portion of the biceps could be felt contracting.

Pathological Report.—An anaërobic gas-forming organism was grown from the excised muscle, which, on histological examination, showed hyaline degeneration of groups of fibres with separation. This condition represents a very early stage in the process of gangrene. Long bacilli could be recognized between the muscle fibres, but they were very scanty.

The extreme rapidity of the infection in this case is remarkable, occurring as it did within three and a quarter hours of the time of injury. It was, in fact, the earliest case we have ever seen. There is no doubt that if any delay had occurred in the treatment the consequences would have been disastrous owing to the virulence of the infection; the patient would have lost his limb if not his life. The treatment by resection of half of the muscle rather than the whole, which at first sight would seem to have been the better course, was due to the fact that the infection is known to spread longitudinally along the length of the fibres and that transverse spread is a late phenomenon occurring in the more advanced stages. The differentiation between living and dead portions of the muscle was made from the presence or absence of contractility, it being well established that heavily infected muscle is non-contractile. (C. H. S. F.)

Case II.

Lance-Corpl. D., wounded by shell fragment on July 2nd, 1916, was admitted twenty-four hours later, when the following condition was found. Temperature 102.6°, pulse 118; there was a through-and-through wound in the middle of the left upper arm; the arm was greatly swollen in the neighbourhood, and tender on palpation. Subcutaneous crepitation was present.

At the operation, which was performed at once, the biceps muscle at the site of the wound was found to be in a state of "black death," and was full of gas; for two inches above and below this the muscle was non-contractile and in the "red death" stage. A long incision was made over the whole length of the biceps and the entire muscular portion was excised. The wound was dressed with gauze soaked in peroxide until all oozing had ceased, and then was left exposed to the air and sun under a single layer of gauze.

The patient vomited a good deal for two days after the operation, but on the third day this ceased, and his temperature and pulse dropped to normal, and remained so. No other muscle was affected, and the resection was entirely curative, and conserved his limb. He was sent to the base on July 11th with a healthy granulating wound, and a satisfactory report on his condition was received from England on July 26th. (G. E. N.)

Case III.

Pte. O. was admitted at 7.30 p.m. on October 29th, 1916, suffering from multiple shell wounds received the same afternoon. His general condition was good; there was a penetrating wound of the right chest, an in-and-out wound of the right calf, and a penetrating wound of the right biceps muscle.

The next day he was given a spinal anæsthetic, and the wound in the leg was incised and drained. On the following day his condition was not so good, and he complained of pain in the right arm; pulse 105, temperature 101.8°. The wound in his arm was the size of a sixpence (1.9 cm.), and was situated over the centre of the biceps muscle. The arm was swollen, and the skin was tense and slightly discoloured in the region of the wound. On gentle pressure a small amount of dirty serum with gas bubbles in it escaped from the wound. A general anæsthetic was given, and the biceps muscle exposed by a long incision. In the middle third of the muscle, deeply situated, there was a small cavity containing a fragment of shell; above and below this for a distance of two inches was an area of dead crepitant muscle. The whole necrotic area was excised until healthy muscle was reached, which bled on section. The wound was left freely open, and dressed with eusol gauze.

He made a straightforward recovery, and was evacuated to the base on November 12th. The wound in his arm was then healthy and ready for secondary suture.

In this case immediate improvement followed resection of the infected muscle. (H. D.)

Case IV.

Pte. G., wounded on July 24th, 1916, was admitted the same day with shell wounds of the right buttock, right calf, and skull.

Immediate operation by trephining; wounds of buttock and calf drained and a piece of metal removed from the soleus muscle.

Twenty-four hours later the calf was very swollen and tender and gas bubbled from the wound on pressure; the temperature was 102° and the pulse 112. An anæsthetic was again given and the calf opened up from the lower part of the popliteal space to 3 in. from the ankle. The gastrocnemius was split down the mid-line and found to be healthy and contractile; the soleus beneath along the track of the projectile was found to be in the "black death" stage of gangrene; it was crepitant and no part of the muscle was contractile. As much as possible of the muscle was cut away and the wound was flushed out with peroxide and left open to the air, the limb being slung in a cradle for this purpose. The patient was given 100 c.cm. of 5 per cent. eusol solution intravenously at the end of the operation.

Rapid improvement followed; the temperature and pulse dropped to normal on the next day, and he was evacuated to the base on July 30th, with normal temperature and pulse. The head wound had healed and the other wounds were clean.

A note from the base hospital stated that he was sent to England on August 5th, 1916, having made an uninterrupted recovery. (G. E. N.)

Case V.

Second Lieut. G., wounded in the left leg by a rifle bullet at close range at 2.30 a.m. on October 11th, 1916; he was admitted at 9 a.m. and operated on immediately.

There was a through-and-through wound in the upper and outer part of the left calf, the wounds of entry and exit being of about the same size and just large enough to admit the tip of the finger. The wounds were excised and freely drained by means of two large tubes after irrigation with eusol; the wound appeared to be a comparatively trivial one.

Eighteen hours later the pulse, which had been previously normal, ran up to 120, and he showed signs of profound toxæmia; the upper part of the leg was swollen and tender and the skin was glazed; there was no subcutaneous crackling. An anæsthetic was again given and the entire track of the wound, which was about three inches long, was laid open by division of skin and intervening muscles. The peroneus longus and brevis muscles were found to be considerably lacerated; they were altered in colour, crepitant, and non-contractile. The dead portions were cut away until healthy bleeding muscle was reached, which contracted on stimulation. The wound was left open and treated with continuous eusol drip irrigation.

Immediate improvement followed, the pulse dropping to normal within a few hours. He was evacuated to the base nine days later with a healthy granulating wound.

Anaërobic gas-forming organisms were found on culture in the dead muscle removed.

This case is of interest, as the infection commenced in spite of free and early drainage. Resection of the infected area cut the process completely short. (C. H. S. F.)

Case VI.

Corpl. E. was admitted at 5.50 p.m. on August 27th, 1916, having been wounded by a shell fragment at 7 p.m. the previous day. On admission he looked flushed, the tongue was dry, the pulse 128, and the temperature 103°. There was a wound of entry the size of a shilling (2.5 cm.) over the anterior tibial group of muscles at the junction of the middle and lower thirds of the leg; the wound of exit was 2 in. above the ankle-joint on the posterior aspect of the limb in the middle line. The missile had passed between the two bones of the leg. The limb was very swollen in its lower half and the skin had a white, tense, glazed appearance; there was considerable pain on palpation. No subcutaneous crackling was elicited.

On raising the limb under the anæsthetic, gas bubbles escaped from the anterior wound with some foul stinking serum. The skin wound was excised and the anterior tibial group of muscles were explored through a 6 in. incision. The extensor longus digitorum muscle was exposed, this had been divided across by the missile; the retracted ends showed an opaque sheath with underlying dead non-contractile muscle for an inch on either side of the wound. The dead portions were cut away until normal vascular muscle was reached at either end. About two and a half inches in all were cut away from either end; the anterior tibial artery was exposed at the bottom of the wound, but was uninjured. The extensor longus hallucis looked healthy and contracted well. The posterior muscles were not markedly damaged and were not interfered with. The wound was drained and drip irrigation with eusol commenced.

The patient made an uninterrupted recovery, and was evacuated to the base on September 3rd; his pulse was then 90 and his temperature 99°. The wounds were granulating.

An anaërobic gas-forming organism was isolated from the removed muscle, which, on section, showed necrosis and irregular fragmentation of muscle fibres; there was œdematous thickening and leucocytic infiltration of the interstitial connective tissue. Large bacilli were present in considerable numbers between the dead fibres.

This case clearly shows the longitudinal spread of the infection in the muscles and how free resection of the diseased muscle arrests any further spread of the infection. (H. D.)

Case VII.

Pte. C. was wounded at 4 p.m. on July 29th, 1916, by a shell fragment in the region of the left knee. On admission five hours later his condition was very bad owing to loss of blood; the pulse was 150.

Six hours later after warmth and stimulation he was fit for operation, and the wound was explored. There were two lacerated wounds on each side of the popliteal space which had evidently been traversed from within outwards; examination showed an extensive fracture of the head of the tibia involving the knee-joint. The pulsations of the main vessel could not be felt; the gastrocnemius and soleus muscles were extensively lacerated. The wound was freely drained after irrigation with eusol.

The next day his condition was satisfactory until 8 p.m., when his pulse was 120 and his temperature 102.4°. The region of the wound was more swollen and the skin over the calf had the appearance of a bruise which was fading; percussion gave a tympanitic note over this area; there was no subcutaneous crackling. The knee-joint was also reseated from the presence of gas. The lower third of the leg was cold, and there were several light purple patches over the dorsum of the foot.

The leg was removed by disarticulation at the knee-joint; examination showed occlusion of the popliteal artery from a bruise wound and a large hole in the popliteal vein—the gastrocnemius and soleus muscles showed marked gas gangrene.

He was much improved the next day, but on the following day his pulse was 120, and his temperature 101.4°; the lower third of the thigh was swollen, tender to the touch and resonant to percussion; it was evident that the infection was spreading up the muscles of his thigh. Under chloroform an incision was made up the back of the thigh and the semimembranosus muscle was found to be gaseous and stinking. It was followed up to the middle of the thigh and resected at this point as the fibres were found to be healthy there. The anterior aspect of the thigh was then explored and the sartorius muscle found to be similarly infected in its lower part; the distal four inches were resected through healthy muscle.

The wounds were left exposed to the air, being covered by one layer of gauze only; the wound was kept irrigated by a constant eusol drip. The thigh was slung so as to take the weight off the muscles of the back of the limb; suspension was effected by means of a gauze band attached to the exposed condyles of the femur. From this time on he commenced to improve; on the following day his pulse was 96 and temperature 102°. On August 3rd the stump of the popliteal artery, which was lying in a bed of sloughing muscle, commenced to core; in order to avoid a secondary haemorrhage the femoral artery was ligated in Hunter's canal under local anæsthesia. After this he continued to improve, and was evacuated to the base on August 19th.

The muscles were infected with a pure culture of *B. perfringens*.

It was impossible even to attempt to save the limb in this case by resection of muscle in the first instance owing to the occlusion of the popliteal artery. When the secondary spread of infection occurred into the thigh muscles after the amputation his general condition became rapidly so bad that a further amputation would have been inevitably fatal. Resection of the infected muscles was the only satisfactory course to adopt, as proved to be the case. (H. D.)

Case VIII.

Pte. P., wounded August 28th, 1916, was admitted the same day. There was a through-and-through wound of the left thigh, with compound fracture of the femur in the upper third. He had had much haemorrhage before admission, and was very collapsed on admission; pulse 140, temperature subnormal.

Twelve hours later he had improved sufficiently for operation; both wounds were freely opened up, lacerated muscle, fragments of bone, and the case of a bullet being removed. The outer wound was kept open with a silver retractor, and both were lightly packed with eusol gauze. The limb was immobilized on a Wallace Mayburry splint, and the wounds were syringed every two hours with eusol.

The patient had a good night, but next morning his temperature and pulse began to rise; he complained of pain in the limb and of great thirst, and the tongue became dry and brown. The limb was found to be swollen and tense, and had a characteristic odour. There was no skin crepitation and no gas bubbles from the wound. An immediate "chaff-cutter" amputation just below the trochanters was performed; as the adductor muscles were found to be in the red stage of gas gangrene, they were completely excised from the stump. The wound was dressed for twenty-four hours in gauze soaked in peroxide, and then left exposed to the air under one layer of gauze.

Within two days the temperature dropped to normal and the pulse to 90; none of the other muscles in the stump showed any sign of being infected, and he was evacuated to the base on September 15th with a granulating wound.

A laboratory report confirmed the diagnosis of gas gangrene.

This method of removing a group of infected muscles was also carried out in another case five days after amputation, the adductors here being also removed. No spread occurred in the other muscles. (G. E. N.)

Case IX.

Lieut. B., wounded at 1 a.m. on September 13th, 1916, by shell; the right leg was shattered in the lower third. He was admitted at 1.30 a.m. the same day.

Primary amputation by equal lateral flaps at the middle of the leg was performed at 4 a.m. It was noticed at the operation that the anterior tibial artery was occluded; there was no change in the muscles, which were contractile and apparently healthy. The wound was freely irrigated with eusol, and the flaps which were free were united loosely with three sutures. Free drainage was provided by means of two tubes, which also served for constant eusol irrigation, which was started at once. The pulse before the operation was 99; at the end it was 88.

Twenty-six hours later the pulse rose to 120, the tongue became furred and dry, and the patient was drowsy and obviously very ill. Examination of the wound showed mottling of the skin over the front of the leg, together with a tympanitic note on percussion over the same area; there was no crackling of the subcutaneous tissues. The wound was at once opened up, when it was found that the entire anterior tibial group of muscles were a brick-red colour, non-contractile, and quite dead. They were removed *en masse* and the wound was left open under constant eusol drip irrigation.

The general condition remained bad for twenty-four hours, with rapid pulse, drowsiness, and persistent vomiting. Steady improvement then followed, and the patient was sent to the base on September 22nd with a healthy granulating wound.

The removed muscles were found on culture to be heavily infected with gas-forming organisms.

The only other alternative in this case would have been a further amputation through the thigh, which it is doubtful if the patient would have survived. Resection of the muscles avoided this additional danger and gave the patient a much more serviceable stump, as the knee-joint was saved. (C. H. S. F.)

Case X.

Pte. P. was wounded by shell fragment on July 23rd, 1916. When admitted on July 24th the temperature was 103.6°, and the pulse 120. There was a through-and-through wound of the left thigh, the entry being on the inner side, 3 in. above the patella, and the exit 2 in. higher up on the outer side. The exit wound was swollen, tense, and tender, but did not crepitate.

Both wounds were excised and united by incising the skin. There was some laceration of the edge of the vastus internus; this was cut away; the muscle looked normal, and was contractile. The rectus femoris was grooved on its under surface, but appeared otherwise normal. The exposed inner edge of the vastus externus was brick-red and non-contractile, and smelt strongly of gas gangrene. An area of 4 in. by 2 in. of the muscle showed signs of red death; the parts beyond were normal and contractile. A free skin incision was made, and a piece of muscle 8 in. by 3 in. enclosing the affected area was excised. The wound was dressed in gauze soaked in peroxide, and later exposed to sun and air.

The temperature and pulse steadily fell, and by July 30th were 99° and 76 respectively. He was sent to the base on that day; the wound was then healthy and granulating, and there was no sign of further gas infection.

A report from the mobile laboratory stated that the infection was due to an anaërobic gas-forming organism. (G. E. N.)

Case XI.

Pte. M., wounded on August 29th, 1915, by shell fragment in the left groin. There had been much haemorrhage at first, necessitating saline infusion in the field ambulance, where he was retained until midday on August 31st.

On admission his condition was grave; tongue brown and dry, pulse 130. There was a ragged wound of entry the size of a shilling (2.5 cm.) an inch and a half below Poupart's ligament and just to the inner side of the femoral vessels; the skin over the upper third of the thigh and for a handbreadth above Poupart's ligament was mottled and discoloured, and showed marked subcutaneous crackling.

An anæsthetic was immediately given, and the wound opened up; it was found to extend upwards and outwards towards the anterior superior spine, where a fragment of metal and khaki

w s found in the sartorius muscle. The muscle in this situation was dead, and the upper third was cut away. The discoloured and crepitant areas were incised down to deep fascia, and freely injected with hydrogen peroxide. No dressing was applied, and the wound was kept constantly irrigated with hydrogen peroxide and left exposed to the air and sun.

Rapid improvement took place, and the man was evacuated to the base with a granulating wound twelve days later. No bacteriological examination was made, but there was no doubt about the condition.

At the time when this case came under treatment the significance of the muscle resection was not realized, but it seems at least probable that it cut short the process by removing the main focus of infection. (C. H. S. F.)

CASE XII.

Lance-Corpl. C., wounded in the left thigh by a shell fragment at 3 p.m. on March 13th, 1916, was admitted into hospital at 2.30 p.m. the following day.

On admission he looked flushed, the temperature was 102°, and the pulse 120. There was a jagged wound two inches long on the outer aspect of the lower third of the left thigh. There was no exit wound. The lower part of the left thigh was swollen and tense, and the overlying skin shiny. There was tenderness on palpation, and a tympanitic note was obtained on percussion; there was no subcutaneous crackling.

At 5.30 p.m. on the same day a long incision down the outer aspect of the thigh exposed the vastus externus muscle, of which the lower half was markedly affected with gas gangrene. A portion of the muscle near the wound of entry was black in colour and the muscle fibres were diffluent. The lower part of the muscle was resected up to the middle of the thigh, where healthy contractile muscle was found. As the muscle planes were separated by gas up to the level of the great trochanter, the skin incision was carried up to this level. The whole wound was left wide open and dressed with eusol gauze. At 9 p.m. the same evening he was given an intravenous injection of eusol 100 c.cm.

The pulse dropped the next day, and he showed great improvement; this was maintained, and he was evacuated to the base six days later. Information was received from England a week later that he was progressing well.

An anaërobic gas-forming organism was obtained on cultivation from the muscle removed. (H. D.)

CASE XIII.

Pte. B. was wounded by shell fragment on September 1st, 1916, and admitted the same day. There was a through-and-through wound of the thigh, the entrance being on the inner side two inches below Poupart's ligament and the exit at a corresponding point on the outer side.

Under an anæsthetic the skin wounds were excised and the track syringed with eusol and drained.

Fifteen hours later the patient complained of great pain in his thigh and of great thirst; the temperature was 101° and the pulse 115. The wound was found to be tender, crepitant, and glassy.

An anæsthetic was again given, and the whole track of the missile laid open; the sartorius, rectus femoris, and the inner edge of the vastus externus were found to be in the "black death" stage of gas gangrene. An incision was made from the anterior superior iliac spine to the knee and another along the inside of the thigh; these were stitched back to healthy skin so as to expose the wound fully. All three muscles showed the "black death" stage of gangrene at the site of the wound, toning down through the "red death" stage to normal muscle as the muscles were traced down the thigh. The muscular part of the rectus femoris was removed, and also the sartorius from its origin to just above the knee. A strip of the vastus externus for nearly its entire length and for a width of 5 in. was also excised. No other muscles appeared to be affected; the wound was dressed with gauze soaked in peroxide, and afterwards exposed to the sun and air.

For three days he was very ill, with rapid, feeble pulse, constant hiccough, and persistent vomiting; he however slowly improved, and on September 5th his pulse was 88 and temperature 100°; the hiccough still persisted. Two days later a part of the skin flap sloughed, after which he improved steadily, and was evacuated on September 11th with a healthy granulating wound, which was skin-grafted at the base hospital.

The diagnosis of gas gangrene was confirmed by the mobile laboratory. (G. E. S.)

CASE XIV.

Corpl. V., wounded in the left thigh by a shell fragment at 5.30 p.m. on September 12th, 1916, was admitted five hours later.

His general condition was good; pulse 100, temperature 99°. There was an entry wound the size of half a crown on the inner and posterior aspect of the thigh at the junction of the middle and upper thirds. The exit wound was at the outer side of the thigh in the middle third; it was very large, admitting the whole hand; the muscles were greatly lacerated. He was operated on immediately after admission; the missile had passed through the vastus externus and biceps muscles close to the femur, and had partially divided the sciatic nerve. The wound was freely drained after irrigation with eusol.

He continued to do well for two days, when the evening pulse rose from 104 to 132, and the temperature to 102°. The skin over the exit wound was now a dirty-brown colour, and the area in the neighbourhood was swollen and tender; there was no subcutaneous crackling. The skin discoloration extended to the popliteal space. A further anæsthetic was given, and the large exit wound was laid freely open. In the lower part of the wound the vastus externus muscle was found to be gangrenous; it was non-contractile and gaseous. The infected portion of the muscle was resected until healthy muscle was exposed. In the upper part of the wound the vastus externus was pale and contracted feebly; with clean instruments a piece was removed for examination, and the skin was laid freely open over the muscle. Eusol dressings were used.

Immediate improvement followed, and he was evacuated to the base on September 26th, with a normal temperature and pulse.

Anaërobic gas-forming organisms were cultivated from the dead muscle, and were also obtained on culture from the portion of muscle removed from the upper part of the wound.

This case shows the immediate improvement after resection of the infecting focus, and also that muscle may look healthy and be contractile, and yet be infected. (H. D.)

REFERENCE.

[1] Gas Gangrene as Seen at the Clearing Stations, BRITISH MEDICAL JOURNAL, September 16th, 1916.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

PNEUMONIA AND TOXAEMIA.

IN the JOURNAL of May 5th, 1917, Captain Drew emphasized the distinctions between the local lesion of pneumonia and its toxaemia; and suggested lumbar puncture in highly toxic cases. The following case, recently in this hospital under the care of Professor Sir Clifford Allbutt, illustrated with almost singular clearness the distinction in question, and the doctrine then insisted upon by the Regius Professor that, speaking within limits, the toxic symptoms of pneumonia do not correspond in degree with the extent of local lesion, and that a small, almost a latent, patch of pneumonia may be attended by severe and even mortal toxic symptoms.

The case to be related illustrates the contrary side of the comparison; a very severe and extensive local lesion was attended by no toxic symptoms whatever.

M. H., female, aged 22, was admitted on March 14th, 1917. She had never before had a severe illness. Her temperature after the first few hours was 103°, the pulse 104, and the respirations 36. The attack began three days before, with vomiting; but she had, till admission, gone on with her duties as a V.A.D. nurse. She was sent into the hospital because of her temperature. Two days later crisis occurred sharply; the temperature, respirations and pulse falling to the normal in the course of a day or two. Pneumococci were found in the sputum. So far there was nothing unusual about the case. The remarkable thing was that during all this time the young woman seemed fairly well. Her face was a little flushed, but she betrayed no sign whatever of distress. There was no sense of dyspnoea, she sat upright in bed, and moved easily into any attitude. There was no loss of appetite, no debility, no nervous disorder, but good comfortable sleep. She was quite cheerful and chatty, and it was difficult to persuade her she was really ill.

Yet on physical examination the left lung was dull throughout and typical fine crepitation heard over the whole of it, front and back, but especially over the lower half behind. So startling was the contrast between symptoms and signs that until the crisis came the fear of acute tuberculosis could not be dismissed. The extent and severity of the lesion was proved by the slow disappearance of the signs of consolidation and the long persistence of crepitatio redux. However in about three weeks the pneumonia had disappeared, though during convalescence, on account of a mild attack of tonsillitis, then prevalent in the ward, her discharge was delayed. She went out quite well, and returned to her duties, scarcely having been "ill in herself" throughout.

S. RIDDOUGH,
Acting House-Physician to Addenbrooke's Hospital, Cambridge.

Reports of Societies.

ETIOLOGY OF TYPHUS FEVER.

AT a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine, on May 25th, Colonel J. LANE NOTTER, Vice-President, in the chair, Miss MURIEL ROBERTSON (Lister Institute) read a paper on recent researches into the etiology of typhus. After a brief historical sketch, Miss Robertson considered in detail the experimental work initiated by the investigations of Nicolle in 1909. She called attention to the numerous contradictory assertions made by competent investigators, and pointed out that one of the sources of these discrepancies had been failure to allow for the fact that a considerable proportion of monkeys, the experimental animals mostly employed, possess at least a transient immunity, and that among monkeys kept in captivity small variations of temperature are quite common, so that, without careful preliminary investigation, erroneous inferences may be drawn from temperature charts. The work of Nicolle, Conor, and Conseil, and that of Anderson and Goldberger and of Ricketts and Wilder was described. The conclusion was drawn that no satisfactory proof had been provided of a monkey exhibiting a typical typhus reaction after the injection of filtered serum from a typhus patient, and that the present state of knowledge authorizes the belief that the virus of typhus will not pass a sound Berkefeld filter. Passing to the supposed bacterial causes of the disease, the opinion was expressed that the organisms isolated by Plotz in 1915 from guinea-pigs infected with Anderson and Goldberger's strain of the virus, and subsequently incriminated by Popoff, who investigated an epidemic in Macedonia, by Olitzky, and by Denzer and Hask in Mexico, had better claims to be regarded as the causative agent than any other organism so far described. It was, however, pointed out that there were weak links in the chain. Thus, cultures isolated did not produce a convincing form of the disease in inoculated animals, while the development of specific agglutinins for the organism during the natural disease, as observed by Popoff, was not a conclusive proof. Reference was also made to the description by Prowazek of intracleocytic bodies staining intensely by Giemsa's method, which appeared about the third day of the disease, and were also found in experimentally infected monkeys. The work of Nicolle and his colleagues on transmission by body lice in monkeys was described, as were the generally confirmatory results of Ricketts and Wilder, and of Anderson and Goldberger. One curious point emerged from these experiments—namely, that while a full dose of virulent blood did not immunize unless it produced a febrile reaction, in transmission by lice the monkey was apparently immunized without the production of a febrile reaction. The blood of such a monkey, if injected into another monkey, failed to produce infection. Finally, reference was made to the recent work of Sergent, Foley, Violatta, and Rocha-Lima. Their results appeared to confirm the findings of Prowazek, so far as the existence of bodies staining intensely by Giemsa's method was concerned, but Rocha-Lima believed them to be bacterial; more recently, however, he had provisionally classified them as Chlamydozoa, and introduced the name *Rickettsia prowazekei*. Rocha-Lima's louse transmission experiments were positive, but, so far as the optimum temperature at which the lice should be kept was concerned, his results were in direct conflict with those of Nicolle and his colleagues, Ricketts and Wilder, Anderson and Goldberger.

In opening the discussion, Dr. JOHN BROWNLEE commented upon the fact that some confusion still apparently existed as to the differentiation of typhus, particularly with regard to critical phenomena. His experience at Glasgow led him to support the hypothesis of transmission by lice. In his opinion, little importance attached to statements in the older literature respecting the variable fatality of the disease. There had been in some cases confusion with cerebro-spinal fever and in others with relapsing fever. The results of a considerable number of animal experiments he had performed were not convincing. He had also found in the blood intraleucocytic appearances somewhat suggestive of Prowazek's bodies. His experience of serum therapy had not been satisfactory.

Lieutenant-Colonel E. W. GOODALL agreed with Miss Robertson and Dr. Brownlee as to the need for caution in interpreting temperature charts. Only one case of typhus had occurred in his ward staff, and it was, in his opinion, difficult to attribute that case to lice; he thought that the head louse was a much less probable source of infection than the body louse.

Captain A. G. R. FOULERTON thought that the case against the body louse was proved; all evidence collected since the date of Nicolle's first papers tended in the one direction. He did not think that Plotz's bacillus was the causative agent of typhus, immunizing experiments having failed.

Mr. A. W. BACOT thought that what was now known respecting the life history of the louse was quite consistent with its being a transmitting agent. The question of the degree of infestation was important. It was well known that men or animals weakened by fatigue or hunger rapidly ceased to attempt to free themselves from the parasites.

Captain GREENWOOD observed that the literature contained several suggestive cases consistent with the louse theory, although not conclusive. The special incidence of typhus as well as dysentery upon the English troops before Dundalk in 1689 as contrasted with the immunity of the Dutch soldiers was interesting. The Dutch were seasoned troops, well housed, while the English were described by a contemporary as negligent and dirty, "many of them, when they were dead, were incredibly lousy." There was also a case in the Irish epidemic of 1817–18, when the inhabitants of the island of Rathlin, although equally famine stricken, did not share in the epidemic which ravaged Antrim.

Lieutenant BARRIE remarked that his experience in Serbia absolutely confirmed the louse theory of transmission. Measures leading to the mitigation of lousiness had an immediate effect. Clinically, among other features of interest was the occurrence of ambulant cases. With regard to the fatality, some experienced Balkan observers did not agree with the view that relapsing fever was much less fatal.

The CHAIRMAN, in closing the discussion, while recognizing the great importance of the louse problem, expressed the opinion that other parasites also demanded attention, particularly bugs.

Reviews.

GYNAECOLOGY.

THE *New System of Gynaecology*,[1] edited by Dr. T. W. EDEN and Dr. OUTHWAIT LOCKYER, is an imposing work in three volumes quarto, with over 2,500 pages, freely illustrated, and containing articles by numerous authors. In the preface to this important work the editors state that its design originated in the belief that the time had come to put into concrete form the great changes through which gynaecology in this country has passed in becoming a special branch of surgery "during the last ten years." We think this statement is not historically accurate. Gynaecology has always been a special branch of surgery, and there is perhaps no gynaecological operation now performed which was not performed by gynaecologists long before ten years ago. Again, the editors state that "the old view that the gynaecologist is a physician, not a surgeon, is no longer tenable." We doubt whether any thoughtful person ever held this view. Gynaecologists have always done work which may partly be called physician's work and partly surgeon's, and still do such work. The old title by which the teachers of gynaecology were known, obstetric physicians, is no doubt unsuitable; but it has never meant that they only practised as physicians; in the nature of things they cannot do so, but we note that both the editors and many of the contributors of surgical articles are called obstetric physicians in the list of authors.

[1] *The New System of Gynaecology*. Edited by Thomas Watts Eden, M.D., F.R.C.S.E., F.R.C.P.; and Cuthbert Lockyer, M.D., B.S., F.R.C.S., F.R.C.P. London: Macmillan and Co., Ltd. 1917. 9½ × 6½ in. Vol. I. pp. xv + 765; Vol. II. pp. vi + 875; Vol. III. pp. viii + 891. Numerous illustrations in colour and in black and white. £5 5s. the three volumes.)

The editors rightly point out that it is incumbent on a gynaecologist to familiarize himself with the technique of certain problems of general surgery which often have to be solved in gynaecological work, and they do well to emphasize the importance of a practical knowledge of obstetrics in the training of a gynaecologist, and rightly state that gynaecology has suffered in the past (and they might have added still suffers) from the incursions of those who are not qualified by this training to understand its clinical problems aright.

The editors have thought well to bring general surgical conditions (of the kidney, bladder, rectum, vermiform appendix, intestinal complications, and female breast) into this *System of Gynaecology*. The articles on these purely surgical subjects have been written by general surgeons, and they unduly increase the size of the work without adding anything which is not available in the general surgical textbooks. In our opinion, the space would have been more usefully employed had the editors arranged for a full bibliography at the end of all the gynaecological articles, which constitutes one of the great advantages of Veit's *Handbook of Gynaecology*, with which this new *System* may be, in many respects not unfavourably, compared.

Volume I.

The article on the anatomy of the female pelvic organs is written by Professor Elliot Smith and Dr. J. S. B. Stopford. It gives a good but, for a gynaecological work, somewhat brief account of the subject, illustrated by figures of very unequal merit. Fig. 18 is a photograph of a poor specimen of the uterus and broad ligaments, and Fig. 23 is a very rough drawing showing the hydatid of Morgagni attached to the upper wall of the Fallopian tube and the vertical tubes of the epoöphoron converging to the middle third of the ovarian hilum, positions which those structures are rarely found to occupy. Dr. Louise McIlroy gives an excellent account of the physiology of the female reproductive organs. Micro-organisms in the female genito-urinary tract are dealt with by Dr. Ernest H. Shaw in a good and beautifully illustrated chapter. Dr. Beckwith Whitehouse writes on methods of examination. The text is good and many of the illustrations are excellent, but Fig. 78 gives an inaccurate representation of the lower hand in bimanual examination; although the illustrations are good, we think it was hardly necessary in a work of this kind to give six large figures representing the use of the Sims speculum and sound. At the end of the chapter a reference is given to Volume II (it should be Volume III) for a description of dilatation of the cervix by tents, but in the chapter referred to nothing is stated about this valuable method. A short but clear account is given by Dr. Topley of the examination of the blood, including the Wassermann and Abderhalden reactions. In a chapter of 70 pages Dr. Ballantyne gives an admirable account of malformation of the female generative organs. Dr. Blair Bell has written a full and excellent chapter on function, and Dr. Blacker a very complete account of ectopic gestation, in which the methods of treatment are judicially considered. Other chapters in this volume, all attaining to a high degree of merit, are on septic infections, by Dr. C. Oldfield; gonorrhœa, by Dr. T. G. Stevens; tuberculosis, by Dr. Clifford White; inflammatory affections of the Fallopian tubes, by Professor Munro Kerr; pelvic cellulitis, by Dr. Fairbairn; and syphilis, by Mr. Arthur Shillitoe. Two articles on streptothrix infections and echinococcal invasions of the pelvis and pelvic viscera, by Dr. Taylor Young and Professor D. A. Welsh, of Sydney, form an addition of great value to our knowledge of these rare affections. The volume ends with a very brief chapter on nervous diseases associated with morbid conditions of the pelvic organs by Dr. Purves Stewart.

Volume II.

Dr. Berkeley writes a good account of the diseases of the vulva and vagina. No mention is made of the so-called hidradenoma nor of fibromas of the hymen; these chapters are clearly written and well illustrated, but would be improved by a bibliography. Chronic endometritis and erosion are dealt with by Professor B. P. Watson of Toronto. Chronic metritis and allied conditions, by Dr. Fletcher Shaw—a chapter with beautiful illustrations—deals especially with the microscopic appearances met with in those conditions. Professor McKerron writes on morbid involution. Professor Hastings Tweedy gives a short but excellent account of lacerations of the cervix. Dr. Lockyer's chapters on myoma and adenomyomata are of very high merit and add greatly to the value of these volumes. Both text and illustrations are admirable. No British author has dealt so thoroughly with myomata and the changes which occur in them. The chapter on adenomyomata is also excellent, and contains a very complete account of adenomyoma of the recto-genital space, on the origin of which we note that the writer's views have changed. Dr. R. W. Johnstone gives a very good description of sarcoma and endothelioma of the uterus. He alludes briefly to carcinoma sarcomatodes, but we have noticed no reference to carcinosarcoma either in the text or index. Professor Thomas Wilson's article on cancer of the uterus claims attention on account of the wide experience of the author. The clinical portion of the article is excellent, but we think some of the pathological part is revolutionary. Professor Wilson wishes to drop the term squamous epithelioma, and speak instead of alveolar carcinoma. He says that examination of the growing edges gives no indication of the evolution of tumours from the natural epithelium, but, on the contrary, supports the view that the cancer grows by multiplication of its own elements. We do not agree with this view. Whence come "its own elements"? Examination of the growing edge of early cases we think clearly demonstrates the origin from the surface squamous epithelium, and the editors, who regard all cases of cancer of the cervix as of the squamous-cell type, must have read this portion of the article with some surprise. The whole article is written in a judicial spirit and with an engaging frankness and an independence based on personal research which will cause gynaecologists to give it their close consideration. Professor Teacher writes an excellent chapter on chorion-epithelioma, or, as he calls it, chorion-epithelioma malignum. It is a valuable summary of our knowledge of this interesting disease and contains important suggestions on the difficult subject of diagnosis. The chapter on backward displacements of the uterus is by Professor Chipman of Montreal, who writes in a broad spirit on the importance of general treatment and, in certain cases, of treatment by pessaries. The operations he recommends for the cure of these displacements are the "Gilliam," the "Baldy-Webster," the "Olshausen," ventrisuspension, and ventrifixation. He alludes to some of the disadvantages, but does not lay sufficient stress on the dangers of intestinal obstruction, which has caused fatal results in a large number of cases after the operations he describes. Dr. Fothergill writes the chapter on prolapse. The treatment by colporrhaphy and perineorrhaphy is well described and illustrated, but we find no mention of colpohysterectomy, which is a valuable means of treating severe cases of procidentia. Professor Swayne gives a full account of chronic inversion of the uterus and the various methods of treatment. The excellence of Aveling's repositor does not appear to be appreciated by the author, though, properly used, the repositor will undoubtedly cure nearly every, if not every, case of chronic puerperal inversion. Of cysts and tumours of the Fallopian tubes an admirable and full account is given by Dr. Lockyer. Dr. Herbert Williamson and Dr. Barris give an excellent description of tumours of the ovary.

Volume III.

This volume contains chapters on diseases of the breast, by Mr. C. C. Choyce; on the vermiform appendix, by Mr. Herbert Paterson; on methods of examination of the urethra and bladder, by Mr. Thomson Walker; on diseases of the rectum, by Mr. Lockhart-Mummery, and on intestinal complications, by Mr. Scott Carmichael. All these articles are written by general surgeons, and, though they attain a high degree of merit, we think they might have been considerably curtailed in a work on gynaecology which might quite as justifiably have contained articles on the stomach, duodenum, gall bladder, liver, spleen, and pancreas. Hernia in women is dealt with by Dr. Eardley Holland. Dr. Eden writes a very clear and comprehensive article on operative technique. Dr. Felix Rood contributes a short but excellent chapter on anæsthesia; we do not, however, find in it any mention of the most recent forms of gynaecological local anæsthesia, namely, the para-vertebral and sacral. Professor Donald gives the result of his large experience in a short but very good article on ovariotomy. Dr. Giles writes an excellent article on hysterectomy, the interest of which is greatly enhanced by the statistics he has obtained from twelve of the principal London hospitals of the mortality for operations for myoma and cancer. The broad results of these twelve hospitals (namely, 2.11 per cent. mortality for myoma, 3.76 per cent. for cancer of the body, and 13.1 (or 17.6) per cent. for Wertheim's operation for cancer) are gratifying evidence of the excellence of British gynaecological surgery. But the tables afford an illustration of the fallacy of statistics; for by comparing the number of operations and the results obtained by abdominal hysterectomy for cancer of the body (almost all cases of which are operable and operated on) with the operations for myoma and for cancer of the cervix (in which the operability rate varies with the operator), the conclusion is forced upon the reader that gynaecologists in some institutions treat by abdominal hysterectomy many early and simple cases of myoma which others would either not operate upon or treat by myomectomy or vaginal hysterectomy, and that some gynaecologists show little enthusiasm for extending the beneficial effects of the extended abdominal hysterectomy for cancer of the cervix to any but a very small proportion of the cases seen. The difference in the mortality statistics is thus in part explained. Thus, for the twelve hospitals, the mortality for abdominal hysterectomy for cancer of the cervix varies between 0 and 31.4 per cent., but whereas the ratio of operations for cancer of the cervix to those for cancer of the body is 86 to 7 in the institution with the high mortality, the ratio in the institution with 0 mortality is 12 to 16, and this is the only institution in which fewer cases of cancer of the cervix than of cancer of the body are operated on by abdominal hysterectomy. In regard to prognosis, the writer makes two assertions which we cannot accept; one, that the fate of the cervical stump after supravaginal hysterectomy "need cause no apprehension"; the other, that the permanent cures of carcinoma of the body "even after many years may be put down at 95 per cent." Professor Wilson, in the second volume, shows that his own rate of absolute curability is 24 per cent., and Wertheim's 51.2 per cent. We believe the average rate of cure by experienced operators will be found somewhere between these two figures. Professor Munro Kerr writes an excellent article on operations on the gravid uterus. On page 531 we notice a misprint of Tait for Gow. Professor Howard Taylor's article on vaginal coeliotomy is good, but the operation is unnecessary for such a small submucous myoma as that shown in Fig. 244, which could be enucleated with ease and safety after dilatation of the cervix. A description of the "interposition" operation of Schauta-Wertheim is given, but the danger of embolism, which has occurred in several cases, is not mentioned. Fistula in the female genital tract is dealt with by Professor Hellier. The articles on minor operations by Dr. Bonney, after-treatment by Professor Franklin Martin, and general therapeutics by Dr. Amand Routh, are good. The volume ends with short chapters on radio-therapeutics in gynaecological practice by Mr. Lionel Provis and Dr. Robert Knox. We have nowhere found mention of the important fact that some of the German clinics have for several years practically ceased operating for cancer of the cervix, which is treated by radium, mesothorium, and Roentgen rays.

The *New System of Gynaecology* is highly creditable to British gynaecology. The printing, paper, and illustrations are admirable. The work would, in our opinion, be improved by curtailing the chapters dealing with general surgery, by the addition of bibliographies at the end of all the chapters, and by the provision of a full general index, the absence of which will be found a constant source of irritation. The indices at the end of each volume are not complete; for instance, none of them contains the Schauta-Wertheim or "interposition" operation for prolapse, which is described under vaginal coeliotomy, but only briefly mentioned in the article on prolapse. The *New System of Gynaecology* suffers from certain omissions, repetitions, even contradictions, inseparable from a work written by many authors; but in general excellence we have no hesitation in stating that it is the best work on gynaecology published up to the present time.

NOTES ON BOOKS.

A NEW volume of Methuen's Health Series has appeared from the pen of the general editor, Mr. BISHOP HARMAN, under the title *Staying the Plague*.[1] It is an attempt to show the public what venereal disease really is, how it poisons our social life, and what means are being taken and should be taken to remedy the mischief. On the principle that to understand aright the causes of an evil one must first know what is good, the author devotes his early chapters to a clean, sane, and pithy account of the relation of sex to the race, to the individual, and to human ideals. This leads on to a discussion of the causes and conditions of prostitution, which is the abasement of sex; and so to the main purpose of the book. Mr. Bishop Harman knows his subject thoroughly, and speaks his mind in good, stalwart English, which all can understand. He gives a clear story of the work of the Royal Commission on Venereal Diseases, with illustrations drawn from his own experience in London blind schools of the toll levied by these diseases upon the eyes of innocent children. He takes a wide view of future reform, believing that the true remedy lies in the cleansing and simplification of life, the better training of the young, and the encouragement of early marriage. In conclusion, he utters a word of warning against the danger that the fastidious apathy of the past may give place to an even worse folly—the folly of exaggeration.

A very complete *System for Case Taking*[2] suitable for medical cases has been compiled by Drs. Ross and LOUDON for use in the Faculty of Medicine at the University of Toronto. It covers the ground satisfactorily, and, if the clinical clerks for whom it is intended carried it out properly, they would acquire a great deal of the knowledge they are striving to obtain. But, like so many schemes for the benefit of learners, it has the fault of being too good, too complete, too thorough, with the result that it is barely practicable, although it may hold up a worthy ideal to the student. To strike the happy medium in the fullness of the clinical notes taken is an art that can only be acquired after years of study. The system, if rigidly applied, would burden the notes with a great deal of irrelevant information in most cases.

[1] *Staying the Plague.* By N. Bishop Harman, M.A., M.B Cantab., F.R.C.S.Eng. Methuen's Health Series. London: Methuen and Co., Limited. 1917. (Cr. 8vo, pp. 128. 1s. net.)

[2] *A System for Case Taking, with Explanatory Notes.* By G. W. Ross, M.A., M.B.Tor., M.R.C.P.Lond., and J. Loudon, B.A., M.A.Tor., M.R.C.S.Eng., L.R.C.P.Lond. Toronto: The Macmillan Company of Canada, Ltd. 1916. (Cr. 8vo, pp. 69. 2s. net.)

PHYSICAL WELFARE OF MOTHERS AND CHILDREN.

REPORTS TO THE CARNEGIE UNITED KINGDOM TRUST.

ENGLAND AND WALES.

THE blue books giving the reports of the medical officers of the Local Government Board and the medical officer of the Board of Education for the past several years have been filled with information as to the work now being undertaken for the care of mothers and infants, and the reports of the medical officers of health for the several local authorities of the country have given particulars of the work undertaken in these districts, but hitherto there has been no comprehensive account of this many-sided work. The reports of the Carnegie United Kingdom Trust on the "Physical welfare of mothers and children"[1] fill this need in a most conspicuous fashion, and the two magnificent volumes issued will prove of the greatest service to all those engaged in this most essential work of national importance.

The reports aim at assisting in the solution of the various difficult problems involved by setting out the facts in relation to one another, and by placing on record the views of accepted medical authorities on the subject. In a prefatory note Sir Arthur Newsholme states that the number of mothers who died in England and Wales week by week as the result of pregnancy and parturition

[1] Report on the Physical Welfare of Mothers and Children (England and Wales). Vol. I, by R. W. Hope, M.D., M.O.H. Liverpool; Vol. II, by James M. Cairnduff, M.D., one of the Senior Medical Officers, Board of Education; Vol. IV, by Dr. H. Corry Bigger, Medical Commissioner for the Local Government Board for Ireland. Carnegie United Kingdom Trust. East Port, Dunfermline.

is on the average sixty-seven, of which number twenty-four are due to puerperal infections.

Dr. Hope's Report.

Volume I, written by Dr. Hope, is divided into three parts. The first contains general observations on ante-natal and post-natal care, and indications of what can be suggested as an ideal plan for the relations of the various parts of such schemes to the general administration of preventive medicine in an area. The second part gives a good summary of the existing legislative enactments which enable sanitary authorities to take action, and includes suggestions as to the directions in which such legislation might advantageously be strengthened. Lastly, there are a number of reports from medical officers of local authorities, all set out on the same plan, so that the various activities of the several authorities, the conditions of maternal and child life in the area, and the results of measures now in operation may be compared. Also, there are specific statements from the officers indicating their experience of the manner in which the work may best be improved. These statements are of great interest, and it is to be regretted that the like reports are not available for each and every area in the country.

The widening recognition of the supreme importance of maternal and child welfare has received additional stimulus from the unprecedented circumstances of the war; the steady decline of the birth-rate still further enhances the value of the infant, and is an additional incentive to guard and preserve it. A simple calculation shows that had the annual wastage of male infant life during the last fifty years been no greater than it is at present, at least 500,000 more men would have been available for the defence of the country to-day. Even now, 90,000 of the infants born each year in England and Wales fail to survive the first twelve months of life, and at each one of the succeeding four years of age a large, though rapidly diminishing, proportion succumbs.

We have heard a good deal lately about the saving of child life attendant on the smaller birth-rate, and that fewer births mean more and better children in the end. The report before us does not support this generalization. Statistics show that the number of infants surviving at the age of one year per 100,000 of the population is higher, both actually and relatively, when the birth-rates and infant mortality-rates are both high, than when the figures are low; in other words, under existing conditions it is the high birth-rate, notwithstanding its accompanying waste, rather than the low birth-rate and the greater saving associated with it, which dominates the increase of population. Comparing the Welsh urban districts, which have a birth-rate of 29.1 per 1,000, with the English southern rural districts, which have a birth-rate of 18.3 per 1,000, it is found that the number of survivors at the age of 5 years in the Welsh urban districts is 707 per 100,000 of the population greater than in the southern districts, although the infant death-rate of the Welsh districts is 113, as compared with 66 in the southern districts.

Dr. Janet M. Campbell's Report.

Volume II, by Dr. Janet M. Campbell, is also divided into three parts. The first is an admirable and most interesting account of the development of English midwifery from the earliest to the present time, in which our practice is compared with that of other countries. There are suggestions for the raising of the standard of midwifery in the country, and particularly for the needed provision in rural areas. Part 2 deals with schools for mothers, the feeding of expectant mothers, day nurseries, and nursery schools; Part 3 with play centres for children and play-grounds.

It should be added that not only is the matter of these two volumes of the greatest interest to the social worker, but they are written in such a fashion that they are eminently readable, and contain most attractive illustrations.

IRELAND.

Volume IV, by E. Cecy Bigger, M.D., Medical Commissioner for the Local Government Board for Ireland, is a very human document, and Dr. Bigger is to be congratulated on his work. It contains much more than the ordinary collections of statistics. It is full of interesting comments on the lives of Irish people, and in many parts throws sidelights which go far to explain differences between the Irish and English mortality. Indeed, it is evident that the author loves human nature better than figures; figures he gives, but, so far as possible, they are kept to a place by themselves in the appendix.

Hitherto little special work has been done in Ireland for the benefit of mother and child. So far, Dr. Bigger writes,

> Ireland has relied too much on her natural advantages, and has done little beyond what her medical and nursing services have effected.

Those natural advantages rest in the peculiar temperament of the Irish woman.

> The Irish mother is celebrated throughout the world for the affection she has for her offspring. It is only amongst the most drunken and debased in the towns that there is any wilful neglect of or cruelty to children. But affection, unfortunately, is not sufficient. Love teaches much, but it does not teach all that it behoves a mother to know in cities and towns to-day. The truth is that, although she loves her child, she is not fitted for motherhood. The fault is not hers, but is that of the system of education in the country. All that she knows about her functions, childbearing, and child nurture is what she has learned from her mother; it has been handed down from generation to generation, and is a blend of good and bad, a mingling of useful knowledge and harmful tradition. . . . She knows, however, just one thing, and that, perhaps, is the most valuable of all, that she was intended to suckle her children herself, and, doing this, she saves her children from many dangers surrounding the use of the bottle. The practice of breast feeding is almost universal among the poorer mothers in the country, and is still very common in town.

Dr. Prudence E. Gaffkin, who contributes a section of the report, adds a further comment on the psychology of the Irish mother, which is not so greatly to her credit. Dr. Gaffkin writes:

> Their devotion to the newborn and helpless infant is remarkable. Nevertheless, I have not found them such devoted or such careful mothers once extreme infancy is passed, and in dealing with the child they are guided merely by instinct and inherited tradition. In many parts of Ireland families are very large, and yet the coming of another baby is not resented. If a woman bears eighteen or twenty children and twelve of them die from sheer inanition—well, life here is but a prelude to the world to come, and if the prelude for the baby is short and sharp it has at least gained the boon of everlasting life. Neo-Malthusian and even eugenic doctrines are considered wrong, and the breaking of the sixth commandment by bringing life into the world only to die has not yet been brought home either to man or woman.

Late marriage is reported as a cause of reduction of childbirth in some parts of Ireland. Women go to America to earn a dowry, marry late, and have few children. An even more curious custom is reported:

> It is generally the custom in most rural districts in Ireland for the eldest son, when he marries, to bring his wife to his father's farm, of which she becomes mistress, displacing the mother. But he cannot bring his wife till all his sisters are settled, and that is impossible without a dowry for them. All the savings of the household go towards these dowries, and it follows that as the sisters become older their dowry grows larger, and consequently their chances of marriage are increased. . . . Frequently a man must "marry off" a sister fifteen years younger than himself before he can think of matrimony. The medical officer of a western district states that the most common age for the marriage of men in his district is 40 to 50, and gives his opinion that the late marriage at a time when the parties have lost much of that vitality of youth on which racial strength depends, is a cause of lack of vitality in the children which has its effect on both their mental and physical natures, and which in his opinion is tending towards a serious racial degeneration.

Dr. Bigger makes some specific recommendations to which we hope to refer on some future occasion.

THE forty-sixth annual report of the State Board of Health of Massachusetts, a board that has now become a department, contains a full and interesting account of the multifarious activities of that body during the year 1916. Most of the volume deals with problems and work done in connexion with the water supply and sewerage, but many pages are devoted to the work of the inspectors of food, drugs, cold storage, slaughterhouses, and dairies.

British Medical Journal.

SATURDAY, JUNE 2ND, 1917.

BRITISH SURGERY AT THE FRONT.

A FEW weeks ago we published a group of papers giving an account of the response of British medicine, as represented by the Royal Naval Medical Service, to the new phases of clinical, pathological, and administrative medical practice which have arisen during the war at sea. This conspectus of medicine, surgery, hygiene, and sick transport in the navy under war conditions gave some idea of the admirable work carried out during years of preparation and perfected under the test of active service. In our present issue we publish a set of articles illustrating the progress of surgery during the land campaign on the Western front, from the pens of consultants and specialists serving with the British armies in France who have identified themselves with the subjects of which they treat.

Surgeon-General Sir Anthony Bowlby and Colonel Cuthbert Wallace, in their summary of the present position, record the leading facts which experience has established and describe the trend of surgical opinion and practice, more particularly in the treatment of abdominal wounds, head injuries, wounds of blood vessels, fractures, and joint injuries. They point out the indispensability of the motor ambulance, around which one might safely say the whole surgical system from front to base has been organized. Motor transport of the wounded and the casualty clearing station together form the keystones of the system, and the saving of lives, limbs, and suffering due to their development since the early months of the war has been immense.

In the JOURNAL of December 4th, 1915, we gave a sketch of the evolution of the casualty clearing station, which even then had firmly taken its place as the pivot surgical unit between the collecting and evacuating areas. Situated near the distal end of a line of communication, this unit is in essence an advanced base hospital, equipped and staffed for the immediate operative treatment of bad cases, while still performing the functions associated with its name. An important point made by Sir Anthony Bowlby and Colonel Wallace is that surgery at the front is a special branch of practice which all have to learn by direct experience, and a sound opinion on wound treatment comes to no one, however gifted, by the light of Nature. This seems to be specially true of the decision when and where to amputate. Among other things the war has abolished the old formal amputation dear to the teachers of operative surgery and examiners of former days. Another development in technique has been the early routine excision of damaged tissue, and the use of moist dressings containing such antiseptics as eusol, Dakin's solution or its outcome chloramine-T, which have been devised to meet the special conditions of wound infection at the front.

In abdominal surgery progress was at first hindered by the school of thought which held to the expectant line of treatment. After a few months it was demonstrated beyond doubt that under the conditions of this war early evacuation from the front line and immediate operation gave the only hope of success. For some time past the rule has been to operate, unless there is some special reason to the contrary; not to await special indications but to open the abdomen and make a rapid, methodical examination of the intestine, suturing rents in the gut, and resecting only where this is inevitable. The modern practice—aided by a special service of cars for hurrying abdominal cases to the clearing station or small advanced operating centre—has resulted in a lowering of the death-rate estimated at between 15 and 20 per cent., although the mortality from these wounds is still distressingly high.

In the surgery of joints gratifying improvement has followed modern lines of treatment. In head surgery effort has been directed towards devising the best operation and standardizing a general line of treatment adaptable to all varieties of cranial wounds. It was found that head cases travel badly after operation, although, provided the pulse is slow, they travel well as a rule between injury and operation. Early operation and prolonged rest after it is, therefore, the ideal, and this has been attained to some extent, as we learn, by the establishment of special hospitals neither too near nor too far from the line. With regard to fractures of the limbs the most important generalization seems to be that no amount of skilled after-care can make up for improper early treatment. Thorough deliberate operation is needed, and, as would be expected, the operating facilities of clearing stations, combined with the *x*-ray plants which have sprung up in connexion with them, have brought about great improvement, while the almost universal use of the Thomas splint and its progeny is an important factor.

In this article are brought to a focus also the latest views on the causation and treatment of gas gangrene, the dreadful infection which has proved one of the greatest horrors of the present war. Colonel Wallace, in a further contribution to our knowledge of this subject, describes—with coloured illustrations made from drawings by Mr. A. K. Maxwell, the artist employed by the Department for the Medical History of the War—the naked-eye changes in skin and muscle produced by gas gangrene; Captain McNee and Captain Shaw Dunn furnish a report on their researches into its mode of spread within muscular tissue; and Lieutenant-Colonel Frankau, Captain Drummond, and Captain Nelligan, in their article on conservative treatment, emphasize the importance of arresting infection in muscle by early resection of the infecting focus. Sir Wilmot Herringham gives an interesting account of thoracic wounds. Unlike those of other regions referred to, chest wounds have generally done better under expectant treatment, actual sepsis alone calling for surgical intervention. Penetrating wounds of the chest have thus remained, to some extent, the province of the physician. Captain Marshall describes the administration of anæsthetics at the front. It will be noted that he is a strong advocate of warmed ether, and of gas and oxygen, and is convinced that not even the most urgent operation should be done while the patient is in a state of shock; the combined shock of anæsthesia and operation superimposed on the shock of the wound and the journey is too much for the patient.

Looking at the articles as a whole, and reviewing the large number which have already appeared, the thought which comes uppermost in the mind is one of admiration for the adaptability, ingenuity, and perseverance of the British surgeon in face of difficulties undreamt of in any previous campaign. As the story unfolds itself one sees in epitome the resourceful spirit of our race. A great and smooth-running organization

has been built up during the war for the treatment and disposal of the wounded and sick. For the success which has been achieved the Army Medical Department deserves the highest praise, and not least for the use it has made of the consultants since the early months of the war. These civilian surgeons and physicians passing from unit to unit, guiding and encouraging scattered workers, watching experimental lines of treatment and collating results, formulating rules and principles, and discussing with administrative officers the practical application of the lessons of experience, have played a great part in the development of military medicine and surgery.

DYSENTERY AT GALLIPOLI

THE acute dysentery of war has generally been regarded as in the main bacillary, and this was certainly true in the South African war (1899–1902), though in the Spanish-American war the American troops in Manilla, where amoebic dysentery is endemic, suffered from both forms, and, as Strong proved, mixed infections occurred. When cases of dysentery contracted in Gallipoli by the Mediterranean Expeditionary Force began to arrive in this country during the autumn of 1915 difficulty in deciding as to their nature, and therefore on the appropriate treatment, arose. For whereas at the front, and especially in the base hospitals at Alexandria and Cairo where amoebic dysentery is common, the prevailing opinion was in favour of the amoebic origin, in this country evidence in support of this view was commonly wanting. This divergence of opinion may reasonably be explained, at least in part, by the convalescent state of the patients, who had nearly all received routine treatment by emetine before their arrival here. Subsequently the question was apparently settled by the compromise that both forms occurred, that each was predominant at different periods, and that mixed infections were frequent.

Among the valuable reports now being made on the subject of dysentery to the Medical Research Committee special interest attaches to that of Dr. Bartlett "On dysentery in the Mediterranean Expeditionary Force,"[1] based on the experience of some eight months' work as pathologist to No. 21 General Hospital in Egypt, where he examined 1,129 stools and observed 61 necropsies on cases of dysenteric ulceration, the microscopic examination of the material being completed at the London Hospital. This careful and elaborate research, illustrated by thirty-four figures and summarized in thirty conclusions, confirms the opinion that the dysentery was primarily amoebic. Secondary bacterial infection, however, was very frequent, and in some cases so intense as to obscure the amoebic lesions by a diphtheroid inflammation resembling that of bacillary dysentery. Out of the 61 necropsies, 56 (92 per cent.) showed amoebic lesions, and out of the 5 remaining cases, tentatively called pure bacillary dysentery, evidence of a specific infection by organisms of the dysenteric group was forthcoming in one only. Examination of 477 dysenteric stools showed that 379 (79·4 per cent.) contained vegetative amoebae of pathogenic type. From these results it is obvious that specific treatment should be adopted as soon as possible so as to arrest amoebic ulceration before the colon has become more vulnerable to bacterial invasion. Thus Sir Ronald Ross's advice in August, 1915, that emetine should be given early to all cases of dysentery was fully justified, and was considered to have prevented a much higher mortality among the forces. But as secondary bacterial invasion may prove fatal from purulent diarrhoea after amoebiasis has been removed by emetine, measures to combat it are necessary, and for this purpose saline purgatives to flush out the colon and bismuth mixture by the mouth were employed. A powerful multivalent anti-dysenteric serum, prepared at Alexandria, was also used in such cases, but opinions as to its value varied widely.

The cases referred to by Dr. Bartlett received injections of emetine hydrochloride ½ grain until 6 or 10 grains had been given, and after an interval one or two further short courses. Usually this was successful, but it is frankly admitted that in some instances a thorough course of treatment failed to eliminate amoebiasis. The high reputation of emetine injections in *Entamoeba histolytica* carriers has been gravely impugned by Mr. Clifford Dobell,[2] who states that full courses (10 to 12 grains or more) are successful in about one-third only of the cases treated, and that subsequent courses offer little hope of cure. He advocates the oral administration of emetine bismuth iodide in daily doses of 3 to 4 grains until 36 to 40 grains have been given. By this means the vast majority (90 per cent.) of carriers are cured even when emetine injections have previously failed. Dr. G. C. Low,[3] in a further report to the Medical Research Committee, mentions that vomiting caused by the administration of emetine bismuth iodide can be eliminated or reduced to trivial proportions by giving the double iodide in pills coated with salol, as recommended by Dr. H. H. Dale.

[1] G. B. Bartlett, *Quart. Journ. Med.*, Oxford, 1917, x, 185–244.

[2] Medical Research Committee. Reports upon Investigations in the United Kingdom of Dysentery Cases received from the Eastern Mediterranean. 1. Amoebic Dysentery and the Protozoological Investigation of Cases and Carriers, pp. 49–83, 1916. BRITISH MEDICAL JOURNAL, January 27th, 1917, p. 127, and March 24th, 1917, p. 405. See also Mr. Dobell's paper, BRITISH MEDICAL JOURNAL, November 4th, 1916, p. 623.

[3] *Lancet*, 1917, i, 485.

MEDICAL MEN IN PUBLIC LIFE

THE failure of members of the medical profession to take their fair share in the work of public authorities throughout the country has been the subject of standing criticism both within and without the profession for many years—since, at any rate, the remarkable address on the political powerlessness of the profession given in 1883 by Sir Walter Foster (afterwards Lord Ilkeston). Many reasons are given for the fact, which can hardly be disputed, although a considerable number of medical men serve on the councils of boroughs and county boroughs. There are however, we believe, very few medical members on county councils, and we are glad to know that their number has been increased by the election of Dr. W. W. Robb to be the representative of the Irthlingborough Division on the Northampton County Council. Dr. Robb had been M.O.H. for the Irthlingborough Urban District for fourteen years, until his resignation at the end of 1915, and he is a J.P. for the county. It is, we are told, many years since the medical profession was represented on the Northampton County Council, and Dr. Robb is now the only medical member of it. Many reasons are given for the disinclination which medical men apparently feel in seeking to become members of local councils; one is the difficulty a man in busy practice finds in giving the amount of time which membership of a county council entails, and another is the dislike of entering upon a contested election. But county councils themselves have the power to obtain the services of medical members by nominating them to be aldermen, as has been done in certain cases. However this may be, we are quite clear that it would be to the advantage of the profession and the public itself if county councils had more medical members.

FRAGILITAS OSSIUM, BLUE SCLEROTICS, AND OTOSCLEROSIS

IN an interesting paper, published in the *Edinburgh Medical Journal* (April, 1917), Dr. E. Bronson gave a very clear picture of two families in which a rare abnormality, consisting in what he terms fragilitas ossium, was associated with other abnormalities. In addition to the two families, which illustrate its hereditary characteristics, he has mentioned a few cases in which no such hereditary influence was discoverable. The outstanding feature in each case was the extreme degree of brittleness of the bones, so that numerous fractures occurred without violence; there was also hypotonicity of the joints. The associated peculiarities are a blue sclerotic, progressive deafness, shortness of stature, and bulging of the frontal and occipital regions of the skull. The earliest record of association of the blue sclerotic with fragility of the bones was made by Eddowes in 1900. In one family it was noted that the depth of colour of the sclerotic corresponded to the degree of fragility of the bones. In other instances blue sclerotics were observed apart from this association. Fractures occurred in children whose parents had not had fractures, but had hypotonicity of the joints (one case) or blue sclerotics (one case). The earlier in life the fractures commenced the greater the subsequent liability; this was specially marked in the pre-natal cases. The fractures generally occurred without causing pain at the time; there was rapid reunion, sometimes without formation of callos. Shortness of stature was the more marked the earlier the onset of signs of the defect. The general health of the adults was good. Radiography showed that the bones were frequently much reduced in thickness, especially in the shafts, and there was rarefaction; considerable deformity often resulted from the numerous fractures. Chemical and histological examination of the sporadic cases failed to throw much light on the etiology of the condition, but in several cases there was no true lamellar formation; the Haversian canals were absent, the osteoblasts were abnormal in structure—and presumably in function also—and the cells of the articular cartilage underwent direct calcification. No histological examination of the hereditary cases has been made. As regards treatment, several plans were tried, but without benefit. On theoretical grounds no benefit would be anticipated from any drug or hormone, for probably the condition is primarily due to the presence of some substance ("factor") interfering with normal metabolism. The defect is inherited as a Mendelian dominant, and a dominant, according to present theory (and high probability), is due to the presence of the controlling factor. It is difficult to see how drugs could rid the system of something inherited from the parent. The paper concludes with a very full bibliography. The author makes a mistake in discussing the etiology when he says, "The inheritance, when present, is direct transmission—*what Bateson calls 'knight's move'* —namely, the characteristic fragility is a dominant one." It is true that the inheritance is direct, and that the abnormality behaves as a Mendelian dominant; but it is not inherited like a knight's move. His statement would be correct if the words placed in italics were omitted. Colour blindness and haemophilia both show the so-called knight's move, which means that an affected male transmits his defect to a male grandchild through a daughter who does not show the defect—that is, a generation is skipped; but in the family described by Dr. Bronson there is no such skipping.

INTRACRANIAL ANEURYSM

THOUGH the presence of an aneurysm on one of the basal cerebral arteries has rarely been diagnosed correctly during life, yet the discovery of such an aneurysm at autopsy is far from uncommon, and these cases have for long attracted the attention of clinicians and pathologists alike. A full account of the subject, together with records and an analysis of forty-four new instances, has recently been published by Dr. E. G. Fearnsides.[1] Speaking generally, these aneurysms have been attributed in the past to arterial syphilis, to arterial degeneration, whether local only or generalized, to congenital defect of the arterial wall, or, fourthly, to the local action of infective emboli, in varying proportions of the cases recorded by various authors. Dr. Fearnsides, adopting Turnbull's classification[2] of arterial diseases, notes that in none of his new cases of intracranial aneurysm was syphilitic infection the cause of the vascular disease, although such instances are not rare in the literature, particularly in the case of the relatively large basilar artery. His new pathological material is based on the records of the Pathological Institute of the London Hospital. Here, during the years 1907 to 1913, nearly eight thousand *post-mortem* examinations were made, in 5,432 of which the cranial contents were investigated. Among these, 184 true and 7 dissecting aneurysms of the aorta were found, 175 of them due to syphilitic inflammation; 43 true aneurysms of other large elastic arteries were discovered, all due to syphilitic inflammation; there were 44 examples of true aneurysm of muscular and small elastic arteries, excluding those of the brain, only 6 of which were syphilitic in origin; and, finally, there were 51 true aneurysms of cerebral arteries, 25 due to infective embolism and 26 caused by medial degeneration, occurring respectively in 13 patients with ages between 5 and 44 and 31 patients aged from 19 to 86. In 35 of these 44 persons death had been caused by rupture of a cerebral aneurysm; 26 were males, 18 females. Discussing the clinical manifestations associated with intracranial aneurysms of non-embolic origin, Dr. Fearnsides remarks that in only one of his thirty-one patients did an unruptured aneurysm at the time of its development appear to have caused acute intracranial symptoms, although a shrewd guess as to the causative factor was made before autopsy in a considerable proportion of them. Details and discussions of many of the 44 cases are given, and it appears that of the 13 instances of aneurysms on the cerebral arteries due to infective embolism, 10 were associated with progressive ulcerative endocarditis; in 2 patients it was the onset of nervous manifestations that brought them to the hospital. Numerous interesting points emerge from the clinical study of the 31 new examples of non-inflammatory cerebral aneurysm. In 15 of them the heart was not hypertrophied. In 25 of them clinical manifestations pointing to cerebral haemorrhage occurred, in 5 an unsuspected and unruptured aneurysm was found, and in one an unruptured aneurysm was discovered at the junction of the right carotid and middle cerebral arteries in a patient who for some time had suffered from right frontal headache and had been deaf in his right ear. Multiple leakages of blood due to partial ruptures of the aneurysmal sac occurred in 13 instances, together with a history of multiple seizures of an apoplectic type. The first rupture of the sac of a cerebral aneurysm was often brought about by a violent muscular effort or emotion; signs of increased intracranial pressure were rare before rupture, but frequent after it had taken place, 10 patients before death showing changes in the fundus. In many instances the cranial nerves, particularly the third pair, were involved in blood-clot after the rupture. After rupture of aneurysms of the posterior fossa a complaint of stiffness in the neck is said by Dr. Fearnsides to be a sign valuable in diagnosis; an involvement of the facial nerve after its exit from the pons is also common. It may be added that the finding of blood cells and blood pigment in the cerebro-spinal fluid obtained by lumbar puncture is the

[1] *Brain*, London, 1916, xxxix, 294–396.

[2] *Quart. Journ. Medicine*, Oxford, 1913, viii, 324.

only clinical evidence of cerebral haemorrhage that can be obtained; in the case of ruptured intracranial aneurysms staining of the cerebro-spinal fluid occurs early. The localizing signs in cases of embolic intracranial aneurysms are usually scanty; but the headaches associated with those of non embolic origin may have some localizing value.

TUBERCULOSIS IN THE UNITED STATES ARMY.

A LARGE general hospital at Fort Bayard, New Mexico, is devoted to the treatment of tuberculosis in soldiers of the United States Army, a limited number of civilians of both sexes being also received. A report is issued every year, presenting the results of the year's working and an analysis of so-called completed cases. The completion, however, only relates to results as far as the hospital is concerned, and no evidence is afforded as to the ultimate success or failure, as shown by capacity for work on return to military duty. The proportion of men so returned during the year 1915 is not very high, and this fact may be accounted for by the large numbers admitted in the later stages of disease. Although the mortality does not exceed the average for chest hospitals in general, the number of patients who are only to be classed as "improved" by treatment goes to prove that treatment has been too long deferred. The frequent occurrence of tuberculous laryngitis as a complication points in the same direction. The climatic advantages of the south western portion of the State of New Mexico would seem to offer ideal conditions for arrest of incipient disease by open-air methods, but only a small proportion of the total admissions to the hospital appear to have been in the early stage. The experience of all chest hospitals has shown that a certain amount of improvement may be expected even in town hospitals. Where improvement only can be hoped for it would seem to be a misuse of advantages to utilize sanatoriums in the most favourable climatic conditions for any but incipient cases, capable of permanent recovery. Details are given in the report of a very large number of individual cases, and it may be noted that only about 17 per cent. of the whole presented febrile conditions, or a maximum temperature of 100° or more. In an unusually large proportion also it is recorded that there was no impairment of digestion. The percentage of general success as regards actual arrest of disease would doubtless be far higher if the admissions were restricted to cases in the incipient stage.

A NEW PHYSICIAN-POET.

AMERICA has not so far produced a great number of doctor poets, but in point of quality she has no reason to fear comparison with the Old World. The names of Oliver Wendell Holmes and Weir Mitchell are a host in themselves. To these must now be added another of equal brilliancy. Quite recently a new medico-poetic planet has swum into the ken of lovers of literature in the person of Dr. Frederick Peterson, of New York, whose name is well known to the profession by his work in neurology and morbid psychology and his pioneer efforts to promote the treatment of cases of incipient insanity in psychopathic hospitals. He contributed an article on the hospital treatment of insanity to the tenth edition of the *Encyclopaedia Britannica*. He was for many years professor of psychiatry in Columbia University, and he is the author of a work on nervous and mental disease, written in conjunction with Dr. Church, of the *American Textbook of Legal Medicine*, produced in collaboration with Professor Haines, and of many contributions on subjects within his special province to medical periodicals, notably to the *New York Medical Journal*, of which he was assistant editor for several years. It is in the issue of that journal for March 31st that the announcement of Dr. Peterson's appearance in his new avatar as a poet is made. He had, it is true, published a volume of verse and translations from the Swedish as far back as 1883. But he has now spread his wings in a greater flight. During the past two years, as we learn from our New York contemporary, many lyrics dealing with natural phenomena and landscapes in their relation to mankind, favourite themes with Chinese artists, have appeared in American literary magazines under the signature "Pai Tu-Shan." These have been collected in a volume printed in luxurious style by Kelly and Walsh of Shanghai (New York: Scribner and Sons), illustrated with collotype reproductions of ancient Chinese paintings, and bound in Chinese silk. The examples given in the *New York Medical Journal* seem to show that Dr. Peterson has rendered in graceful verse the dainty touch of the Chinese artist.

THE PSYCHOPATHIC LABORATORY.

THE city of Chicago has a population of over two and a half million souls. Its Municipal Law Court has an ever-increasing amount of business to deal with, and every year sees more and more civil cases—misdemeanour, felony, and criminal cases—filed in its books. In 1906 the number of offences for which persons were arrested was over 75,000; in 1915 this number had grown to 137,000. A recent volume[1] of the *Annual Reports* of the Municipal Court of Chicago gives some account of the legal machinery that has been developed for dealing with this mass of ill-doing. Many pages of the *Reports* are occupied by an account of a new piece of mechanism for making the punishment fit the crime in the cases of juvenile depravity and chronic offenders. This mechanism is described as the Psychopathic Laboratory. It has long been recognized that there is in many instances a close connexion between mental and physical defectiveness on the one hand and criminal conduct on the other, these terms being used in their widest senses. In other words, very many offenders break the law and come to bar in consequence of mental defect or disease. It is the business of the Psychopathic Laboratory to investigate the physical and mental development of offenders in all instances in which the evidence or the prisoner's behaviour in court give rise to suspicions of his soundness in either mind or body. The Laboratory employs a great variety of tests, and relies upon no single method of examination. It is found that the ordinary physical examination frequently yields convincing results, and that the reactions to neurological tests explain other cases of delinquency. The tests of psychiatry often disclose latent dementia of various kinds. The purely psychological tests—many of them of the Binet-Simon type—reveal instances of feeble-mindedness in varying degrees. Reliance is not placed on these laboratory examinations alone. With the offender comes a history of the case, throwing light on the environment and characteristics of the delinquent. Confirmation of the conclusions already reached is often furnished by a study of his heredity. Great emphasis is laid upon the importance of reaching a correct diagnosis for the following reason. The offender who is normal in mind and body reacts to punishment in such a way as to justify the view that punishment is an effective deterrent. Not so, however, the defective. The victim of imperfect mental equipment, the slave of narcotic habit, the child or adult with serious organic disease of one sort or another—these all require special treatment. The institutions and methods which have been evolved all the world over for the discouragement of crime practically all predicate mental competence and responsibility in their subjects. This fact explains the frequent failure of correctional and institutional treatment to prevent relapse into crime, and accounts for the existence, in the State of Illinois, of an offender who has been sentenced two hundred times, to quote a glaring example. What is to be done with the defective delinquents once they have been identified and labelled in the Psychopathic Laboratory? Punishment is useless. Those who are feeble-minded can get along very well outside institutions if they are placed and kept in a simple

[1] Eighth and Ninth Annual Reports of the Municipal Court of Chicago, December 1st, 1915, to December 5th, 1916, inclusive. Chicago: Cameron, Amberg and Co.

but protected environment. No fewer than two hundred instances of dementia praecox were detected among 2,700 delinquents investigated in the Chicago Laboratory: these are more dangerous cases, and it is suggested that they should be confined in farm colonies under proper supervision. One of these delinquents—a case of high-grade mental defectiveness combined with dementia praecox—had been in court on thirty-seven previous occasions. It is thought that such defective delinquents as these might be employed in road-making and other public work of the kind. The *Reports* give a full account of the many-sided work put upon the psychopathic expert who is placed in charge of such a laboratory as that described. He must be an expert in surgery, medicine, venereal disease, obstetrics, neurology, psychology, and psychiatry; but where such accomplished paragons as this are to be found is not indicated. It is clear that the Psychopathic Laboratory is based upon the most scientific and logical foundations, and that it should, in theory at any rate, be of the greatest service to judges and justices called on to pronounce sentence on criminals and offenders of the relapsing or mentally defective types. How far the bench would feel inclined to put itself at the disposal of the laboratory and take its orders, and how far the astute criminal might succeed in imposing on the psychopathic expert, are questions that only practical experience can settle.

RHUBARB AND RED TAPE.

OUR contemporary, *Nature*, published on May 24th an interesting and timely article on rhubarb, intended by its author for the *Kew Bulletin*, the publication of which the Government in its wisdom has decided to suspend. The official explanation given for this paltry piece of economy is "that it has been ruled that the *Kew Bulletin* is not essential, and its publication has therefore been suspended" owing to the shortage of paper. The small amount of paper needed to secure the continued publication of so useful a periodical, which serves as a link between scientific and economic botany, could well be spared by a trifling reduction in the waste of paper in a single Government department. Lop-sided actions of this sort bring our Government into contempt, and indicate a narrowness of outlook threatening the future of the country. With these remarks we pass to the smaller topic of rhubarb. The article in *Nature* traces the history of *Rheum rhaponticum* as an article of diet. The author's researches bring to light the fact that poisoning by rhubarb leaves, of which several cases have been reported lately, is no new thing. Seventy years ago the case was recorded of a Chelsea woman who boiled rhubarb leaves as a substitute for spinach, and all three of those who ate of the dish were attacked with sickness; the *Gardener's Chronicle* of the day recommended the subject to serious chemical inquiry, deeming it quite conceivable that the leaves contained some principle which the stalks lacked, and warned the public against employing for food any part of the rhubarb except that shown by experience to be wholesome. It was suggested at that time that the chemical composition of rhubarb varied to some extent according to the variety, and also according to the soil on which it was grown. Solly, in the *Transactions of the Horticultural Society*, 1848, showed, as the result of experiments, that considerably less water was present in the leaves than in the stalks, but nearly twice the amount of organic and inorganic matter. It would therefore not be surprising if salts of oxalic acid were present in greater abundance in the leaf blade than in the leaf stalk. At the resumed inquest held this week on the Enfield clergyman who died after eating cooked rhubarb leaves, the assistant analyst to the Home Office stated as the result of analysis that oxalic acid in the form of potassium and calcium salts was present in the proportion of 10 grains of each to the pound. Dr. Spilsbury from chemical analysis of the organs stated that death was due to poisoning by oxalic acid and soluble oxalates, and went on to say that 20 grains to the pound in the ordinary way would not be sufficient to cause death, but such an amount was on the border line, and while it would affect some people, others would escape. He considered the use of rhubarb leaves as a vegetable inadvisable, but agreed with the coroner that there was no harm in the stalk provided soda was not used in the process of cooking. For more than 100 years the stalks of rhubarb have been used on an enormous scale in this country as a substitute for fruit, and except in rare cases of idiosyncrasy this part of the plant appears to be a harmless dish. It is quite clear, however, that the leaves should not be eaten.

SPECIALIZATION IN MILITARY MEDICINE.

SPECIALIZATION in applied science is one of the characteristics of the day, and we have seen its rapid development in medicine during the last two generations. It is not surprising, therefore, that it has been found advisable to apply the principle to military surgery and medicine. Thus the British military medical authorities have found it proper to establish special hospitals or centres for the treatment of disorders of the heart, skin diseases, venereal diseases, for severe compound fractures of the thigh, and for the treatment of disabled men in orthopaedic hospitals and curative workshops. Professor Strauss, in a recent paper in the *Deutsche medizinische Wochenschrift*, suggests that special hospitals, or departments of hospitals, should be set apart for cases requiring special diets, such cases as those of gastric disorder and chronic dysentery. He also wishes to see special wards for men suffering from trench nephritis, and, indeed, asks for two sets of wards for war nephritis, one for severe and the other for light cases, to facilitate the satisfactory dietetic treatment of such patients.

Medical Notes in Parliament.

The Venereal Diseases Bill Passed into Law.—In the House of Lords, on May 25th, Lord Rhondda moved that the amendments to the Venereal Diseases Bill made in the Commons should be accepted. No further objection was offered, and the bill afterwards received the Royal Assent. The changes have already been stated in this column.

Medical Examinations.—In the Commons Mr. Needham asked what course was open to a man called up for military service under the new Act who was dissatisfied with his medical classification. Mr. Macpherson said an application to be examined by a special medical board was submitted for the consideration of the War Office by the military representative in a case in which such examination was recommended by a military service tribunal before which the man concerned had laid his case. Mr. Pringle: Are we to understand that he cannot get an appeal to a special medical board except through a tribunal? Mr. Macpherson: That is so. On May 25th Mr. Macpherson informed Mr. Hogge that a man to whom a notice under the Review of Exceptions Act was sent was deemed to be enlisted, and was transferred to the reserves as from the appointed date. The appointed date was the thirtieth day after the date of the notice. Any time before the appointed date a man had the right of appeal to a tribunal for exemption, and that right was independent of the date of the medical re-examination of the man. The application might be made whether or not the medical examination had already taken place. In reply to Mr. Theodore Taylor, Mr. Macpherson said that he was not aware, as suggested, that examination of recruits by medical boards had frequently been made at the rate of thirty per hour. Express instructions had been issued that examinations under the Review of Exceptions Act should be most careful. The classification certificate was signed by the president of the board.

The Medical Treatment of Naval Officers.—Mr. Mooney asked the Secretary to the Admiralty whether an officer or warrant officer sent to a hospital or to a sanatorium suffering from tuberculosis was allowed full pay during the period he was off duty; whether out of this allowance he had to meet all doctors' bills and expenses of treatment in a sanatorium or hospital; whether officers suffering from other diseases, no matter what the cause, were treated at the expense of the State; whether he was aware that this treatment of tuberculous disease caused hardship. Dr. Macnamara said the facts were generally as stated. Arrangements were, however, provided for the reception of all such cases, after invaliding, into sanatoriums at the public expense. It was recognized, nevertheless, that the treatment so given was not what should be supplied for officers, and steps were being taken to remedy this defect.

THE WAR.

THE ORGANIZATION OF THE AMERICAN BASE HOSPITAL UNITS.

THE six medical units from the United States which are to take over base hospitals in France will, it is expected, all have arrived before the end of this week. The unit from the Western Reserve University, Cleveland, some particulars of which were given in the last issue, was followed quickly by units from Harvard (Boston) and Columbia (New York), both of which have already left London for the Continent, and these by units from St. Louis, Philadelphia, and Chicago. The Harvard unit, whose official title is United States Army Base Hospital No. 5, was organized under the American Red Cross by Professor Harvey Cushing. It consists, like the others, of three members of the administrative staff taken from the medical corps of the regular army—namely, Major Robert U. Patterson, commanding, Captain D. W. Harmon, adjutant, and Captain Charles Rand, quartermaster. The professional staff, in addition to Major Harvey Cushing, includes Major Robert I. Lee, professor of hygiene at Harvard, and Major Robert B. Osgood, professor of orthopaedics, together with five officers holding the rank of captain and sixteen that of first lieutenant. Among the latter is Dr. W. B. Cannon, professor of physiology at Harvard. The staff includes an anaesthetist, a radiologist, two dental surgeons, and other specialists, including a dietist. The hospital company consists of 16 orderlies from the medical department of the regular army and 132 specially enlisted men, 65 per cent. of whom are Harvard students. The nurses number 64, and there are three secretaries. All have "signed on" for the duration of the war.

The Columbia unit, whose official title is United States Army Base Hospital No. 2, is commanded by Major L. L. Hopwood, with Captain Edward Wells as adjutant, and Captain D. F. Hopkins as quartermaster. The director of the professional staff is Major George E. Brewer, professor of surgery at Columbia and surgeon-in-chief of the Presbyterian Hospital, New York City. The chief of the surgical service is Major William Darrach, and of the medical Major Homer Swift, and the number and assignments of the unit are virtually the same as in the case of Harvard and the others.

The fourth and fifth contingents to arrive were the Washington University unit (Base Hospital No. 21) from St. Louis, and the Pennsylvania Hospital unit (Base Hospital No. 10) from Philadelphia. The sixth and last contingent, from Chicago, was expected at the end of this week. In all these cases the organization is practically the same as in the Western Reserve, Harvard, and Columbia units already described, save that the St. Louis unit has a feature which, so far as our information goes, is peculiar to itself. Arrangements have been made for those of the enlisted men from St. Louis who are medical students to continue their studies while serving with the unit. There are thirteen of these at present, but the number is expected to reach thirty-five by next January. Washington University has recognized the professional staff as a teaching faculty, and has arranged to substitute the work with the unit for the fourth year in the medical school; the university teaching, both in medicine and surgery, will be carried out in France. This unit is commanded administratively by Major James D. Fife, with Captain Thomas C. Austin as adjutant and Captain G. S. Kopplе as quartermaster. The director of the professional staff is Major F. T. Murphy, professor of surgery at Washington University, and the assistant directors are Major Walter Fischel, associate professor of medicine, and Major Malvern B. Clopton, associate professor of surgery. The assistant director of the laboratory service is Captain Eugene L. Opie, who is professor of physiology, and the staff includes Captain Allison, Captain Veeder, and Captain Sidney Schwarb, associate professors respectively of clinical orthopaedic surgery, pediatrics, and neurology. All the members of the professional staff are attached to the Barnes Hospital and the Children's Hospital, St. Louis, both of which are integral parts of Washington University. The commissioned officers number twenty-eight in all. The chief of the sixty-five nurses is a lady well known among the social workers and educationalists of America—namely, Miss J. C. Stimson, niece of a distinguished American surgeon. The enlisted staff embodies about 160 men.

The Pennsylvania unit is the only one of the six which is not attached to a university; its members are part of the staff of Pennsylvania Hospital in Philadelphia. Major De Laney is the commanding officer and Major Richard Harte the professional director. Like the Harvard and Washington units, this group includes a chaplain.

The unit from Pennsylvania Hospital, Philadelphia—the oldest hospital in the United States—is commanded by Major M. A. De Laney, with Captain N. L. McDiarmid as adjutant and Captain H. L. Kidwell as quartermaster, all of the medical corps of the United States army. The director is Major Richard H. Harte, surgeon to the Pennsylvania and Orthopaedic Hospitals, Philadelphia; with Major H. Gibbon as chief of the surgical service and Major George W. Norris as chief of the medical service. All the professional staff are graduates of the University of Pennsylvania, with the exception of Major Gibbon. The hospital company includes 156 men and 64 trained nurses.

Another unit of medical men to arrive this week consists of twenty orthopaedic surgeons, in charge of Major Joel E. Goldthwaite. These surgeons are from various parts of the United States and have come over at the request of Colonel Robert Jones for work at present in the British Isles.

Major Brewer gave a representative of the BRITISH MEDICAL JOURNAL some details of the origin and standing of these units, and these were supplemented by Major Patterson, of the Harvard unit, who has been first assistant to Colonel Jefferson R. Kean, of the medical corps of the United States army, to whom the development of the organization of these base hospitals by the Red Cross is due. The idea was originated by Dr. George W. Crile, now the director of the Western Reserve unit, as a result of his experiences in the Spanish-American war, and was brought to fruition by Colonel Kean. The United States Government has no authority to organize military medical units in time of peace, but by a presidential proclamation in 1911 the Red Cross was authorized to act as a Government agent to prepare in advance certain hospital units composed of medical men and nurses and, as far as possible, of orderlies, laboratory assistants, and administrative staff, who had been working together in similar relative capacities in some large hospital. These were organized under the Red Cross, and each member signed a pledge to hold himself or herself in readiness to respond to any call by the Government on a declaration of hostilities. During hostilities, or when these are imminent, the units can be enlisted as regular military organizations under the sole control of the War Department, and each of the medical officers of the unit must be a member of the medical reserve corps. This arrangement was designed to make well-organized hospital units immediately available for service in the base hospitals in time of war, and to avoid the necessity of calling together men from different parts of the country who had had no previous association. Major Brewer stated that the units, most of which are organized from hospitals attached to university medical schools, now number thirty-eight, and during the past year each of these units has been supplied with a full hospital equipment, including beds, bedding, linen, instruments, hospital furniture, *x*-ray and laboratory apparatus, and a supply of surgical appliances and dressings enough to last for two months' active service. When these units are called out the War Department furnishes three officers from the regular army to take charge of the administration of each of them, while the professional personnel remains under the director who has been at the head of the unit from the first, and with him are two subdirectors, one to superintend the surgical, and the other the medical, service. The staff includes a chief of laboratory service, a competent pathologist, a bacteriologist, and a number of laboratory technicians; each group has also an orthopaedic surgeon, a neurologist, an ear, nose, and throat specialist, and a radiologist, all of them as far as possible from the teaching staff of the university medical school. By thus putting into active service a "team" of men who have already been accustomed to work together, it is believed that the best technical results can be obtained. The Columbia unit, for example, consists of doctors and nurses who have been working together at the Presbyterian Hospital in New York in the same capacities as those to which they are now assigned.

At the request of the British Commission which recently visited Washington, six of these thirty-eight hospital units have been lent to the British Government with a view to releasing the staffs already at the base hospitals. As originally organized, the unit, when called out, intended to carry its own complete equipment, but as these six units were requested to take over six general hospitals already in being, only some special instruments and not the full equipment have been brought across the Atlantic. Major Brewer also indicated an interesting development for the immediate future. For some time it has been planned by the National Red Cross of America to provide each of these units with a complete set of hospital buildings of the portable house type. The plans were formulated by Dr. Sidney A. Burrage, a member of the Columbia unit, and have been approved by the Council of National Defence. Through the generosity of a New York philanthropist orders have been given for the construction of a set of hospital buildings capable of accommodating 500 patients, staff, and administrative personnel, and including operating theatre, kitchen, lavatory, heating, lighting, and disinfecting plant, sewerage system, and all labour-saving devices on the most up-to-date lines. Between forty and fifty buildings (forming one set) are now being constructed on this portable plan, capable of being erected and made ready for use within two or three weeks, so as to form a base hospital; when this model building is completed it will be placed on exhibition, either in one of the parks of New York or at one of the military concentration camps, and if it proves as satisfactory as expected the Government will probably order ten or more of these groups of buildings to be constructed for base hospital use with the first expeditionary force to Europe.

In the official summary, issued on May 29th, of what the United States has accomplished during the seven weeks which have elapsed since it entered the war, it is stated that ten thousand doctors, in addition to many nurses, have been ordered to England and France. As the bill which is to be put into force forthwith will provide an army of 2,000,000 men, this is at the rate of one doctor to 200 men. It is, however, anticipated that not more than 100,000 Americans all told will be available in France at an early date, and it is to be assumed that all the ten thousand doctors will not come to Europe before the main American forces reach this country.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Killed in Action.

TEMPORARY SURGEON A. MCK. RUSSELL, R.N.

Temporary Surgeon Archibald McKerrow Russell, R.N., who was reported as missing in the casualty list published on May 19th (BRITISH MEDICAL JOURNAL, May 26th), is reported as killed in that of May 26th. He was educated at Glasgow University, where he graduated as M.B. and Ch.B. in 1914, and was a resident of Newmains, Lanarkshire.

ARMY.

Killed in Action.

Captain William Gordon Cummings, R.A.M.C.(T.F.).

CAPTAIN F. HUNTON, R.A.M.C.(T.F.).

Captain Frederick Hunton was killed in action on May 6th, near Gaza, in Palestine, and a brief summary of his professional career was printed in the JOURNAL of May 19th, 1917. A medical colleague sends us an appreciation of his life and character, from which we make the following extract: "Frederick Hunton was the ideal country practitioner, and by his cheery courage, professional skill, and sterling character he wielded a wide influence for good. He loved the life of the country, and his favourite holiday was a ride on horseback alone with Nature. He was devoted to hunting and outdoor exercise, and his physical courage brought him many accidents. This fearlessness was characteristic throughout his life and in his death. After seeing the wounded come in from action near Gaza, and on one occasion working amongst them for eighty-four hours with only four hours' sleep, Hunton was killed by a piece of bomb whilst running to succour the wounded who fell during a bombing raid."

Lost at Sea.

The casualty list published on May 28th contained the names of twenty-two officers reported as "missing, believed drowned," including four of the R.A.M.C.—Captains C. A. W. Fope and A. Tilbury, Lieutenant J. E. B. Smith, and Lieutenant and Quartermaster A. T. Hasler, M.C. Two more R.A.M.C. officers were reported as drowned in the casualty list of May 29th—Captain H. H. Robinson, D.S.O., and Lieutenant J. T. Brown. Obituary notices of Lieutenants Smith and Brown have already been given (BRITISH MEDICAL JOURNAL, May 12th and 26th). Lieutenant Smith appears to have been lost in the *Arcadian* on April 15th. Captain Tilbury, and probably the others, were lost in the transport *Transylvania*, 14,000 tons, formerly an Anchor liner, torpedoed and sunk in the Mediterranean on May 4th.

CAPTAIN C. A. W. POPE, R.A.M.C.

Captain Charles Alfred Whiting Pope was educated at St. Bartholomew's Hospital, taking the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1903, and at Cambridge, where he graduated as M.A. and B.C. in 1904, and as M.B. in 1907. After filling the posts of assistant house-surgeon of the South Devon and East Cornwall Hospital, and of house-physician of the Somerset Hospital at Capetown, he went into practice at St. Leonards-on-Sea. He took a temporary commission as lieutenant in the R.A.M.C. on April 12th, 1915, and was promoted to captain after a year's service. He had been for some time in medical charge of military families at Aldershot.

CAPTAIN H. H. ROBINSON, D.S.O., R.A.M.C.

Captain Henry Harold Robinson, D.S.O., was educated at Owens College, Manchester, and took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1899. After serving as house-surgeon of Burton-on-Trent Infirmary, as senior house-surgeon of Southport Infirmary, and as house-surgeon of Birkenhead Children's Hospital, he went into practice at Birkenhead, where he was honorary medical officer of the children's hospital. He took a temporary commission as lieutenant in the R.A.M.C. on April 10th, 1915, and was promoted to captain after a year's service. He received the D.S.O. on August 25th, 1916, and the Military Cross on November 14th, 1916.

CAPTAIN A. TILBURY, R.A.M.C.

Captain Arthur Tilbury, youngest son of Mr. John Tilbury of Oakley, Hants, was educated at Guy's Hospital, and took the diplomas of M.R.C.S., L.R.C.P.Lond. in 1913. He then joined his brother in partnership at Queen's Road, S.E., and continued to hold clinical appointments at Guy's Hospital. On the outbreak of war he was called up as a reservist in London University O.T.C., and was given a commission in the R.A.M.C. He served at Canterbury for a year, and on obtaining his captaincy was sent to Egypt in September, 1915. On March 17th he came to England on special duty, and on his return journey the *Transylvania*, on which he was on duty, was torpedoed and sunk on May 4th, and he was reported missing and believed drowned. His loss is keenly felt by his relatives, patients, and many friends at Guy's.

LIEUTENANT AND QUARTERMASTER A. T. HASLER, M.C., R.A.M.C.

Lieutenant and Quartermaster Arthur Thomas Hasler, M.C., R.A.M.C., was born on March 11th, 1875, and, after serving in the ranks for nearly eighteen years and as a warrant officer for two and a half years, received his commission on February 6th, 1915. He gained the Military Cross as a sergeant-major on January 1st, 1915, being one of the first recipients of that order on its institution.

Died of Wounds.

CAPTAIN H. A. WILSON, R.A.M.C.

Captain Robert Henry Wilson was reported as having died of wounds, in the casualty list published on May 29th. He resided at Strasid, Ballycharn, County Antrim, and was educated at the University of Belfast, where he graduated as M.B., B.Ch., and B.A.O. in 1915. After qualifying he entered the R.A.M.C. as a temporary lieutenant, and was promoted to captain after a year's service.

Died on Service.

CAPTAIN R. F. RUSSELL, R.A.M.C.

Captain Robert Fergusson Russell, R.A.M.C., was reported as having died on service, in the casualty list published on May 28th. He was educated at Aberdeen University, where he graduated M.B. and Ch.B. in 1905, and was in practice in Jamaica, until he took a temporary commission in the R.A.M.C.

Wounded.

Lieutenant Colonel J. J. Fraser, Canadian A.M.C.
Captain J. F. Bourke, R.A.M.C. (temporary).
Captain J. C. Ferguson, R.A.M.C. (temporary).
Captain J. A. Gilfillan, R.A.M.C. (temporary).
Lieutenant J. W. Mackie, R.A.M.C., S.R.
Captain H. N. Stafford, R.A.M.C. (temporary).

DEATHS AMONG SONS OF MEDICAL MEN.

Ardagh, Arthur Holford, Captain Canadian Infantry, only son of Dr. Edward Ardagh, of Orillia, Ontario, Canada, killed on May 10th, aged 23.

Codner, Christopher Cardew, acting Captain Prince Albert's Somerset Light Infantry, younger son of Dr. J. Codner, of Corfe, Taunton, reported wounded and missing on May 3rd, now reported killed, aged 22. He got his commission in July, 1915, and reached the rank of captain in November.

Dunwoody, John Myles, Second Lieutenant Royal Dublin Fusiliers, reported missing, believed drowned, on May 4th, on troopship *Transylvania* on his way back to Salonica after leave, only son of Dr. W. G. Dunwoody of Ramsgate.

Henson, Gordon Reed, Private, Canadian Forces, second son of the late Dr. J. E. Henson, of Hornsea, Yorkshire, died on May 17th of wounds received on May 8th.

Irvine, Gerard Byrons Currie, Major Indian Infantry, elder son of the late Inspector-General G. J. Irvine, R.N., died on May 15th of wounds received on April 23rd. He was born on February 18th, 1881, and served with the Devon Militia during the South African war, in 1900-2, in the Transvaal, Orange River Colony, and Cape Colony, receiving the King's medal with three clasps and the Queen's medal with two clasps. He received a commission in the Leinster Regiment from May 4th, 1901, joined the Indian Army on March 18th, 1906, became captain on February 18th, 1909, and had recently been promoted to major. He had served for the last eleven years in the 9th Bhopal Infantry, and was with his regiment in France in 1914-15, being severely wounded in October, 1914.

Poole, H. R., Captain Canadian Forces, youngest son of Surgeon-Major Poole, of Norwood, killed on May 3rd.

Pye-Smith, Philip Howson Guy, Lieutenant Liverpool Regiment, only child of the late Dr. P. H. Pye-Smith, killed May 15th, aged 21. He was educated at Eton and entered Magdalen College, Oxford, in October, 1914, but took a commission on December 22nd, 1915. He went to the front in May, 1915, was wounded on Good Friday, 1916, and returned to the front last Christmas.

Sanslee, M. W. A., Second Lieutenant Devonshire Regiment, eldest son of Dr. Sanslee, of Broadclyst, Devonshire, killed May 7th, aged 21.

Wright, William Richard, Lieutenant Canadian Infantry, third son of the late Dr. Henry F. Wright, of Ottawa, killed May 15th, aged 19.

[We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.]

HONOURS.

A SUPPLEMENT to the *London Gazette* of May 26th contains a further list of honours and decorations conferred upon officers for gallantry and devotion to duty. Among the recipients are the following medical officers:

Bar to Military Cross.

Temporary Captain Reginald Peter Nathcombe Buckland Binett, M.C., R.A.M.C., attached Highland Light Infantry.

For conspicuous gallantry and devotion to duty. He displayed great judgement and endurance in organizing the stretcher-bearers in the attack. He worked continuously throughout the day, exposed for many hours to very heavy hostile fire. (M.C. gazetted March 30th, 1916.)

Military Cross.

Temporary Captain Thomas Bowyer, F.R.C.S.I., R.A.M.C., attached Manchester Regiment.

For conspicuous gallantry and devotion to duty. He showed great personal bravery in moving about in the open under heavy fire, organizing his bearers, and assisting in the search for the wounded.

Captain Francis Hergate Ellis, M.O. Rhodesian Regiment.

For conspicuous gallantry and devotion to duty on many occasions. He has at all times displayed a total disregard of personal safety, and has set a fine example to all ranks.

Captain Thomas Graham, M.B., R.A.M.C.

For conspicuous gallantry and devotion to duty. He rendered invaluable assistance in evacuating the wounded under very heavy fire. He has at all times set a splendid example of courage and determination.

Captain Thomas Whittle Martin, M.B., R.A.M.C.(S.R.), attached Royal Scots.

For conspicuous gallantry and devotion to duty. He was of the greatest assistance in organizing the evacuation of the wounded across "No Man's Land" during the operation. He has on many previous occasions done fine work.

Temporary Captain Francis Lorne McKinnon, M.D., R.A.M.C.

For conspicuous gallantry and devotion to duty. He personally led a search party up to the enemy wire in front of the village, under very close rifle and machine-gun fire. He succeeded in recovering two wounded men.

Temporary Captain Charles O'Brien, M.B., R.A.M.C.

For conspicuous gallantry and devotion to duty. Although wounded, he insisted on remaining in command of the bearer division of his field ambulance, and in so doing materially expedited the removal of the wounded from the field.

Captain Bertrand Cecil Owens Sheridan, M.B., R.A.M.C., Special Reserve, attached Worcester Regiment.

For conspicuous gallantry and devotion to duty. He tended the wounded continuously for twelve hours under very heavy fire. He set a splendid example of courage and determination throughout.

Captain George Charles Willcocks, Australian A.M.C.

For conspicuous gallantry and devotion to duty. He worked continuously for about sixteen hours in the open under heavy fire, and successfully evacuated a large number of wounded men. He set a splendid example of courage and determination.

The Distinguished Conduct Medal for acts of gallantry and devotion to duty has been awarded to two non-commissioned officers of the South African M.C., the Military Medal to two staff nurses of Queen Alexandra's Imperial Military Nursing Service Reserve, eight non-commissioned officers and privates of the R.A.M.C., to six of the Australian A.M.C., and to one temporary sergeant of the New Zealand Field Ambulance. The Meritorious Service Medal for valuable services rendered in the field has been bestowed upon two sergeants of the R.A.M.C.

MENTIONED IN DISPATCHES.

The following officers and men of the Army Medical Service and Royal Army Medical Corps are included in the list of names submitted by Sir Douglas Haig in his dispatch of April 9th as deserving of special mention:

ARMY MEDICAL SERVICE.

Head Quarters Staff.

Lieutenant-General Sir A. T. Sloggett, K.C.B., C.M.G.
Surgeon-Generals: W. G. Macpherson, C.B., C.M.G., M.B.
M. W. O'Keefe, C.B., M.D., R. Porter, C.B., M.B., R. H. S. Sawyer, C.M.G., M.B., F.R.C.S.I., T. P. Woodhouse, C.B.
Colonels (temporary Surgeon-Generals): J. M. Irwin, W. W. Pike, C.M.G., D.S.O., F.R.C.S.I., B. M. Skinner, C.M.G., M.V.O.
Colonels: A. W. Bewley, E. G. Browne, C.B., C. H. Burtchaell, C.M.G., M.B., H. Carr, C.B., M.B., J. J. Gerrard, M.B., R. Jackson, M.B., R. Kirkpatrick, C.M.G., M.B., Sir W. B. Leishman, C.B., F.R.S., M.B., F.R.C.P., D. M. O'Callaghan, J. J. Russell, C.B., M.B., S. Westcott, C.B., C.M.G.
Temporary Colonel C. C. Fleming, D.S.O., M.B., ret. pay (Res. of Off.).
Lieutenant-Colonel and Brevet Colonel H. Ensor, D.S.O., M.B.
Lieutenant-Colonels (temporary Colonels): J. D. Alexander, M.B., H. P. W. Barrow, C.M.G., W. C. Beever, C.B., C.M.G., M.B., ret. pay, R. J. Blackham, C.I.E., D.S.O., E. W. Bliss, D.S.O., A. W. N. Bowen, G. W. Brazier-Creagh, C.M.G., ret. pay, J. Greeb, D.S.O., F. J. Greig, ret. pay (Res. of Off.), H. A. Hinge, C.M.G., A. W. Hooper, C.M.G., D.S.O., S. de C. O'Grady, M.B., J. Fee, D.S.O., M.B., C. F. Pollock, D.S.O., M. McG. Rattray, M.B., D. D. Shanahan, D.S.O., F. A. Symons, C.M.G., D.S.O., M.B., H. S. Thurston, C.M.G.
Lieutenant-Colonels (acting Colonels): J. G. Gill, H. Herrick.
Lieutenant-Colonels: W. W. O. Beveridge, C.B., D.S.O., M.B., W. H. Blackwell, S. L. Cummins, C.M.G., M.D., H. E. Fawcus, C.M.G., M.B., L. N. Lloyd, C.M.G., D.S.O., C. K. Morgan, C.M.G., M.B.
Majors: H. St. M. Carter, D.S.O., J. A. Harfigan, D.S.O., M.B., N. Low, D.S.O., A. H. MacN. Mitchell, J. D. Richmond, M.B., M. B. H. Ritchie, D.S.O., M.B., G. F. Sheehan, S. B. Smith, M.D., J. A. Turnbull.
Captains: D. C. G. Ballingall, M.C., M.B., J. J. H. Beckton, F. Casement, M.B., K. K. Drury, M.C., A. J. Gibson, M.B., F. A. McCammon, M.C., M.B., H. F. Paulon, M.C., M.B., G. S. Parkinson, G. P. Taylor, M.C., M.B., H. F. Wilkin, M.C., F.R.C.S.E.
Temporary Captains: G. J. D. Hindley, M.B., E. S. Marshall.
Lieutenant (temporary Captain) J. H. Pendered, M.B., F.R.C.S.

Consultants.

Temporary Surgeon-General Sir G. H. Makins, K.C.M.G., C.B., F.R.C.S. (Lieutenant-Colonel 2nd London General Hospital, R.A.M.C.).
F. M. Caird, M.B., F.R.C.S.E. (Lieutenant-Colonel 2nd Scottish General Hospital, R.A.M.C.), Sir Bertram Dawson, K.C.V.O., C.B., M.D. (Captain 2nd London General Hospital, R.A.M.C.), W. T. Lister, C.M.G., M.B., F.R.C.S., C. S. Wallace, C.M.G.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonels: S. A. Archer, C. R. Evans, D.S.O., T. Fraser, M.B., G. H. Goddard, F. W. Hipgrave, M.D., C. H. Hoskins, W. E. Hume, M.B., D. D. Logan, M.D., E. W. P. V. Marriott, A. H. Waring, E. A. Wraith.
Temporary Lieutenant-Colonel R. H. M. Roberts, C.M.G., T.D., F.R.C.S.E.
Majors (temporary Lieutenant-Colonels): D. Ahern, R. Coffey, J. F. Crombie, R. H. V. Dunbar, M.B., G. M. L. Hammerton, H. C. Hildreth, F.R.C.S.E., A. B. Hinde (Res. of Off.), G. J. Houghton, T. Kay, M.B., W. D. C. Kelly, M.B., C. H. Lindsay, C.M.G., M.D., J. E. Powell, T. P. Publicomibe, M.B.,

J. Rahilly, M.B., H. Rogers, M.B., D. Rorie, M.D., W. M. B. Sparkes, D.S.O., H. Stewart, M.C., M.B., E. J. C. Thompson, D.S.O., R. M. West, M.D., T. J. Wright.
Major (acting Lieutenant-Colonel): A. J. Hull, F.R.C.S.
Majors: G. E. Gask, F.R.C.S., J. M. Glover, M.B., W. B. Milbanke, M.B., G. W. Miller, M.B., J. S. Pascoe.
Temporary Majors (temporary Lieutenant-Colonels): W. B. Edwards, E. L. Gowland, M.B.
Captains (Acting Lieutenant-Colonels): J. D. Bowie, M.B., E. D. Caddell, M.C., M.B., H. K. Dawson, M.D., W. H. Forsyth, M.B., A. D. Fraser, M.C., M.B. (S.R.), A. S. Littlejohns, D. F. Mackenzie, D.S.O., M.B., G. Mackie, R. Magill, M.B. (S.R.), C. R. M. Morris, M.B., K. D. Murchison (S.R.), R. T. C. Robertson, M.B. (S.R.), M. R. Taylor, M.B. (late Captain A. Med. Res.), A. G. Wells, A. J. Williamson, M.D.
Captains (temporary Majors): E. Alderson, M.D., R. S. Taylor, M.B., F.R.C.S.E.
Captains: W. W. Adamson, M.B., F. J. Allen, M.B., G. N. Anderson, M.B., R. P. Ballard, M.B. (S.R.), T. W. Browne, C. F. Burton (S.R.), A. Campbell, M.B., T. F. Corkhill, M.B. (S.R.), N. A. Coward, M.D., E. M. Cowell, M.D., F.R.C.S., R. S. Cumming, M.B., A. M. Deane, M.B., A. E. Delgado, M.B., W. J. Dowling (S.R.), S. R. O. Duffield, M.B., P. W. Edwards (S.R.), H. Foxton, M.B., A. F. Girvan, J. Golding, C. M. Gozney, M.B., J. M. Hamill, W. H. F. Hey, M.B., F.R.C.S., A. M. Hughes, C. Jacobs (S.R.), D. W. John (S.R.), H. W. Lance, M.B., R. Lightstone, M.C., P. McCallum (S.R.), H. E. McCready, M.D., R. W. Maltby (S.R.), D. M. Marr (S.R.), R. P. S. Mason (S.R.), E. R. Matthews, G. L. Matthews, W. T. F. Meade-King, E. J. Mesmer, F. R. H. Mollan (S.R.), B. B. Morgan, M.D., W. F. Munro, M.B., T. S. Nelson (S.R.), J. A. Nixon, O. G. Parry-Jones, S.R., (died of wounds), L. T. Poole, M.B., A. D. Ramsbottom, M.D. (S.R.), A. E. Rayner, D. G. Rice-Oxley, M.B., J. C. Rowe, M.B., A. A. Rutherford, J. A. C. Scott, M.C., M.B., T. G. Shand, A. H. Spicer, M.B., W. C. Stewart, M.B., A. F. Thomson, G. T. van der Vyver, M.B. (S.R.), H. Vickers, J. S. Wallace, W. J. Webster (S.R.), L. T. Whelan, F.R.C.S.I., C. S. E. Wright, M.B., S. K. Young, M.B. (S.R.).
Temporary Captains (acting Lieutenant-Colonels): R. E. Drake-Brockman, F. F. Maccke, M.B., F.R.C.S.
Temporary Captains: T. E. Amyot, M.B., W. A. Anderson, M.B., B. W. Armstrong, V. E. Babcock, M.D., S. Batchelor, J. Biggam, M.B., A. G. Bisset, M.B., J. C. Boyd, M.D., C. A. Brisco, M.B., D. S. Brough, M.B., W. T. Brown, M.B., C. W. G. Bryan, F.R.C.S., F. Carson, M.B., H. Carson, M.B., C. N. Coad, M.B., H. M. Cockcroft, R. C. Cook, E. W. Craig, M.B., J. Crawford, M.C., J. Davidson, M.B., C. F. Dillon-Kelly, C. O. Donovon, D.S.O., M.B., C. G. Douglas, M.C., M.D., J. J. Dwyer, H. D. Eccles, C. M. G. Elliott, A. H. Elliott, M.D., C. C. Finlator, M.D., S. J. C. Fraser, M.D., H. B. German (late Surgeon, R.N.), R. S. Gibson, M.B., N. F. Graham, M.B., N. Greiller, J. B. Hay, M.B., W. S. B. Hay, M.B., G. W. Huggins, D. M. Hunter, M.B., A. H. Huycke, M.D., G. W. B. James, M.D., D. S. Jones, D. W. F. Jones, M.B., J. Kirker, J. Kirker, M.B., J. St. P. Kruse, M.B., H. A. Lake, F. J. Lidderdale, M.B., W. H. E. McCarter, M.B., W. McCready, M.B., F.R.C.S.I., N. MacDonald, M.D., (Lieut. C.A.M.C.), J. W. McKinney, M.B., J. W. McLeod, M.B., M. T. McMahon, M.B., R. J. B. Madden, M.B., J. R. Marrack, M.C., M.B., H. C. D. Miller, M.B., W. Millerick, B. S. Moreland, K. M. Nelson, H. B. Owen, W. H. Parry, M. P. Paton, M.B., D. H. Pennant, D.S.O., S. E. Picken, M.B., J. H. Porter, M.B., K. Pretty, M.B., M. Ramsay, M.B., G. A. Renwick, M.B., F. P. Robertson, W. Rogerson, M.B., H. B. G. Russell, W. Russell, A. P. Saint, A. D. Sharp, M.D., T. Sheehan, G. R. Spence, A. V. Stocks, M.B., R. Tindall, M.D., T. Sheehan, G. R. Spence, A. V. Stocks, M.B., R. Tindall, M.B., R. W. L. Todd, M.B., W. A. Troup, M.B., R. B. Wallace, M.B., G. R. C. Wilson, J. A. Wilson, M.B., H. Young.
Lieutenants (temporary Captains): R. Ellis, M.B., D. N. Macleod, M.B.
Lieutenant E. S. Bissell (since relinquished his commission).
Temporary Lieutenants: G. R. Chissell, A. A. Halliday, M.B., K. M. Walker, M.B., F.R.C.S.
Quartermasters and Honorary Majors: J. Green, W. M. Moreton, H. Sparkman.
Quartermasters and Honorary Lieutenants: G. S. Annett, R. J. Fleming, M.C., J. Jackson, J. King, J. W. Osborne, A. G. Powell, W. J. Rice, G. Sellen.
Temporary Quartermasters and Honorary Lieutenants: A. H. Addey-Jibb, C. O. Elliot, J. R. Kenshole, A. Morrison, G. R. Spring, J. Tewkesbury.

The list also includes 97 non-commissioned officers and men of the R.A.M.C., 11 members of Queen Alexandra's Imperial Military Nursing Service, 6 of Queen Alexandra's Imperial Military Nursing Service Reserve, 11 of the Territorial Force Nursing Service, 14 of the Civil Hospital Reserve, 38 of the Women's Voluntary Aid Detachment, 3 of the First Aid Nursing Yeomanry, 2 special military probationers, 14 of the British Red Cross Society, 4 of the Voluntary Aid Detachment, 13 lady helpers, and one representative of the American Nursing Service.

NOTES.

HOSPITAL FOR DISABLED OFFICERS.

THE Sir John Ellerman Hospital, primarily intended for disabled officers discharged or about to be discharged from the service, is situated in beautiful grounds, the leading idea being to make it as homelike as possible. The authorities desire such officers to feel that when they have been there some time and wish for a change they can go away and return later. Any beds not required at the moment for disabled officers are being utilized by the War Office for convalescent patients from abroad. Medical officers in charge of hospitals are asked to remember when discharging disabled officers that the Sir John Ellerman Hospital was fitted up for their benefit. It has an *x*-ray room and appliances for electric treatment and massage. On application to the secretary at Walkhurst Lodge, Benenden, Cranbrook, Kent, forms of admission for officers will be sent.

FOLKESTONE AIR RAID.

The following notes show the help given during the raid on May 25th, 1917, to the civilian population by the Canadian Army Medical Corps at present on duty in this neighbourhood:

As soon as the raid was announced a dispatch rider was sent to the ambulance depôt with a message to send ambulances forward. The first on the scene was one stationed permanently at West Cliff Military Eye and Ear Hospital, Folkestone. First aid was given locally, and the cases were collected to a first aid post at the West Cliff Eye and Ear Hospital, which is in the town, and will be known to many as the West Cliff Hotel. The first case reached the hospital ten minutes after the raid, and in thirty or forty minutes all the cases had been admitted. From it the cases were distributed to the civilian hospital, or, if requiring serious surgical operations, to Moore Barracks Hospital, Shorncliffe. The staff at Victoria Civilian Hospital was reinforced by four Canadian surgeons.

The Town Commandant has expressed his great satisfaction with the service rendered.

The offices of the Wounded Allies Relief Committee have been removed to Bank Chambers, 329, High Holborn, W.C.1.

England and Wales.

THE WELSH NATIONAL LIBRARY.

IT was announced at a meeting of the court of governors of the National Library of Wales on May 25th that the whole of the building contracts had been completed, and that the total expenditure had been £110,563, leaving a small balance in hand. The library owes more to Sir John Williams than to any other man, and in particular, that it already possesses a collection of Welsh books and manuscripts which make it the foremost library of Celtic literature in the world. Everyone will be glad to know that he has lived to see the fine building on the commanding site on Grogythan Hill, overlooking the bay of Aberystwyth, in which the treasures he has presented to his country are worthily housed. The beautiful reproduction of the Black Book of Carmarthen, edited by Dr. Gwengvryn Evans in 1906, is dedicated to Sir John Williams as "the first President of the Welsh National Library, the first in personal sacrifice for its good, and the first in the importance of his contributions to its treasures." In reporting the meeting last week the *Western Mail* states that Sir Herbert Lewis, M.P., who presided, said that Wales could do nothing better at the present time than help forward that orderly, progressive, national development typified by the Welsh National Library. One development of the library may here be mentioned: it is that it keeps in circulation duplicate copies of books for the use of lecturers and tutorial classes held throughout the principality.

NOTIFICATION OF BIRTHS IN SALFORD.

At a recent meeting of the practitioners of Salford a resolution of a previous meeting was confirmed to the effect that "as notification of births by the practitioner in attendance is a breach of that professional secrecy which we are bound to observe, we refuse to notify." The feeling was strongly expressed that the confidential relationship between doctor and patient is being insidiously undermined by the legislation of the last few years, the Notification of Births Act being a glaring example of this. At first the doctor in attendance at a confinement was made jointly responsible with the parents for the notification, but as the Act was optional, and as many local authorities did not adopt it, the first protest of the profession soon became

broken and feeble. In areas where the Act was adopted many practitioners simply ignored it, or took refuge in the provision which excuses the doctor if he can prove that he had reasonable grounds for believing that notice had been duly given by some other person. Even this involved the doctor in the necessity of instructing the parents in their legal duty. But, to a great extent, the Act was a failure, partly because most of the well organized local authorities had other means of getting all the information about births that could be of any practical advantage without imposing on the doctor a task which is repugnant to his better nature. A further step was then taken of withdrawing the optional character of the Act and compelling local authorities to adopt it. But it still met with passive resistance, and the Government has recently taken a step which quite clearly foreshadows an attempt to compel medical practitioners to notify births, and local authorities have recently issued a circular to practitioners which is nothing less than a threat if they fail to notify. The effect of this at a time when the profession is giving so freely of its services to the country cannot fail to be disastrous. Side by side with this is placed the reduction of the ordinary notification fees for infectious diseases. There is no use in hiding the fact that the profession generally both in Manchester and Salford have the conviction that things might have been much more satisfactory if the British Medical Association had shown a firmer attitude in dealing with the Local Government Board, which appears to be constantly on the look-out for means to make the position of general practitioners more and more intolerable.

THE HYGIENE OF MERCANTILE SHIPS.

The Liverpool Port Sanitary Authority has issued *A Report on Marine Hygiene*, by Dr. William Hanna, assistant medical officer of health for the Port of Liverpool, based on an essay which gained the Henry Saxon Snell prize and medal of the Royal Sanitary Institute. The report consists of practical suggestions for improvements in the sanitary arrangements and appliances on shipboard. The author points out that much progress in the building of ships on hygienic lines has recently taken place, but the evolution of marine hygiene has not kept pace with the advance of sanitation on land. Whatever steps are being taken to speed up construction of merchant ships, in view of the present crisis, it is to be hoped that the health and comfort of the seamen will not be neglected. Dr. Hanna's report is therefore timely, since the health of the mercantile marine is only second in importance to that of the personnel of the Royal Navy. Fleet Surgeon Munday's article on naval hygiene, which we printed on April 28th, showed the importance attached by the Naval Medical Department to sanitation afloat, so that the war instead of lowering the standard has raised it, with the result that the physical efficiency of all ratings in the navy is higher now than at any previous time. Ventilation on board ship has been the subject of continual inquiry and experiment in the navy, and Dr. Hanna dwells especially on the need for improvement in this matter in mercantile vessels. He points out that the situation of crew spaces and their ventilation are perhaps the two most important problems in marine hygiene. Owing to the great variety in shape, size, and purpose of trade vessels he has had to treat the subject on broad lines only. Other cognate matters which he discusses are the heating, lighting, and drainage of crew's quarters, water supply, filters, and lavatories; the disposition of berths, bunks, and mess rooms; and the provision of hospital accommodation. The last-named point he regards as especially important in view of the occurrence of infectious disease on board. "It seems very strange," he says, "how thoughtlessly the plans of ships are drawn up by naval architects when so important a point is frequently overlooked." The report ends with a number of clear diagrams illustrating the author's suggestions.

SCHEME FOR VENEREAL TREATMENT IN BRIGHTON AND SUSSEX.

The board of management of the Royal Sussex County Hospital, Brighton, has entered into an agreement with the Brighton Town Council and the County Councils of East and West Sussex for the establishment of a centre for the treatment of venereal diseases, which agreement has been submitted to the Local Government Board for approval.

The scheme provides for an out-patient department for the diagnosis and treatment of venereal diseases in both sexes, where patients are to be treated free of charge, provided they are not willing to be treated privately, or cannot be treated satisfactorily by their own doctor. As far as possible the treatment will be carried out in consultation with the patient's own doctor. No distinctive name, indicating venereal treatment, is to be given to the clinic. Medical officers who have special experience in venereal diseases and a knowledge of modern methods of diagnosis and treatment are to be appointed. These medical officers will undertake the following duties:

1. Attendance at the clinic and the examination and treatment of patients, both out and in.
2. The keeping of records of the patients' progress and treatment.
3. Consultation with medical practitioners in cases sent by them.
4. Taking of specimens for pathological examination and consultations, when necessary, with the pathologist.
5. Supply of salvarsan or its substitutes to medical practitioners.
6. Transmission of reports to medical officers of health. The medical officers will also give demonstrations at the clinic to registered medical practitioners as to the methods of taking and transmitting material for laboratory diagnosis, and as to the best known methods for the systematic diagnosis and treatment of venereal diseases.

Two beds are to be reserved for in-patients requiring salvarsan or other drugs given by intravenous injection, and for the temporary treatment of certain acutely contagious cases of gonorrhœa. Two additional beds are to be available if necessary. Cases requiring prolonged treatment are to be treated at the hospital only in exceptional cases.

Arrangements are made in the agreement for the adequate remuneration of the medical officers to the clinic. The scheme has met with the approval of the Executive Committee of the local Division of the British Medical Association.

Scotland.

MEAT FROM TUBERCULOUS CATTLE.

A PARAGRAPH in the *Glasgow Herald* of May 16th reported that the Paisley Public Health Committee had recently interviewed Major G. R. Leighton, veterinary medical inspector to the Local Government Board for Scotland, on the subject of economy in meat consumption. The Scottish Local Government Board is stated to have come to the conclusion that those portions of the meat of tuberculous cattle which were not visibly affected might be used for food if sterilized, and the Public Health Committee was asked whether it would support the sale of such meat, as the health authorities of Dundee, Aberdeen, and Hamilton were already doing. The Paisley Town Council, after a discussion of the report, decided to defer action for a month. The question of what should be done with the flesh of animals affected with tuberculosis has long exercised the minds of hygienists and veterinary surgeons attached to Continental slaughter-houses. In Germany, as Dr. T. M. Legge has stated,[1] a ministerial decree issued in 1892 allowed considerable latitude in the sale for human consumption of the meat of tuberculous cattle; and the flesh of animals with tuberculosis confined to one organ, or to several organs lying in the same cavity and not connected with one another by lymph channels or by blood vessels belonging to the systemic circulation, was permitted to be sold for food. Dr. Legge points out that the result of this was that large quantities of meat which formerly would have been condemned came upon the market. For the sterilization of the meat of animals affected with tuberculosis not sufficiently extensive to demand total seizure, nor so slight as to allow its sale without restriction, large steam disinfectors were erected at the Berlin abattoir. This meat is cut into pieces, and sterilized by contact with steam under pressure, and sold at greatly reduced prices in a special corner

[1] *Public Health in European Capitals.* London: Sonnenschein and Co.

of the abattoir, labelled, "Sale of the cooked meat of tuberculous animals," where it finds a ready market among the poor.

Dr. David Newman, in a letter which we have not space to print in full, criticizes severely the action of the Scottish Local Government Board in suggesting to local authorities that they should follow the German practice of reclaiming condemned meat by sterilization. Our correspondent admits that the flesh of tuberculous animals may possibly be rendered harmless by sterilization, but he doubts whether the food problem is so serious as to call for this infringement of legal provisions for the protection of the public from diseased meat. He quotes from the Public Health Scotland Act, 1891, in order to prove that the Local Government Board has no power to allow the sale of tuberculous flesh, and that meat which is diseased is forbidden by law to be exposed for sale. As a final point, Dr. Newman claims that the meat provisions of this Act have had a great influence in reducing the number of cases of bovine tuberculosis among the poor in Scottish hospital practice.

Canada.

THE PROPOSED SIX-YEAR COURSE IN MEDICINE.

THE decision of the universities of Toronto and McGill to extend the medical curriculum to six in place of five years, beginning with 1918, has met with serious objection on the part of the Senate of Queen's University, Kingston. The proposed change has been under consideration by the universities of McGill and Toronto for some time, and at the Conference of Canadian Universities held in Toronto in May, 1915, a Committee on Medical Education was appointed to report to the next conference. The report of this committee was presented to the third conference in May, 1916, and its recommendation that the conference should express approval of the adoption by Canadian medical schools of a six years' medical course as a minimum was unanimously accepted, and transmitted to the several provincial medical boards throughout the dominion. Approval of the suggested change was signified by Western University, London, Ontario, and on its own initiative, in May, 1916, the University of Manitoba announced that it would introduce a six years' course in medicine.

It is proposed that a pre-medical year shall be added to the five-year course, to be taken after matriculation and devoted to physics, chemistry, biology, and one literary subject (French or German), the course of instruction to include three lectures and six hours of laboratory work a week in physics, chemistry, and biology, and four lectures in French or German, taken at any college, university, or collegiate institute whose equipment and staff is sufficient. To this it is objected by Queen's University that the pre-medical year proposed could not be taken at any institution other than a university, since the laboratory equipment would be insufficient, and it is asked, Why not raise the standards in such a way as would harmonize with the present work of the secondary schools? In reply to this, the University of Toronto agrees that it is impossible at present for the collegiate institutes or secondary schools of the Province of Ontario to undertake the work, but expresses the hope that the action of the university will furnish a stimulus, and that before long it will become possible for the work to be done at those schools.

The proposal to give the degree of B.Sc. in medical sciences at the end of the second year of the regular medical course to students who, in addition to the regular work of the first and second years in medicine, have done special work in anatomy, physiology, or biological chemistry, meets with particular objection from Queen's University on the ground that its degree of Bachelor of Science now requires honour work in mathematics, followed by four years' work, and that such a degree would almost certainly replace the B.A., M.D. course of seven years, which is now taken by about 20 per cent. of the medical students of the university. The answer to this, made by the University of Toronto, is that the outline as set forth in the Queen's memorandum is so far only a proposal of the Faculty of Medicine, and has not yet been adopted by the Senate of the University of Toronto, and that, furthermore, there is no common policy of the universities in regard to the degree of Bachelor of Science.

Other objections raised by Queen's University are that, were a graduate obliged to do six years' academic work in order to obtain the degree of M.D., he would be disinclined to spend another year as hospital interne, and that the proposal to extend the medical course is inopportune, since the demand for doctors is unusually great at the present time. The University of Toronto replies to the first that, in its opinion, this will not be borne out by facts, and that the chief purpose of the change is to increase the hospital experience under direct clinical instruction. As to the demand for doctors, it is pointed out that any decrease in the supply of graduates in medicine will not come into effect until 1922, and that of recent years the medical schools of the province of Ontario have been providing more graduates in medicine than the province could absorb; that the western provinces are developing rapidly, and that there is no reason to suppose that for a few years after the war there will be any greater dearth of medical men in the west than there has been in the past.

It is contended also that the proposed change follows the development of medical education in the United States, which is based upon the German rather than the British methods, and that such changes should not be instituted while the whole subject of medical education is under investigation by the Medical Council of Canada and the Royal Commission appointed by the Ontario Government. Reply is made by the University of Toronto that the best universities in the United States are in line with the best British and Continental practice, and reference is made to the Educational Number of the BRITISH MEDICAL JOURNAL of September 9th, 1916, p. 348, where the normal course of study for medical students in Britain is outlined.

Lastly, the financial aspect of the matter is considered. It is pointed out by Queen's University that the expenses incurred by a medical student have increased already from 1,321 dollars in 1894 to 2,500 dollars at Queen's, and are proportionately heavier at Toronto and McGill, as living expenses are higher in either Montreal or Toronto than at Kingston, and that the addition of a sixth year will make it impossible for the son of an average working man to enter the profession. Answer to this objection is made by the University of Toronto by reference to the fact that the expense of a medical education in the University of Toronto is less than in Britain or in the leading schools of the United States, and that in all probability the governors of the university will impose a smaller fee for the pre-medical year than for the regular years in medicine. Emphasis is laid also upon the necessity of providing Canadian students with an opportunity of procuring the best medical education in their own country, so that they will not find it necessary to study elsewhere.

Correspondence.

FUTURE MEDICAL POLICY.

SIR,—I was pleased to read the letter of Dr. W. Gordon in the JOURNAL of May 19th, and I sincerely hope the moderate manner in which he has drawn attention to a future medical policy will stimulate all members of the profession to realize the nature of the crisis in the practice of medicine. I would also ask those members of the profession who have always prided themselves on having nothing to do with medical politics because they are not affected by any legislation, are not interested in the Insurance Act, and have no panel patients, to consider seriously the rapid developments taking place in medical legislation affecting medical practice from the highest consultant to the humblest general practitioner. I have no desire to open any new controversial questions, the more so as the Representative Meeting of the Association is to be held in July; but I have no hesitation in stating my personal opinion, which is in accord with Dr. Gordon's, that a part-time State service is the solution of the problem which has now arisen. In this connexion the profession must realize the present position of voluntary hospitals, and recognize the change in social and economic conditions since their foundation.

Every one knows the extraordinary good work which our profession has so long gratuitously given to the poor

and to charity through the voluntary hospital system, but we also know that these hospitals do not supply one-third of the requisite needs of the sick poor. Further, the interference of the State in the treatment of certain specific diseases and the Employers' Liability Act with the Medical State Insurance justify assertions in speeches of Labour members that working men accept hospital treatment not in the form of charity but as their just rights.

These facts cannot be too fully appreciated by our profession, and I have always agreed with the late Sir Victor Horsley that State medical work should not be muddled up with charity.

The complete abolition of panel lists with a thorough reformation and reorganization in the working of the State Insurance Act should afford the means for every one to help the scheme to be a success and to command the confidence of the public.

The Ministry of Health must give gratuitous medical treatment to the necessitous poor without the stigma of pauperism. It should be so organized by the formation of proper clinical surgeries, to which specialists would attend, that the service would attract our best men, keen and interested in their work, to apply for the appointments. There should be a part-time service, allowing for proper co-ordination and co-operation between domiciliary and institutional treatment. Undoubtedly there should be State control of medical education. We know in England there are eleven universities and three medical corporations, in Scotland four universities and three medical corporations, and in Ireland four universities and three corporations, all of which grant degrees and diplomas. The whole business is disjointed without central organization. We have long agitated in the Association that there should be one State examination before any one is allowed to practise.

Finally, I again ask members of the profession to give these questions their earnest and unbiassed consideration, free from any sentimental feeling which they may retain for old traditions. War has loosened the roots of many conservative institutions. Medicine has progressed with education and knowledge; let us progress further against the enemy of disease, to secure a healthy nation.—I am, etc.,

London, S.W., May 29th. G. E. HASLIP.

SIR,—The question of State Medical Service is well above the horizon. In discussing it, one side rhapsodizes over security of income, the beauties of work for work's and knowledge's sake, and a nicely ordered hierarchy for the medical officers and their satellites. The other side points out that in a salaried medical service no supervision could keep the lazy ones up to the mark (and none of us are always perfect); that promotion would be apt to be due to mere seniority or wire-pulling; that without the daily and hourly financial stimulus work would often be slovenly, and the patient would not have an easy means of defence against minor wrongs if our books were in order.

In fact, it is not the pros and cons of State but salaried service that are usually the bone of contention.

But must a public service be salaried? The exponents of "scientific management" point out that in the industrial world the best result is generally obtained by a combination of piece and time work rates of pay, or a minimum wage for a minimum amount of work, with a bonus for an increase in quality or quantity. Such systems of remuneration are successfully at work in large industrial organizations.

Is not this worth looking into by both the State and the profession? There are very few of us who are such hard-and-fast individualists as to regret having to work for the State if the advantages of the old system are retained whilst some of its disadvantages are removed.—I am, etc.,

Cambridge, May 27th. C. M. STEVENSON.

SIR,—I am glad to see that at last the Association is recognizing that it should advocate a part-time State service, instead of waiting until an inadequately paid whole-time service is thrust upon the profession, and most of the best men are therefore left standing outside.

The Association should fearlessly acknowledge that the attendance under the National Insurance Acts, which is itself a part-time State service, is an absolute failure, and amounts to little more than first aid carried on at an enormous cost. No adequate return can be made for the money expended until there is a proper linking up with consultant, specialist, and hospital treatment, and all members of the profession must be paid for the work they do. The system of voluntary hospitals is not consistent with a State service, nor under it is the general practitioner able to obtain a continuous knowledge of his patients, who must of necessity return to him for subsequent attendance, although they may have passed through the hands of specialists or surgeons.

There appears, however, to be a failure to recognize that all out-patient attendance can and should be given at central surgeries and not at the private houses of practitioners, where the waiting rooms are small, and one already hears of serious complaints in this respect. Individual surgeries are not suitable for proper attendance. There is no need for any hospital to have an out-patient department in its own building. The central out-patient dispensary should be completely equipped, and should be attended by not only general practitioners, but by specialists and consultants in all branches. Minor dressings would be attended to by nurses or dressers and the time of practitioners not wasted thereon; some qualified medical man would be continuously in attendance, and a second opinion always be obtainable on any case during dispensary consultations.

It must be recognized that the supply of drugs and dressings should be entirely done from the central dispensary and not from a number of little shops with no waiting room accommodation. The present system for insurance patients is inadequate and costly, and when special drugs are required they cannot be obtained. Every conceivable appliance and requisite—bed-rests, water-beds, splints of every description—should be kept for loaning out and returned. Both *x*-ray and pathological departments might properly exist at each dispensary; there would be no necessity to have separate dispensaries for tuberculosis or other diseases.

On such a system only can honest scientific attendance be provided for the bulk of the population, and the medical profession itself be satisfied that it is providing such. However, it must be recognized that in small country villages a difficulty would arise to bring the standard of attendance up to such an ideal.—I am, etc.,

HAROLD S. BEADLES,
Secretary Stratford Division and West Ham Panel Committee.

London, E. 15. May 26th.

ANAESTHESIA BY WARMED ETHER.

SIR,—Captain McCardie's contribution to your issue of April 21st (p. 508) raises many points of interest to the anaesthetist. The administration of C_2E_2 with a bag was first suggested to me by an anaesthetist of London—I think Mr. Carter Braine—in April, 1904, but I have never ventured to give it by any closed method.

During two years' practice at the West End Hospital I commonly gave C_2E_2 to the children, for orthopaedic operations, from a Hewitt's A.C.E. inhaler, and found that the amount of each drug used was about half what one would expect to use of either alone.

As regards ether for soldiers, I fully agree with Dr. McCardie as to the value of small quantities of chloroform in mitigating the cough-provoking action of ether.

During the last six months, however, I have found that the mere addition of steam to the ether vapour has an equally good effect, and have now practically discarded both chloroform and morphine as accessory anaesthetics to ether. A little very hot water in the gasbag and a whiff or two of oxygen is sufficient to secure an easy induction in nearly every case, the anaesthetization being continued by means of a "draw over" ether apparatus,[1] with an arrangement to take up steam from a jug of hot water, without any rebreathing. The ether is inhaled constantly at a temperature of 85° to 95° F., fully moistened, and suffices for all kinds of operations except of course some on the chest and throat. The anaesthetist has both hands free for holding the jaw, as a rule, there being no bellows to work, and all adjustments of the apparatus can be effected by one hand. The arrangements for regulating the strength of the ether vapour approximately are quite simple. My own work has become so much easier now that I think this method may be of use to others.

I hope to publish details of this steam ether method before long.—I am, etc.,

BERESFORD KINGSFORD, M.D.,
Anaesthetist, University College Hospital and Military Orthopaedic Hospital.

London, W., May 9th.

[1] Figured in the *Lancet*, September 2nd, 1916.

TREATMENT OF ASTHMA BY PEPTONE INJECTIONS.

SIR,—May I ask the indulgence of your columns in order to set at rest, if possible, certain doubts which have been expressed in a number of letters I have received from medical practitioners? The main question refers to sterilization of the peptone. The process of manufacture should ensure sterilization, involving as it does, amongst other things, evaporation to dryness *in vacuo*. If, however, any subsequent contamination be suspected, there ought to be no objection to heating the aqueous solution to 100° C., although up to the present I have not had any occasion to do so. Some correspondents suggest that sterilization by heating may destroy the activity of the peptone. That it does not do so, however, seems proved from the experiments of Vaughan and Wheeler, who, in their quest for the anaphylactic poison, split proteins, such as egg white, by boiling in absolute alcohol containing 2 per cent. of NaHO, and obtained an alcohol-soluble fraction which produced typical anaphylaxis in guinea-pigs. In like manner as regards serum, Besredka showed that its sensitizing properties were not lost even when heated to 120° C.

Other questions refer to the method of using the peptone. Dissolve the powder as formerly described for each injection. A stock solution should not be made. When pure, the peptone froths and evolves heat on being added to the water. Inject *deeply* into a suitable region of subcutaneous tissue poor in fat.

I have to thank Dr. Morton for his reference, but I fear he has not looked up my lecture to which allusion was made, in which the sentence occurs: "It will now be seen that this view of asthma is essentially that propounded by Broe," and was published by that physician over a hundred years ago.—I am, etc.,

London, W., May 25th. A. G. AULD.

REFRESHMENT HOUSE EXPERIMENT IN CARLISLE.

SIR,—The report in the BRITISH MEDICAL JOURNAL of May 19th, p. 663, under the above heading, would suggest that the experiment of State purchase and disinterested management of the liquor trade in the Carlisle district was proving an unqualified success; unfortunately, such is far from being the case.

There are two points in that report with which I wish to deal. The first has reference to the figures quoted regarding the number of convictions for drunkenness in April, May, and June, 1916 (the period immediately preceding the commencement of the operations of the Control Board), when they totalled 315, as compared with January, February, and March, 1917, for which period he gives the total as 159. It would be fairer to compare the first three months of 1916 with the corresponding period of 1917. They were as follows:

	January.	February.	March.	Total.
1916 ...	53 ...	73 ...	89 ...	215
1917 ...	53 ...	63 ...	48 ...	164

Here we have a difference of only 49; one would have been thankful for this small improvement, if it could be proved that the restrictive measures had played any important part in producing it; as a matter of fact, the operations of the Control Board had little or nothing to do in bringing it about, as at that period there were other factors at work which played an important part in its production. The first was a remarkable change in the character of the population occurring about the time the Control Board began its work; previous to this there was a tremendous influx of navvies into the locality—men who are known to be heavy drinkers. As these men completed their work they were replaced by munition girls. I submit that this fact would account for a considerable amount of the decrease in drunkenness at that time. Further, it was in March, 1917, that prohibition of the sale of spirits on Saturdays came into operation in the district, and was immediately followed by a remarkable fall in the number of convictions.

Your correspondent also infers that a further result of the experiment is that the people are eating more food and consuming less drink, and quotes the Gretna Tavern, where he tells us that the sales of food amount to 75 per cent. of the total takings. I would point out that the Gretna Tavern is primarily a restaurant and only secondarily a drinking saloon; also in many of the houses in the district no food is provided, sold, or obtainable, so that any comparison of figures on these lines can only be of value when we compare the relative quantities of food and drink sold in the whole of the houses in the area; such figures, if given, will disprove the theory advanced by your correspondent.

Judged from the standpoint of a temperance movement, the Carlisle experiment has been a colossal failure, as the following extract from the *Carlisle Journal* of January 2nd, 1917, goes to prove: "The convictions for drunkenness in Carlisle . . . in 1914 numbered 273, last year the total was 953, or three and a half times as many. . . . The Control Board's regulations have not yet produced any appreciable diminution in the number of convictions."

This and similar experiments go to prove that the liquor traffic is impossible of regulation and can only be effectually dealt with by means of total prohibition.—I am, etc.,

Plymouth, May 23rd. ROBERT SIMPSON.

MEDICAL BOARDS.

SIR,—Your space being limited, I would not have requested you to publish this letter if it only emphasized the complaint that we members of medical boards have received no thanks from the authorities for our very hard, onerous, and trying work.

No, Sir, its object is of far greater importance to us and to the State—namely, to bring to the notice of the profession several distinct grievances from which we suffer, with the desire of having them remedied.

To begin with, we have no status whatsoever, very few regulations—apart from the instructions regarding the method of examination of recruits—and so on. The only regulations concerning ourselves personally of which I am aware are (1) that we can resign or be dismissed by either party giving twenty-four hours' notice to that effect; (2) that if a member be ill for more than forty-eight hours he is obliged to send a medical certificate to the president of the board, stating the nature of the illness. If this be of brief duration and the member resume his duties within eight or ten days, he receives full pay (24s. a day) for the period of his absence. But, if the sickness be of longer duration—pneumonia, for example—and can be certified as such from the commencement, the examiner will receive at most three or four days' pay and be placed on the waiting list.

Next comes the question of leave. Up till now we have had only two or three days at Christmas and at Easter—no summer or bank holidays, whereas we ought to have, in addition, at least a fortnight in the summer, half a day in the week to attend to our private affairs, and bank holidays.

Then comes the question of the rate of pay, which is, as I have said, 24s. a day, and which is quite inadequate according to the present cost of living. Besides, I am given to understand that at Manchester and Liverpool the members are paid £2 a day. If this be a fact, the members of the London boards are very unjustly treated.

These grievances are important, but not so important as that concerning the number of recruits to be examined per day. With regard to this, the writer, having acted as an examiner for the past twenty-seven months in several districts and with many colleagues, is perfectly convinced that no man should be required to examine more than twenty five recruits a day. The latest instructions issued in this connexion state that each board of four members are expected to examine 130 recruits a day, that is, about thirty-two men for each examiner.

Well, Sir, I am fully convinced that no examiner can do

justice either to the recruits, the State, or to himself, if he should continue to examine such a number day after day. No one, unless he has acted as an examiner, can form an idea how fatiguing such work is both mentally and physically. The result is that before the end of the day we are almost completely done up.

In conclusion, we, like the rest of the profession, do not appear to be desirous of uniting together to obtain just treatment from the authorities. If I err in this, I would suggest that the members of the various medical boards in the London districts should hold a meeting on the earliest Sunday possible, to discuss and decide upon the necessary steps to be taken, in order to ameliorate and improve our present unenviable position. I suggest Sunday, for it is the only day we have free during the week. On Saturday we work the normal number of hours.—I am, etc.,

May 27th. A BELIEVER IN ACTION.

A WAY TO HELP ABSENT DOCTORS.

SIR,—The present and future financial needs of doctors on service must be great, but the contributions available are small. It seems to me that one proper source is neglected. Many doctors at home are doing war work gratis for the sake of their country, either from patriotism pure and simple, or partly for the sake of gaining credit, or even sometimes from laziness in face of the effort required to obtain remuneration due.

I think that where the medical man does not himself want this money—which he has as a rule more than earned—it is due to his profession, and should be devoted to those who have suffered financially by their patriotism, and that every man entitled to remuneration should make a point of using every effort to obtain money for his war services at home for the sake of those at the front when he does not need it himself.

I understand that many doctors have foregone fees for examining recruits, attending to soldiers on furlough or quartered locally (Army Forms O. 1666 and 1667), or doing V.A.D. hospital work. In many cases a great deal of persistence in application is required, and even then I know from personal experience payments that are due are often impossible to obtain. I have not yet been able to obtain payment for contract attendance on troops quartered locally, or payment for attendance on single soldiers (Army Forms O. 1666 and 1667) in many cases years old by now, or even for examining recruits under the Derby scheme, December, 1915; but I am now trying to obtain all that I can, and feel sure that if the plan were generally adopted much money might be obtained for the most needy and deserving of the profession, and perhaps if the British Medical Association itself gave a hand, or the secretary of one of the benevolent funds were authorized to collect for it, even more might be obtained.—I am, etc.,

May 16th. AN OVERWORKED PROFITEER.

THE GRIEVANCES OF TERRITORIAL MEDICAL OFFICERS.

SIR,—It would go a long way towards removing these grievances and be a very simple method if Mr. Churchill's Committee were to recommend that each year of continuous mobilized service of these officers should count two towards promotion and gratuity. The effect of this would be, if the war ends this year, that captains would obtain their majorities at the end of nine years' service and majors be promoted lieutenant-colonels at the end of twelve years' total service. It would double the gratuity to be paid at the end of the war and thus reduce the discrepancy between the remuneration of the Territorial and temporary officer. Further, accelerated promotion, I think, will induce men to remain in the Territorial Force after the war, but without some such inducements very few men will wish to retain their Territorial commissions, but prefer to bargain with the War Office for their services should occasion arise.—I am, etc.,

May 25th. O.C.

SIR VICTOR HORSLEY.

SIR,—Last July came the news of Sir Victor Horsley's death in Mesopotamia. We ought to have some record of his life and of his work; we cannot afford to forget him and what he did for medicine and surgery. I am collecting notes for a book; I hope that it will plainly show what we lost when we lost him. I ask for help in this venture from his friends and colleagues, and from the many patients, in hospital practice or in private practice, who have reason to be thankful for his skill and his kindness. I want all that they can tell me of him, and any letters of his which they will let me use. Without their help nothing that I can write of him will be of much service to anybody. Great care will be taken to return all letters.—I am, etc.,

STEPHEN PAGET.

21, Ladbroke Square,
London, W. 11,
May 28th.

The Services.

EXCHANGES.

M.O., attached to an infantry battalion in France, desires to exchange with a M.O. in an ambulance train, Red Cross barge, motor ambulance convoy, or fever hospital.—Address, No. 1593, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

Would an officer on Home Service care to exchange with an officer holding appointment on Lines of Communications? Easy exchange from this to Front Line could be arranged if desired. Territorial Officer preferred.—Address, No. 1650, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

Universities and Colleges.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE Secretary of the College has issued to the Fellows the annual official circular, informing them that a meeting of the Fellows will be held at the College on Thursday, July 5th, at 3 p.m., for the election of three Fellows into the Council in the vacancies occasioned by the retirement in rotation of Mr. W. Harrison Cripps and Mr. V. Warren Low, C.B., and by the death of Sir Frederic Eve. Blank forms of the requisite notice from a candidate and of his nomination may be obtained on application to the secretary, and the same must be received by him duly filled up within ten days from this date—that is, not later than on Friday, June 8th. A voting paper will be sent by post to each Fellow whose address in the United Kingdom is registered at the college on Tuesday, June 19th.

SOCIETY OF APOTHECARIES OF LONDON.

THE diploma of the Society has been granted to Messrs. J. Y. Dent, S. G. K. Kastelianski, R. H. Pettersson, F. A. Unwin, and L. J. Vincent.

Obituary.

FLEET SURGEON FLEETWOOD BUCKLE, R.N. (retired), died at Southsea on April 9th, aged 76. He was educated at St. Bartholomew's Hospital, and took the diplomas of L.S.A., L.R.C.P.Lond. and the degree of M.D.St.Andrews in 1862, and the M.R.C.S. in 1865. He entered the navy shortly afterwards: he attained the rank of fleet surgeon on May 26th, 1886. He had a long list of war service. He served as assistant surgeon of H.M.S. *Bristol*, flagship of Commodore G. T. P. Hornby, on the West Coast of Africa, taking part in various boat expeditions, when he was wounded in the hip, and went through a severe epidemic of yellow fever, for his services in which he received the thanks of the Admiralty. He was surgeon of H.M.S. *Alexandra*, flagshipof Admiral Sir Geoffrey Hornby, at the passage of the Dardanelles in 1877. He was deputed to inspect the field hospitals and field ambulances in the Shipka Pass during the Russo-Turkish war of 1877–78, for which he received the Turkish war medal, and the thanks of the Stafford House Committee. In 1880 he was staff surgeon of H.M.S. *Kingfisher* on the West Coast of South America, and received the thanks of the Chilian Government for his services to the wounded in the battles round Lima in the war between Chili and Peru in 1880. In 1881 he was entertained at a public banquet and presented with a valuable ring by the staff of the Panama Canal Company in recognition of his services in an epidemic of yellow fever at Panama. In 1884–85 he served with the Royal Marines at Suakin and in the operations in the Eastern Sudan, being present at the battle of March 24th, 1885, and receiving the Egyptian medal with a clasp and the Khedive's bronze star. On September 13th, 1891, he was awarded a Greenwich Hospital pension.

ALTHOUGH Dr. WILLIAM BOOTH of Edinburgh retired from active practice some ten years ago, he was until quite recently often to be seen in the south side of Edinburgh, and he continued to minister to the needs of a small number of his former patients who were his personal friends. He was the fourth son of the late Rev. Patrick Booth, M.A., minister of Innerkeithen. In his early years he spent some time at sea, and he was consequently a little more senior than most students when he took the L.R.C.P. and F.R.C.S.Edin. in 1886. He acted for a time as demonstrator in anatomy at the College of Surgeons and as medical officer at the Provident Dispensary, Marshall Street, Edinburgh. He built up, and until his retirement he carried on, a large private practice. He became a member of the Edinburgh Medico-Chirurgical Society in 1888, and a Fellow of the Edinburgh Obstetrical Society in 1891. He died at his house, 2, Minto Street, on May 7th, and was buried in the Grange Cemetery on May 10th. He was in his 53rd year, and he leaves a widow.

DEPUTY SURGEON-GENERAL JAMES FAIRWEATHER, Bengal Medical Service (retired), died at Forest Hill, Beaumont, Jersey, on April 29th, aged 88. He was born on October 19th, 1828, the son of James Fairweather of Brechin, and was educated at Edinburgh University, where he graduated M.D. in 1851, taking the L.R.C.S.Edin. in the same year. He entered the I.M.S. as assistant surgeon on August 4th, 1855; became surgeon on August 4th, 1867; surgeon-major on July 1st, 1873; brigade-surgeon, when that rank was first instituted, on November 27th, 1879; and retired with a step of honorary rank on October 19th, 1880; also receiving one of the extra compensation pensions in the first year when these pensions were given. He served on the North-West Frontier of India in the Bozdar campaign in the early part of 1857, receiving the frontier medal with a clasp; and in the Indian Mutiny in 1857–58, when he took part in most of the big fighting, including the siege and capture of Delhi; the actions of Bulandshahr, Aligarh, and Agra; the relief of Lucknow; the defeat of the Gwalior contingent at Cawnpore; the action at Shamshabad; the siege and capture of Lucknow; the action at Aliganj, and capture of Bareilly, receiving the Mutiny medal with three clasps.

DR. JOHN KEARSLEY MITCHELL of Philadelphia, son of Dr. Weir Mitchell, died on April 10th, at the age of 57. He graduated in arts at Harvard in 1880, and in medicine at the University of Pennsylvania in 1883. He was at one time lecturer on medicine in the medical school of that university, and for many years he was physician to the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases. He collaborated with his father in the well-known work entitled *Fat and Blood*. In 1895 he published a monograph on the remote consequences of injuries of nerves, and in 1904 one on mechano-therapy, massage, and physical education.

PROFESSOR DOMENICO DE SANCTIS, lecturer on pathology and clinical medicine in the University of Naples, was killed recently in a railway accident near Padua while on his way home from the front for a short period of leave. He held the rank of captain in the medical service of the Italian army. He was the author of many writings, among which may be mentioned researches on micro-organisms in the faeces of the subjects of exalnria which transform carbohydrates into oxalic acid.

DIOSCORIDE VITALI, formerly professor of pharmaceutical chemistry in the University of Bologna, has died at Venice at the age of 85. He began life as a pharmacist at Pisoenza, his native place; in 1859 he fought under Garibaldi and Bixio. After the peace of Villafranca he became director of the dispensary of the Pisoenza Hospital, and on the death of Francesco Selmi was appointed professor of pharmaceutical chemistry at Bologna. He was greatly appreciated as a teacher by generations of pupils and gained a high reputation as an investigator. He was the author of more than two hundred publications embodying the results of original research. Among them are studies on the crystals of the blood, on blood stains, on bile acids and pigments in the urine, and on acetone.

Medical News.

MR. S. W. WOOLLEY has succeeded Mr. Peter MacEwan as editor of the *Chemist and Druggist*.

DR. J. B. MENNELL, who is in charge of the massage department of the Military Orthopaedic Hospital, Shepherd's Bush, has written a book on massage which will shortly be published by Messrs. J. and A. Churchill.

THE Marquis of Crewe, as chairman of the London County Council, appeals on behalf of the Children's Country Holidays Fund, 18, Buckingham Street, Strand, W.C. Reports show that there are many children for whom nothing but a country holiday can be prescribed, and who, lacking this, will suffer in health throughout the year.

AT the Brighton Grove Military Hospital, Newcastle-upon-Tyne, Lieutenant-Colonel R. A. Bolam, R.A.M.C. (T.F.), concluded on May 20th a course of six lectures and clinical demonstrations on venereal diseases to medical practitioners. Dr. Hudson subsequently presented a silver salver to Colonel Bolam in the name of fifty-five subscribers and spoke of the appreciation of those present of the value of such lectures and demonstrations, especially when given by a teacher of so much experience and power.

THE Association of Municipal Corporations has considered the proposal to form a Ministry of Health, and at the next meeting of the Council of the Association on June 14th a resolution will be proposed to the effect that inasmuch as the care of the public health calls for the exercise of wide powers of local government touching the lives of the people at many points, and involving questions not only of public medicine, but also of engineering, economics, and finance, any further consolidation, or expansion, of public health powers should be obtained by development of the present organization, and the recognition of the Local Government Board as the central public health department.

THE twenty-first annual meeting of the Asylum Workers' Association was held on May 14th at the Mansion House, with the Lord Mayor in the chair. The Lord Mayor laid stress upon the claim to public sympathy and appreciation of those ministering in asylums, a point further enlarged on by Cardinal Bourne, by Bishop Ryle, and by Sir G. Wyatt Truscott. In proposing the re-election as President of Sir John Jardine, Bt., M.P., Sir J. Crichton-Browne referred to the better realization by the nation of the value of its hospital nurses, and trusted that this appreciation might be extended also to mental nurses, whose work for the community, if less in evidence, was equally valuable and often more trying. Sir R. Armstrong-Jones spoke of the improvements in asylum nursing arrangements within his own experience, and Sir George Savage of the improved status of the asylum nurse. Sir Frederick Needham emphasized the present call for food economy in asylums, and Dr. Hubert Bond supported the claim to recognition of duly trained mental nurses in any scheme for the State registration of nurses generally. Owing to Dr. Farquharson Powell's absence on active service, Dr. G. E. Shuttleworth is again acting as honorary secretary of the association.

THE Ivory Cross is the name now adopted by the National Dental Aid Fund. Thanks to the patriotism of the dental profession, who gave their services on a hospital basis and have consented again to do the same, 15,000 men were treated, and two thousand sets of artificial teeth were supplied by the Soldiers' and Sailors' Dental Aid Fund, at a cost of £5,000, the office expenses being less than ½ per cent. The War Office and the Admiralty having now made their own arrangements for the overseas armies and the Royal Navy, the National Dental Aid Fund, under its new name, intends to carry on similar work for men discharged from the services, for the home army, the mercantile marine, and the necessitous poor, including mothers and children. A public meeting will be held at the Mansion House, London, on Tuesday next at 3 p.m., under the presidency of the Lord Mayor, to help the development of this new work. Among the speakers announced are Lieutenant-General Sir Francis Lloyd, K.C.B., General Officer Commanding the London District; Sir Arthur Newsholme, Medical Officer to the Local Government Board; Sir StClair Thomson, Miss Lilian Braithwaite, and Miss Irene Vanbrugh.

THE third part of the first volume of a review of current Japanese medical literature by the staff of the research department of the Severance Union Medical College, Seoul, Korea, issued by the director, Dr. Ralph G. Mills, contains an abstract of a paper by R. Inada, Ito, Hogie, Ido, and

Oagika on a preventive serum for *Spirochaeta icterohaemorrhagiae* which appeared in *Saikin Gaku Zasshi*, the Japanese journal of bacteriology (No. 247, 1916). Milk containing spirochaetes in the proportion of ten organisms to the field was treated with carbolic acid to make a 0.5 per cent. solution, and the supernatant fluid, after centrifugalization, was injected into marmots. For injection into the human subject the amount was thirty times as great, and doses of 0.5, 1.0, and 2.0 c.cm. were injected within five days. The serum was found to have a weak immunizing action after ten days. Serum from marmots immunized with a mixture of highly immune horse serum 0.01 c.cm. and milk culutre (ten organisms to the field) 1.0 c.cm. was used for treatment at intervals of five to six hours until a total of 60 c.cm. had been injected. In the first 35 cases the serum from convalescent patients was found to be very effective in sterilizing the blood early in the disease. This work may be regarded as an extension of the researches of certain other Japanese investigators to which reference was made in the BRITISH MEDICAL JOURNAL of February 17th last, on page 230. In a paper on rat-bite disease (*Ji Kwa Zasshi*, the Japanese journal of paediatrics, No. 191, 1916), D. Koshira states that the cause was found to be a spirochaete to which the rabbit is particularly susceptible and which gradually loses its virulence by frequent passage through animals. As the result of clinical observation and animal experiment he has found that the Wassermann reaction is usually present and that the ulceration is curable by neo-salvarsan.

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

THE telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are: (1) EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand London*; telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand London*; telephone, 2650, Gerrard. (3) MEDICAL SECRETARY, *Medisecra, Westrand London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

ANSWERS.

SPHAGNUM MOSS DRESSINGS.

IN reply to a question by "Commandant" as to the mode of use of sphagnum moss dressings, Lieutenant-Colonel Charles W. Cathcart, F.R.C.S., R.A.M.C.(T.), writes from the Edinburgh War Dressings Supply, 37, Palmerston Place, Edinburgh: These dressings are specially useful for wounds which suppurate freely. In such wounds the best results will be obtained when the moss is applied damp. A thin layer of gauze is wrung out of a warm antiseptic lotion and laid on the wound; over this, and overlapping it freely, are placed the damp bags of moss, in number as required. After each bag has been wrung out of the warm lotion the contained moss must be lightly opened out with the fingers; this is done easily owing to the elasticity of the material. Lastly, the bags are held comfortably in position with a bandage. This treatment of the moss bags is recommended whether the dressings are in the loose or compressed form, and whether they have been sublimated or sterilized by steam. The method has given great satisfaction at the Edinburgh War Hospital, Bangour.

LETTERS, NOTES, ETC.

STIGMATIZATION AND SUGGESTION.

DR. JOHN REID (London, W.C.) writes, with reference to the paragraph under this head, published May 26th, p. 691: As no doubt St. Francis's mind was ever dwelling on the wounds on His hands and side, it requires no great stretch of the imagination to place the so-called stigmata to unconscious acts during sleep or reverie.

RHUBARB LEAVES.

DR. WILLIAM BRAMWELL (Liverpool) points out that a very slight knowledge of the processes of assimilation and metastasis in plant life would show that the chemical constituents of root, stem, or leaf may so differ that the public should be warned against making experiments in their diet with any parts of vegetables which are not recognized foodstuffs. He endorses Dr. Tebb's reference in the JOURNAL for May 19th, p. 668, to the possibility of washing soda rendering oxalates soluble in the process of cooking. In view of this chemical action it would, perhaps, be unsafe to eat rhubarb or tomatoes at a meal which included cabbages or peas boiled with soda. Dr. Bramwell recalls that in the JOURNAL of November 22nd, 1902, and May 20th, 1916, he drew attention to the toxic effects of spring rhubarb.

GLYCERIN OF BORIC ACID, *B.P.*

MR. GEORGE LUNAN, F.C.S., pharmaceutical chemist (Edinburgh) writes: This is not a glycerin of boric acid but a glycerin of glyceryl borate. In view of the proposal to eliminate it from the *B.P.* on account of the want of added antiseptic power from the glycerin solvent property, it would be well to bear in mind its chemical composition and its consequent therapeutic properties when applied to mucous surfaces. Glycerine of glyceryl borate is decomposed into glycerin and nascent boric acid, which from concentration is precipitated, and in contact with albuminous surfaces yields the at least partial colloidal activity of the antiseptic. By no other solvent means can this be attained when exhibited in a throat paint. While not disputing the relative potency of boric acid as an antiseptic when dissolved in comparatively weak solutions of water or glycerin, it should be borne in mind that the formula for glycerin of boric acid in the *B.P.* is constructed for the special purpose of the reaction, and this entirely nullifies theoretic antiseptic values for germicidal purposes.

MEDICAL ECONOMIES.

A RESPECTED correspondent alleges that the following lines were recently rediscovered in a Mesopotamian *tel*. The date, he admits, is uncertain, but the analogies are sufficiently modern to make us doubt the strict accuracy of his covering letter.

Simples Simplified.

(Report by the —— Hospital Staff on War Emergency.)

Surgeon:
To save a limb, to save a life,
Needs no elaborate machine;
I'll manage nicely with a knife
And Iodine.

Physician:
'Twixt life and death to bridge the gulf
Were many drugs, but if you mean
To cut them down, leave me Mag. Sulph.
And some Strychnine.

Obstetrician:
I'll sally forth without a fuss
At dawn or dusk or in between
If only I've my forceps *plus*
Pituitrin.

Anaesthetist:
This latest plan of war reform
Brings me a chance quite unforeseen,
I'll toddle round with chloroform
And Tab. Morphin.

Ophthalmologist:
An ophthalmologist can cope
With eyesores of the great and mean
When armed with an ophthalmoscope
And atropin.

Rhinyngotologist:
I'll manage ears and throats and noses
More deft than I have ever been,
With forceps, speculum, and doses
Of cocain.

Dermatologist:
I'm not at all ashamed to state
My only drugs have always been
Just Ung. Hydrarg. Ammoniat.
And paraffin.

Omnes:
And should the last of drugs and grub
Find bottom through the submarine,
Is there aught else? Ay, there's the rub,
And Nicotin.

T. P. B.

Mesopotamia Expeditionary Force.

The Hunterian Oration
ON
BRITISH MILITARY SURGERY IN THE TIME OF HUNTER AND IN THE GREAT WAR.

DELIVERED BEFORE THE ROYAL COLLEGE OF SURGEONS OF ENGLAND ON FEBRUARY 14TH, THE ANNIVERSARY OF HUNTER'S BIRTH.

BY

SIR ANTHONY BOWLBY, K.C.M.G., K.C.V.O., C.B.,
MAJOR-GENERAL A.M.S.; CONSULTING SURGEON, BRITISH ARMIES IN FRANCE; SURGEON IN ORDINARY TO H.M. THE KING.

In the year 1792 John Hunter finished the last of his works, and dedicated it "To the King."

"May it please your Majesty,

"In the year 1761 I had the honour of being appointed by your Majesty a surgeon on the staff in the expedition against Belleisle.

"In the year 1790 your Majesty honoured me with one of the most important appointments in the Medical Department of the Army, in fulfilling the duties of which every exertion shall be called forth to render me deserving of the trust reposed in me and not unworthy of your Majesty's patronage.

"The first of these appointments gave me extensive opportunities of attending to gunshot wounds, of seeing the errors and defects in that branch of military surgery and of studying to remove them. It drew my attention to inflammation in general, and enabled me to make observations which have formed the basis of the present Treatise. That office which I now hold has afforded me the means of extending my pursuits and of laying this work before the public."

This dedication is dated "Leicester Square, May 20th, 1792," although Guthrie states that "the work was not published until 1794"—that is, the year after Hunter's death; but in spite of the fact that more than thirty years had passed since the period of Hunter's active service before he published his *Treatise*, yet his interest in what he had seen at Belleisle remained so keen, and his description of individual cases is so vivid, that it might easily be supposed he was describing events of very recent occurrence. The whole *Treatise* is quite short, and occupies only fifty-six pages in the octavo edition of 1828.

In the *Roll of Commissioned Officers in the Medical Service of the British Army*, by the late Colonel William Johnston, C.B., published in 1917, Hunter's record reads as follows:

John Hunter, surgical staff, Great Britain, October 30th, 1760. Half pay 1764. Full pay, assistant surgeon-general January 4th, 1786. Surgeon-general and inspector of regimental hospitals March 17th, 1790. Died October, 1793. Belleisle 1761. Portugal 1762.

An interesting fact which is not commonly known is supplied in this brief statement, for it appears that Hunter had acted as "assistant surgeon-general" for four years before his appointment as surgeon-general.

At the time when Hunter went to Belleisle, just two hundred years had passed since Ambroise Paré had published his collected works, and it is not too much to say that military surgery had not advanced materially since his death in 1590. This lack of development was certainly not due to lack of opportunity, for the two hundred years had been years of war, and firearms had quite replaced the arrows and bolts which in Paré's day were still frequent causes of injury, in spite of the then recently invented culverins and arquebuses.

A hundred years later than Paré, the great English surgeon Wiseman had written the most important treatise published since the time of the French master, and in the same year that saw the attack on Belleisle, Ranby, who had attended King George II in his Flanders campaign, published a little book on gunshot wounds. In France the successor of Paré was Le Dran, who in 1740 produced a considerable work on gunshot wounds based largely on Paré, and it would appear that the authors I have here enumerated were the only guides to whom Hunter could have turned for help and counsel when he set out to the wars. It is, however, noteworthy that he does not refer by name in his *Treatise* to any surgical author at all, and that on the other hand he notes: "Little has been written on the subject . . . and what has been written is so superficial that it deserves but little attention." It was indeed left for the following century to provide at its very commencement the men whose work, expanding and extending that of Hunter, laid the foundations of the military surgery of the nineteenth century, and the names of Larrey in France and Guthrie in England will for ever be associated in this connexion.

HUNTER'S WAR EXPERIENCES.

It is of interest to glance for a moment at the wars of John Hunter's lifetime. Marlborough's campaigns had ended in 1711, before Hunter's birth, after his successful but fruitless attack at Arleux on the French line of trenches which lay across France from Namur to the sea at Montreuil; but Hunter was a youth of 17 years when, in the campaign of 1745, the battle of Fontenoy was fought. From that time until shortly before the attack on Belleisle there was a lull in the fighting, and again, after 1763, there ensued a long period of peace, as far as England was concerned, except for the wars in America and India. It thus happened that the opportunity for further work in military surgery was lacking, and Hunter's careful notes of his cases made in 1761 remained without the additions which further wars would no doubt have provided.

His experience of military surgery in the field was thus limited to the Belleisle and Portuguese expeditions, and a brief description of these little known naval and military operations in which Hunter served will not, I think, be out of place. To Mr. A. D. Cary, the librarian of the War Office, I am much indebted for some of the following details.

BELLEISLE.

The first of these expeditionary forces consisted of about ten thousand troops under the command of General Hodgson, and was escorted by a powerful squadron of eight ships of the line and several frigates under Admiral Keppel. Its object was the capture of the island.

Belleisle is off the coast of Brittany, and is about twelve miles in its greatest length and about five miles in its greatest width. It is surrounded by precipitous cliffs, and forms a natural fortress. The chief town was on the northern edge of the island, and was protected by a citadel, garrisoned by about 4,000 men under the command of the Chevalier de Saint Croix. According to the French historian, this garrison was very insufficient, and

Saint Croix, in order to deceive the British as to its numbers, mounted fifty volunteers on farm horses of the island, his efforts being admirably seconded by the female population. The women asked permission to help in this deception, and formed a squadron clothed in red capes. Those who had no horses mounted cows. (Waddington's *La Guerre de Sept Ans.*)

The first attack took place on April 8th, and after an initial success resulted in the repulse of the British with a loss of about 450 killed, wounded, and prisoners. Of these there were rescued 75 British wounded, and there were also captured 54 wounded Frenchmen. All these appear to have been taken for treatment to the ships. A second attack on April 22nd was successful in occupying the island and driving the defenders into the citadel, where they withstood a siege for nearly two months, and finally surrendered on June 7th.

The French estimate of their own losses was 200 killed and 450 wounded, while Fortescue states that "the losses of the British throughout the whole of the operations were about 700 killed and wounded," and he adds: "Thus was Belleisle secured as a place of refreshment for the fleet." It was restored to France on the conclusion of peace in 1763.

PORTUGUESE EXPEDITION.

After the capture of Belleisle, Hunter remained as one of its garrison for nearly a year, for it was not until the summer of 1762 that the opportunity came for some of the troops to embark on an expedition to Portugal, and there is no doubt that he accompanied this force. The explanation of this event is thus described by Fortescue:

The Spaniards on the pretext of Portuguese friendship with England, in April, 1762, invaded Portugal, overran that country as far as the Douro from the North, and threw another force against Almeida from the East. The injured kingdom appealed to England for help, and in May orders were sent to Belleisle for the departure of four regiments of infantry together with a detachment of the Sixteenth Light Dragoons to Portugal. Two more regiments were added from Ireland, bringing the total up to about 7,000 men. (Fortescue's *History of the British Army*, vol. ii, p. 546.)

The force stood on the defensive to cover Lisbon and the line of the Tagus, but on August 27th Brigadier-General

Burgoyne, with 400 troops and the grenadier company of the Buffs, surprised and annihilated a regiment of Spanish infantry and took Valencia, with very few casualties. On October 4th another attack again took the enemy by surprise and resulted in the capture of six guns and other booty, with great loss to the Spaniards, but at the cost of only one man killed and eight wounded to the British. The results of this expedition are thus summed up in the *Historical Records of the Third Foot (the Buffs)*:

> This advantage being obtained at a critical moment was attended with important consequences: the enemy was disheartened; the season for military operations was far advanced, heavy rains fell, the roads were destroyed, and the Spaniards fell back to their own frontiers. Thus Portugal was saved by British valour and British skill.

Hunter as an Army Surgeon.

Such, in brief, were the two expeditions in which Hunter saw active service, and it would appear that in Portugal there were very few casualties.

It is probable that in the Belleisle expedition the wounded numbered about 500, although by no means all of them could have been under Hunter's care. It is, however, likely that some of the patients were kept on the island until they had recovered, and so were under treatment for a long time. It is also evident that a certain number of the French wounded were left to the care of the British surgeons, for it was provided by Article XI of the capitulation that "the officers and soldiers who are in hospital in the town and citadel shall be treated in the same manner as the garrison, and after their recovery shall be furnished with vessels to carry them to France."

The actual position occupied by Hunter during his stay on the island has hitherto been somewhat uncertain. I have, however, been fortunate enough to be supplied by Professor F. Wood-Jones with a letter which shows that Hunter was not merely one of a surgical staff, but was in charge of the hospital, for, in addition to his appointment as "Staff Surgeon," he is described as the "Deputy Purveyor," and in that capacity he was supplied by the Government with money to be spent on the hospitals by himself. The letter, dated April 12th, 1762, was written only a short time before the forces at Belleisle were embarked for Portugal. It is as follows:

> Belleisle,
> 12 April, 1762.
>
> Sir,
>
> The Hospital here being in want of money as appears by a letter sent to me this day by Mr. John Hunter the Deputy Purveyor thereof, a copy of which is hereunto annexed, I have in compliance therewith issued my warrant to you of the same date as this letter for the sum of Two Hundred Pounds payable to the said Mr. John Hunter for the use of the said Hospitals, without deduction, but upon account, and do hereby direct and desire (as the Lords of the Treasury have not issued any money to you for the contingencies of this garrison) that you will pay the same out of the money which you have in your hands for the subsistence of the Troops here.
>
> I am, Sir,
> Your most humble servant,
> H. A. Lambart,
> Brigadier Commanding in chief H.M. Forces at Belleisle
>
> To Charles Bembridge, Esq.,
> Deputy Paymaster General to
> Forces at Belleisle.

An examination I have made of the *Journals of the House of Commons* has disclosed payments as follows:

> Dec. 27th, 1761. To John Hunter, Esq., for the use of the Hospitals, £200 0s. 0d.
> March 20th, 1762. To John Hunter, Esq., for the use of the Hospitals, £200 0s. 0d.
> Ap. 12, 1762. To John Hunter, Esq., for the use of the Hospitals, £200 0s. 0d.

It would thus seem that Hunter was both staff surgeon and the chief administrator of the British hospital at Belleisle. Small though the number of wounded was in those days compared with the tens of thousands of the present day, it is evident that at Belleisle it was sufficiently large to provide Hunter with food for much thought and study. He had no other duty except to care for his soldier patients, no other problems to solve save those of gunshot wounds, and we can picture him on the sea-girt cliffs pondering over the questions which presented themselves to his busy brain, and shaping the newly born thoughts of inflammation suggested by his first experience of war.

It seems to me very possible that we owe more to that period of contemplation on the remote island of Belleisle than has ever yet been guessed, and, as we find Hunter himself saying of his experience of war thirty years later, "It drew my attention to inflammation in general," we shall not be far wrong if we conclude that the germs of much of his most important later work were brought to life in the quietude which followed the siege and capture of the citadel.

THE MILITARY MEDICAL SERVICES IN THE EIGHTEENTH CENTURY.

At the time of Hunter's appointment as surgeon-general in 1790 the army had but one physician-general and one surgeon-general, who were selected from the ranks of eminent civilian practitioners of the day, and it was the duty of the first to supply physicians to the army, and of the second to examine all candidates for appointments as surgeons. The surgeon-general also recommended surgeons and "surgeons' mates" for appointments to hospitals and regiments.

In peace these duties were not arduous, for the standing army was small; but when in 1793 we were obliged to raise ever-increasing armies for the war in Flanders, it became impossible to provide the necessary surgical staffs. Hunter must have had many anxious hours at a time when his health was failing, for his own death occurred within six months of the declaration of war. I will therefore ask you to consider the condition of the medical services in the eighteenth century, and the difficulties which were inherent in supplying the troops with efficient medical officers.

Status of Army Surgeons.

The Army Medical Service, both before and during Hunter's lifetime, left very much to be desired, and the pay and status were such that they offered no inducement to men of skill or learning.

John Woodall, writing in 1639 in his book *The Surgeon's Mate*, says:

> And for the surgeons in his Land service he (the King) alloweth to the Surgeon-Major of the whole camp five shillings a day. Also his Majestie alloweth to each Surgeon two shillings and sixpence a day, which is three pounds and fifteen shillings a month, and to each Mate three pounds a month. . . . And further His Highness hath referred to the ancient Masters and Governors of our Society (i.e., the company of Barber-surgeons) the pressing of all Surgeons and Surgeons' Mates or servants to Surgeons and Barbers.

It is therefore evident that, as the pay was not a sufficient inducement, surgeons were "pressed" or forced, as seamen were forced by press-gangs, to join the service when war called for surgical help.

More than a hundred years later, and consequently after Hunter's experience at Belleisle, the inducements to serve were still not improved, for in 1787, only three years before Hunter's appointment as Surgeon-General, Robert Hamilton wrote:

> Each regiment is allowed a Surgeon, as he is termed, and a Surgeon's Mate. Their business is to attend to the diseases of the men at all times whenever it is judged necessary. For this service the surgeon is allowed four shillings a day; the mate three and sixpence. But out of this are levied from them considerable duties; from the surgeon a shilling, and from the mate sixpence a day. This makes their subsistence equal, so that each is limited to a guinea a week, and on this they must subsist as well as they can.

The pay of John Hunter as staff surgeon is uncertain, but was probably ten shillings a day, for I find in the *History of the Standing Army*, 1660-1700, by Colonel Walton, that a "Master Surgeon-Staff" had 10s. a day at that period, and the pay probably remained at the same figure in 1761. He was also paid 10s. a day as the deputy purveyor. There is no doubt that Hunter joined the army for the Belleisle expedition chiefly in order to obtain a change of duties and surroundings after illness and overwork in London, and when the war came to an end he returned to his studious life, and started practice in Golden Square at the age of 35.

It is evident that one of the chief causes of inefficiency in the Army Medical Service in the eighteenth century was the custom of employing ignorant and often uneducated men as "surgeons' mates." The mate was the assistant of the surgeon and was usually unqualified, except that he might have been a surgeon's apprentice in civil practice. Some few, it is true, were well educated men who had attended lectures on anatomy, surgery, and medicine, but all of them were only "warrant officers,"

and did not hold commissions. So long as there was no war to make demands for an increase of the staff of surgeons, the evil was not very great, but in 1793, on the outbreak of war with France,

> an increase of the hospital establishments of the army became necessary, and, the pay of "hospital" mates being higher, many "regimental mates" transferred to the hospitals as "hospital mates." An increase in the number of surgeons led to the promotion of many regimental mates, and many also purchased commissions. (Colonel Johnstone.)

The result of this was, first, that many of the men who now held commissions as surgeons were very ignorant fellows; and second, that the places of the promoted mates were filled by men of low class, most of whom had no surgical knowledge at all, but were yet in control of the treatment of hundreds of men. For example, we read that on one occasion

> five hundred invalids were embarked from Arnheim in barges under the care of a single surgeon's mate without sufficient provisions, and without even straw to lie on. (Fortescue, *British Campaigns in Flanders*.)

Effects of Maladministration on the Health of the Army.

But not only was the pay and status of the surgeons bad, the administration of all the army was on a thoroughly unsound footing, for after Marlborough's time its efficiency, or the reverse, depended on the Minister in power in England for the time being. Military history shows that in the campaigns of 1793 and 1794, just when Hunter's work was published, mismanagement and incapacity in the Government had reduced the whole army to a state of inefficiency and chaos. Thus, Fortescue writes:

> The men were imperfectly disciplined, there were no efficient company officers to look after them; no efficient colonels to look after the company officers; no generals to look after the colonels. . . . No effort was made to clothe recruits, who received a linen jacket and trousers, and many were sent on active service in this dress, without waistcoat, drawers, or stockings. (P. 372.)

So bad, indeed, was the supply of army clothing that greatcoats were supplied to some regiments by public subscription.

The medical service was such as might be expected when the army as a whole was in this condition, and the state of affairs in July, 1794, is described as follows:

> But the very worst department of all was that of the hospitals wherein the abuses were so terrible that men hardly liked to speak of them. . . . Some kind of a medical staff was improvised out of drunken apothecaries, broken-down practitioners, and rogues of every description who were provided under some cheap contract; the charges of respectable members of the profession being deemed exorbitant. . . . "The dreadful mismanagement of the hospitals is beyond description," wrote General Craig. (Fortescue.)

It will be noticed that this explanation of the rotten state of the medical service was the unwillingness to spend the money necessary for efficiency, and it requires but little study to realize that gross maladministration and peculation of public money were at the root of most of the troubles in all departments of the army.

Hunter had been appointed in 1790 to be "Inspector-General of Hospitals and Surgeon-General in the Army," but he had died on October 16th, 1793, before the break-down I have mentioned above. As far as I can ascertain, however, his authority did not in any case extend overseas, and, even had it done so, it is quite certain that he would have been powerless to check abuses which originated in maladministration of ministers in England, and which resulted ultimately in the armies being so starved of supplies of food and clothing that by November, 1794, there were eleven thousand sick out of a total force of infantry of twenty-one thousand. It is not too much to say that the collapse and defeat of the British forces in Flanders at that time were brought about more by the want of ordinary care for our troops than by anything else. Even the best medical service is powerless when no provision is made for the ordinary necessaries of life, especially if the combatant officers are as ignorant and inefficient as were very many at that time.

A Modern Contrast.

In the present war the splendid health of our armies has not been due solely to the work of the medical service during the war, good though that has been. It has also been due to the instruction of the combatant officers before the war in the value of good hygiene and of the proper care of the men in camps and billets. This, in its turn, has been supported by the abundance and excellence of the supplies of food and clothing which have everywhere followed our troops throughout the campaign in a never-failing stream; while the supervision and supply of drinking water, the precautions taken to destroy flies and to burn refuse, to inspect and cleanse billets, etc., have all contributed to save life and to avoid sickness. The result is that the invaliding rate from preventable disease in the fourth and fifth years of the present war has been no more than the same rate in times of peace, and, while the war in Flanders at the end of Hunter's life failed largely because of the immense loss to the forces caused by the sickness of the whole army, it is not too much to say that in the present war much of the efficiency and fighting power of the British troops has resulted from the good health and the consequent high spirits of all ranks.

The records of many sieges have proved that sick and half-starved men may hold on to a defensive position and fight well to the last, but it is only robust, vigorous, and thoroughly healthy troops who are capable of enduring the immense strain of pressing home for many weeks in rapidly succeeding battles such a strenuous and victorious offensive as that initiated by the British army on the ever-memorable day of August 8th, 1918, and consummated in the armistice of November 11th.

HUNTER'S WRITINGS ON MILITARY SURGERY.

It is very difficult to appreciate properly the value of Hunter's writings on gunshot wounds at the time of their publication, but their interest for surgeons can be better estimated if it is remembered that no one had previously written much about these injuries for many years, and that Hunter's great reputation and his position as Surgeon-General compelled the attention of every one connected with the medical service.

Superstition and ignorance had united to create the belief that there was something about a gunshot wound which rendered it quite unlike any other, and, to use Hunter's own words, "they have been considered apart from other wounds and are now become almost a distinct branch of surgery." He then proceeds to point out that they are essentially "contused wounds"; although they have certain peculiarities due to the passage of foreign bodies into the tissues, and that they should be treated on ordinary common-sense principles.

Hunter was the first clearly to appreciate and teach that in the gunshot wounds of his time "a part of the solids surrounding a wound is deadened . . . and is afterwards thrown off as a slough which prevents such wounds healing by the first intention." He pointed out how the separation of a slough might open a part of a large artery or a portion of intestine. He realized that "the greater the velocity of the bullet the cleaner it wounds the (soft) parts." He noticed that "when the velocity is small the direction of the wound produced by the ball will, in common, not be so straight, therefore its direction not so readily ascertained, arising from the easy turn of the ball."

He taught the much needed lesson of not interfering with any wound unless a definite object was to be gained. He wrote "we must see plainly something to be done for the relief of the patient by this opening (of the wound) which cannot be procured without it," and he was able by his influence and reputation to alter the practice of the routine opening up of every bullet wound regardless of any indication for doing so, which was a universal custom before he challenged it.

His descriptions of peritonitis following intestinal injury, and of infection of a haemothorax caused by a wound of the lung, are masterpieces of observation and perception, and his opinion that a haemothorax might be advantageously treated by emptying the blood from the pleura, coincides with the practice of the present day.

Primary and Secondary Amputations.

It is evident that Hunter felt, as all surgeons have felt, the difficulty of deciding the best time for the removal of a hopelessly smashed limb, and it seems also clear that his experience of "primary" amputations, with the primitive methods of that day, had been bad. The consequence was that he advocated delay, more especially when the lower

extremity was concerned, but it is not clear what period of delay he had in his mind, for he does not indicate at all how many days he would wait. Here is his view:

In general, surgeons have not endeavoured to delay it (amputation) till the patient has been housed and put in the way of cure; and therefore it has been a common practice to operate on the field of battle; nothing can be more improper than this practice, for the following reasons: In such a situation it is almost impossible for a surgeon in many instances to make himself sufficiently master of the case, so as to perform so capital an operation with propriety; and it admits of dispute whether, at any time and at any place, amputation should be performed before the first inflammation is over.

Again:

The only thing that can be said in favour of amputation on the field of battle is that the patient may be moved with more ease without a limb than with a shattered one . . . but it may be observed that there will be little occasion to amputate an upper extremity in the field, because there will be less danger in moving such a patient than if the injury had happened to the lower.

There is no doubt that modern surgeons would not agree that obviously necessary amputations should be delayed for several days, and would advocate their performance as soon as the condition of the patient permitted it. But we must remember that in the year 1760 methods of averting haemorrhage were very primitive, and that severe loss of blood from an operation which followed soon after the primary haemorrhage due to the injury might well prove fatal, when delay might have lessened the risk.

In 1815 Guthrie published his book on *Gunshot Wounds of the Extremities Requiring the Different Operations of Amputation*, and in it he strongly defended primary amputations, and opposed with excellent reason the advice given by Hunter. In this he was certainly in the right, and largely because his opinions were founded on a very extensive experience. Guthrie, at the time I allude to, was very young in years, for he was only aged 16 when he joined the army in 1801 as assistant surgeon. But the time he had spent in the Peninsular war had been a time of constant fighting, and his talents and skill had quickly earned for him a most responsible position in which he had opportunity for much operative surgery.

I therefore desire to direct attention to the results he quotes in support of his own views and in opposition to the advice of Hunter.

Guthrie's Statistics (Toulouse).

	Total.	Died.	Cured.	Per-centage of deaths
Primary operations on field of battle:				
Upper extremities	7	1	6	19
Lower extremities	40	8	32	
Total primary amputations ...	47	9	38	
Secondary operations in general hospitals:				
Upper extremities	15	3	12	41
Lower extremities	36	18	18	
Total secondary amputations	51	21	30	

Guthrie supplies the comment—"The medical duties, both in the field on the day of action and in the hospitals afterwards until the final evacuation of Toulouse, were more immediately under my observation and control"—so that it is clear that the figures given above represent the final results.

But I do not quote these figures merely for the purpose of showing that the practice of primary amputation was to be preferred to that of secondary, but to draw attention also to the fact that these results of primary amputation must be considered very good, and to ask how it was that these patients did so well. No doubt one very important reason was that at the end of the Peninsular war surgeons had become very expert in the art of removing a limb, for the amputation rate was exceedingly high, and in the battle of Toulouse itself no fewer than 98 patients lost a limb out of a total of 1,407 wounded, or about one in every fifteen. It must also be remembered that in many patients the injury which justified amputation in those days was not necessarily so severe as to induce a serious condition of shock, for many amputations were done, not so much because of the serious condition of the limb at the moment, as on account of the complications which could, by experience, be foretold. Thus, it was well known that in few patients with fracture of the femur could life or a useful limb be saved, and all wounds of the knee-joint complicated by any fracture were also treated by amputation. These are conditions for which in the present war we should very rarely advise removal of the limb, unless there were serious complications.

But although Hunter's advice to wait for amputation until "the first inflammation is over" was not accepted by his successors, it must be noted that we do not ourselves advocate operation "on the battlefield," nor should we in these days be satisfied as easily as Guthrie, who says "the military surgeon should never be taught to expect any convenience; his field-pannier for a seat for the patient and a dry piece of ground to spread his dressings and instruments upon are all that are required."

We should further note that Hunter himself advocates removal of a limb at once "if the parts are very much torn so that the limb only hangs by a small connexion," and also that "it may be necessary to perform the operation to get at blood vessels which may be bleeding too freely."

PRIMARY AMPUTATIONS AT THE PRESENT DAY.

In the first place, many surgeons besides myself have always advised that a completely shattered limb should be removed as soon as the patient can be brought into a field ambulance, unless his condition is such as to prohibit any operative treatment at all. There is no doubt in the minds of careful observers that the keeping of such a limb, even for a short time, is most prejudicial to the patient, probably to some extent because of the absorption of toxins from the smashed muscles; as soon as he is rid of it his condition improves. In proportion as shock is severe and the limb is nearly severed, it is not, however, advisable to do at once a formal amputation above the seat of injury, especially if the lower extremity be the one concerned, and it is enough at the moment to sever the remaining tissues with knife or scissors, to tie bleeding vessels, apply a dressing, and then to leave the patient to improve before more is done. This severance of the remaining tissues of the limb requires no anaesthetic, save a small dose of morphine and the tight application of a tourniquet, which causes so much numbness that no pain is felt from the procedure I have advocated. It is especially inadvisable to give chloroform or ether if the conditions require the early evacuation of the patient, or if a formal operation under an anaesthetic is to be shortly performed. A second administration of these anaesthetics after an interval of only a few hours has proved most harmful in such patients, and should certainly be avoided.

In other cases, where the limb is not completely shattered but yet requires removal, it is generally best to splint it carefully, and send the patient to a casualty clearing station, where he can be put to rest in a warm place and be carefully tended till he has recovered from the effects of the journey, has taken plenty of fluid, and has slept. After that, there is generally no object in further delay, but in many cases it is necessary, in order to get the patient into an "operable" condition, to administer fluid of some kind either by the rectum or by intravenous injection. For the latter purpose we have used with good results a 6 per cent. solution of gum arabic, or, if the loss of blood has been excessive, a pint or more of blood has been transfused, and by these means many lives have been saved.

I have already mentioned the inadvisability of two administrations of ether or chloroform, but when a patient is suffering from severe shock or haemorrhage even a single anaesthetization by either of these is very definitely dangerous, and may be quite enough to turn the scale in the wrong direction and prevent recovery. I believe that in such cases as we are considering it is safer to give no anaesthetic than to give chloroform, and ether is not much better. Far the best method of anaesthesia is the administration of gas and oxygen, and amputations may often be performed when the patient is under the influence of this anaesthetic which could not be done at all without it. I am indeed inclined to believe that the success of Guthrie and his contemporaries in primary amputations would have been diminished if chloroform could have been given, and I am quite convinced that it should never be employed in such patients.

During the present war we have gradually, but steadily, so improved our methods of treatment of men with severe shock caused by smashed limbs that we are now able to save patients by amputation of an extremity who would previously have died without operation being possible. We are also able to save very many limbs which would four years ago have been lost, and whereas in our longest established general hospitals about one patient in every hundred wounded men lost a limb in 1914–15, in the same hospitals during the past year amputations have been performed in only about one patient out of every 200.

GAS GANGRENE.

It is a curious fact that Hunter has practically nothing to say of the complications of gunshot wounds, and it is evident that those he saw left but little impression on him. In the present war the frequency of "gas gangrene" has greatly impressed all surgeons, for in civil practice it was practically unknown, and its frequency came as a rude shock to the aseptically trained operator. But if it be asked, "Did gas gangrene occur as a common complication in Hunter's time, and has it been of frequent occurrence in other wars?" I believe that the reply should be in the negative. My own belief is that in no previous wars has gas gangrene ever played so predominant a part as it did in France and Belgium in the early part of this war.

It must be admitted by all that acute gas gangrene is so striking and terrible a malady that it could not possibly have been overlooked if it were at all frequent. Yet I find no description of it in Hunter's work or in those of any of the early writers on war surgery, and although the latter wrote chapters on the subject of gangrene or "mortification" it is evident that they refer to that which is due to vascular lesions or else to an extensive smashing of a limb followed by sepsis. It is certain that the so-called "hospital gangrene," so fully described by Larrey as "*Pourriture des Hôpitaux*," was not gas gangrene, but a spreading septic ulceration which characteristically did not occur soon after injury, but rather in suppurating wounds, and was of the same nature as the "sloughing phagedaena" which not so many years ago was rife in wards for venereal diseases. Larrey's contemporary in the French army, Baron Percy, and Guthrie in the British army, give no description of a disease occurring in the Peninsular war resembling the gas gangrene of the present day. There is no mention of its occurrence and still less of its prevalence in the Crimean war; and Professor W. W. Keen, who himself served in the American war, writes to-day: "Personally I never saw a single case in the civil war."

Various French writers described cases of gas gangrene in the Franco-German war of 1870, but, although there is no doubt of its occurrence at that time, there is no evidence that it was generally prevalent.

Coming to still more recent times, gas gangrene never occurred in the South African campaign, and was of quite rare occurrence in the Russo-Japanese war. Finally, I have personally inquired of many surgeons who took part in the Balkan war of 1913, and there is no doubt in their minds that it was very seldom seen.

In the present war gas gangrene has been practically unknown in Mesopotamia, Egypt, or Palestine, and I am informed that it did not occur in the early days of fighting at Gallipoli, although it was occasionally seen later on. At the Salonica front it has been of comparatively rare occurrence, and it has not been prevalent on the Italian front.

It is well known that at the beginning of the war in France and Belgium the medical services of all the combatants were quite inadequate to deal thoroughly with the immense numbers of wounded. Most of the latter at the time of the retreat from Mons and in the fighting on the Aisne had to be evacuated to base hospitals before any surgical treatment could be carried out. There were practically no hospital trains in those days, and the railway services were so crowded with supplies for the armies that traffic of all kinds was exceedingly slow. The result was that the wounded, placed when opportunity offered in the luggage vans of empty returning supply trains, were frequently several days in reaching their destination after being wounded, and great numbers of them were suffering from extensive gas gangrene on arrival, or had succumbed to it *en route*.

During the ensuing first battle of Ypres and the succeeding winter it was still an exceedingly frequent complication. It diminished very much during the next summer, when there was also much less fighting, until the battle of Loos in September; during that battle it was much increased. In 1916 it was less evident until the heavy casualties of the battle of the Somme filled the hospitals with wounded, many of whom developed gangrene; during the fighting at Arras and Vimy in the cold and stormy spring of 1917 there were still very many cases, in spite of good surgical work at the front. From that time, now nearly two years ago, gas gangrene rapidly diminished, and during 1918 it was comparatively little in evidence, at any rate in its worst forms, as will be gathered from the following samples of figures from the base hospitals during heavy fighting.

Gas Gangrene in 1917 and 1918.

A. Of 5,270 consecutive patients from the Messines battle (in June, 1917) there were only 22 cases of gas gangrene.

B. Of 3,690 consecutive wounded at the beginning of the Passchendaele fight (in August, 1917) there were only 16 cases of gas gangrene.

C. Of 3,200 at a later stage of the same fight 7 cases.

D. Of 2,900 patients in July, 1918, there were 11 cases of gas gangrene.

E. Of 10,000 wounded in August, 1918, there were 27 cases.

It will therefore be seen that out of a total of about 25,000 patients at base hospitals in France only 83 patients had serious or "massive" gas gangrene; this is an incidence of about one case in three hundred wounded men, and many of these had multiple wounds or badly smashed limbs.

If the question is now asked as to the causes that account for the great diminution of this grave affection in 1917–18 it must first of all be noted that:

(*a*) The ascertained cause of gas gangrene is the presence of certain well-recognized anaerobic organisms which are present in highly dunged and cultivated soil, and are absent from that of the South African veld or the sun-dried sand of Egypt and Palestine, while they are present in small numbers and are apparently less virulent on uncultivated land in Eastern Europe.

(*b*) The organisms concerned have little power over healthy tissues, but they are resistant to the strongest antiseptics and grow freely in damaged muscle, especially if into the latter be thrust some foreign body rich with the organisms, such as a piece of muddy clothing. Some of the very worst cases are those where the "missile" is composed only of the mud itself driven with immense force by a shell or bomb exploding in muddy ground, and frequently causing a great number of small wounds, in some of which the mud may be driven right through the deep fascia or actually into the muscle sheath.

(*c*) Lowered vitality of the patient, due to exposure to wet and cold, to exhaustion from want of food, or to over-exertion, is a predisposing cause, as is also to a very serious extent the deprivation of blood supply, owing to injury of a large vessel. It is also clear that wet and cold weather and mud favour gas gangrene much more than heat and dust.

Such are the now well-recognized causes of gas gangrene and the conditions in which it may be expected to occur, and very much of the reduction now noticed is due to the abandonment of strong antiseptics, and to the timely excision and surgical cleansing of the wound and the removal of all foreign bodies. It may also be claimed that the thorough arrangements for the treatment of the chilled and exhausted man by warmth, rest, and intravenous injection have saved many lives by restoring the vitality and resisting powers of the patients.

But, when all this is allowed for, it is evident that there must have been other causes at work to account for the diminution of this danger to the wounded man, and these must be sought in a lessened virulence of the infecting agent itself which has occurred during the past four years and has in its turn resulted from altered conditions of the soil in which the organisms are bred. That this is true is supported by the following facts:

In the Somme battle of 1916, in spite of many thousand operations performed at the front, there were very numerous cases of bad gas gangrene both in the casualty clearing

stations and at the base hospitals, although they were much less frequent than in 1914. In the Somme fighting over the very same ground, during the retreat in March, 1918, when the casualty clearing stations had to be abandoned, operations could not be done at the front. Patients had consequently to be sent to the base in trains of all kinds as well as in ambulance trains, and were often not thoroughly treated by surgical operation till after a delay of one or two days. Yet there were far fewer cases of gas gangrene in 1918 than in 1916, and in 20,000 patients at one base between March 23rd and 29th during the worst time of the retreat the incidence was only 1 per cent.

But, whereas in the earlier years of the war much of the land was covered with rich crops and had recently been very freely manured, at the present time in the battle areas the face of the earth is absolutely changed. A great stretch of country comprising many hundreds of square miles has been practically destroyed, as far as its development by mankind is concerned. What was once a prosperous countryside with highly cultivated arable land is now little more than a desert, pitted with shell holes, scarred by innumerable trenches and gunpits, the chalk subsoil scattered over the surface of the ground, the skeletons of smashed and shredded trees alone marking the sites of destroyed villages, and all appearance of cultivation wiped out. The whole land has gone back to "prairie conditions," and looks like an extensive and barren moor, although in summer time it is partly redeemed by the luxuriant growth of wild flowers. In such a country which has been exposed to sun, wind and rain for three or four years, uncultivated, unmanured, uncropped, deserted by man and animals, it is probable that the anaerobic organisms have diminished both in numbers and virulence. But, be the causes what they may, it was an immense relief to the surgeon in 1917–18 to find that this, the greatest surgical epidemic of wound infection which has ever been recorded, was neither so prevalent nor so dangerous as formerly, and that the wounded man was no longer so greatly exposed, even though his wound itself was slight and involved no vital part, to grave risk of life or limb.

TRANSPORT AND HOSPITALS AT THE FRONT.

I now propose to turn to the arrangements for transporting and treating wounded men. The history of the early hospitals in the British army has been carefully investigated by the late Colonel William Johnstone, and from his researches it appears that in Hunter's day the patients at the front were treated in "Regimental Hospitals" or else in "Garrison Hospitals." "Marching" Hospitals or "Flying" Hospitals were established by William III, and first saw active service in his campaign in Ireland. In addition to medical personnel they had "nurses, cars for the transport of the sick, drivers, and men servants." Unfortunately these precursors of our present Field Ambulances came to an end with the completion of Marlborough's campaigns in 1711, and were not revived until the nineteenth century, so that they did not exist in Hunter's time. Ranby wrote in 1781 as follows:

> I would wish to be indulged in a scheme which might, I think, be put into execution with all the facility imaginable. It is this: when the Army is forming for an engagement, let the surgeons with their respective mates of the three or four regiments that are posted next to each other collect themselves into a body, and take their station in the rear according to the command of the general. Here let the wounded be put under their immediate care and management. By this means they will be enabled mutually to assist each other, and to perform their duty both with care, exactness, and dispatch.

It is thus evident both that the need of some arrangement for mutual aid was felt, and also that it did not exist in Hunter's time. In those days the wounded soldiers were taken to the base in country wagons or in the regimental forage carts, and it was left to Larrey to create, in 1792, the first ambulance cars, which were reserved for the sole use of the sick and wounded, and which were named by him *Ambulances Volantes*. He figures and describes them as "a kind of carriage hung on springs, uniting great strength and solidity." They were of two kinds—the light with two wheels and the heavy with four wheels. Each ambulance "cadre" or "division" was provided with twelve light and four heavy cars, and comprised a personnel of 340 officers and men. Larrey states that after the battle of Eylau in 1807 the wounded were successfully transported by the ambulances volantes to chateaux "at a distance of not less than fifty-five leagues." This "division" may fairly be claimed as the first efficient field ambulance in the history of war.

Since this period horse ambulances of various types have been employed as part of the transport of our own field ambulances, but it was not until the present war that "Motor Ambulances" were added to the transport of the Field Ambulances and that "Motor Ambulance Convoys" were provided to supplement the latter.

I think it is hardly realized how much in present warfare the whole system of the treatment of the wounded is based upon and pivots on the "motor ambulance." In Hunter's time the range of the musket was two or three hundred yards, and that of a cannon less than a mile; beyond this distance surgeons could work in safety. It was consequently not at all difficult to carry the wounded to some place where a barn, or shed, or a stone wall offered sufficient protection—for there were no shells.

At the present day there is no such thing as absolute safety anywhere near a battle front, for, apart from bombs and guns of exceptional range, immense numbers of shells are fired to a distance of from six to eight miles. The consequence is that, while surgeons supply skilled help, at much risk, at the Regimental Aid Post or the Advanced Dressing Station, within a very short distance from the line, the patients have to be removed quickly to considerable distances, and the Casualty Clearing Stations have to be placed some eight miles or more in the rear. The consequence is that horsed vehicles could not possibly make a sufficient number of journeys to bring in the wounded from heavy fighting within a reasonable time, and, in addition, the numbers of the wounded are so great that there has been nothing in any previous war to compare with the task of the ambulances of the present day. It must therefore be understood that all wounded men have now to be taken a considerable distance before reaching a place where they can be both immediately treated by the surgeons and also retained and cared for after operation.

It is during this long motor car journey from the battle front that the patient runs risks of those further injuries which it is the object of the surgeon to minimize as much as possible. One of these risks is exposure to cold, and this is a most serious danger to men suffering from shock or haemorrhage. To avoid this, hot-water bottles are freely used, stretchers are covered with one folded blanket and the patient is warmly wrapped in others. The car is also usually provided with a pipe heated by a supply of hot air from the exhaust pipe of the engine. The other most important risk is that of injury to the soft tissues by the fragments of broken bones which are jolted by the movements of the car. The extent of this will largely depend on the roughness of the road and its pitting by shells, but to a still greater extent it will depend on the care with which suitable splints have been applied. It is the custom in the British army to splint all fractures as far forward as possible, and in any case at the Field Ambulance, with the result that, with the apparatus now provided, fractures are so immobilized that the minimum of risk is incurred, and the minimum of pain caused, by the journey. It is not too much to say that very many patients who, without a good splint would arrive in a state of collapse and die, or else would lose their limbs, now get down to the Casualty Clearing Station with discomfort rather than with suffering.

It has been remarked that the modern offensive methods which characterize this war are largely dependent on the invention and development of the petrol engine, and that the tractors of great guns, the war in the air, and the war under the sea are all dependent on this device. It is at least some satisfaction to know that it is to the same device that tens of thousands of wounded men owe not only a more comfortable transport than the soldiers of previous wars, but also the saving of lives and limbs in numbers beyond measure.

THE CASUALTY CLEARING STATIONS.

In Hunter's day the only hospitals near the front seem to have been those called "Regimental," and they were apparently established in any buildings which seemed suitable for the purpose. I have not found any records of their equipment, the number of their personnel, or their accommodation. It is probable that they were very primitive.

In our own army at the present day the demand for hospitals at the front has resulted in a new unit which has been created by the conditions peculiar to this war. I allude to the Casualty Clearing Stations, and these have their counterparts in the armies of all the other European combatants.

This unit had not been in use before the present war. At the commencement of hostilities it consisted of a staff of six medical officers with a commanding officer and quartermaster and 80 orderlies; some of the latter were well-trained nurses. It provided accommodation for 200 patients on stretchers, but was not supplied with beds. Its surgical equipment consisted merely of sufficient instruments and appliances for the performance of a few urgent operations, and it was provided with one operating table and a few very primitive wooden splints. Its function, as the name implies, was "to clear" the Field Ambulances and to pass on by train the sick and wounded for further treatment at the base hospitals. Each unit was intended to be attached to a Division, and was supplied with horsed transport.

Since those days the long line of trenches and the comparative immobility until recently of the armies have provided the opportunity for very great developments, with the results that the Casualty Clearing Stations of the present day are very efficient and well-equipped advanced hospitals, with theatres for six or more tables, and suitable in every way for the performance of any operation. They have expanded to provide, according to circumstances, for from 600 to 1,200 patients, of whom 200 have beds and the remainder stretchers.

A great deal might be said of the work of the Casualty Clearing Stations which would be out of place here, but it may be pointed out that an advanced hospital of this type is an absolute necessity in the warfare of the present day. Very little experience was required to show that it was quite impossible to carry out the pre-war idea of doing all the surgery (with few exceptions) at the General Hospitals at the base. Men with such injuries as wounds of the chest and abdomen, severe fractures and wounds of large vessels could not be safely conveyed long distances by train, while patients suffering from dangerous shock or the effects of profuse haemorrhage demanded immediate treatment as near the front as possible. But, over and above all this, the necessity which arose for early operation in order to prevent the development and spread of gas gangrene or dangerous sepsis in even slight wounds alone justified the expansion of the Casualty Clearing Stations.

VALUE OF FRONT LINE SURGERY TO AN ARMY.

It will thus be seen that the object in view in their development was to secure efficient treatment as early as possible. The ideal of surgical treatment would be the supply of enough surgeons and enough hospitals, close to the front, to allow of all operations being always performed there with the least possible delay. This ideal has indeed often been realized in the present war, when, during quiet periods, the wounded were comparatively few, but it has proved impossible to supply enough surgeons and enough accommodation to realize the ideal when the casualties of a great battle number many thousands a day and when the duration of the battle is measured not by days but by weeks or months. Yet, although it has not been always possible to do that which is ideal, the custom of reinforcing busy hospitals with "teams" of extra surgeons, anaesthetists, and assistants has enabled an immense amount of work to be done. Apart from operations on the abdomen, the chest, and the head, the vast bulk of this work is of a nature which appeals to surgeons and to patients alike, for it is "conservative surgery" in the best sense of the term. In the first place it consists largely in the thorough surgical cleansing of wounds so as to save limbs and lives, and in the second place it supplies the necessary foundation for the early closure of the wounds by suture. In this way large flesh wounds are prevented from suppurating, and compound fractures are made simple fractures, and the patient is saved from a long illness and its debilitating effects. Such treatment diminishes stay in hospital, frees hospital beds, lessens the labour of nurses and surgeons, and, best of all from the point of view of the army, it enables many patients to recover quickly and to return to their regiments. I would claim that, apart altogether from considerations of humanity, good front line surgery very fully compensates an army for the demands it makes on supply and transport. It more than pays its way both by returning sound combatants to the ranks and also by saving the country the expense of innumerable pensions on behalf of men whose lives or limbs have been saved.

Long before this war the combatant branches of the army fully realized the importance of the prevention and cure of illness and their effects on the maintenance of armies in the field, but it is only during the present war that the value of good and prompt surgery has been fully appreciated, and that the necessary facilities have been supplied whenever the military situation has permitted. Similar facilities will henceforth be expected in all future wars.

THE THIRD BATTLE OF YPRES.

It is well known to the medical profession that an immense amount of this front line surgery has been successfully undertaken, and it is also well known to and deeply appreciated by the combatants of all ranks, whose confidence and faith in the Army Medical Service is by far the best possible tribute that could be paid to it. I will not attempt to supply any statistics, but some idea of the magnitude of the surgical work at the front will be gathered if I state that during the three and a half months of the third battle of Ypres, in 1917, 61,500 operations were performed under anaesthetics in the Casualty Clearing Stations of two armies.

It will easily be realized that much forethought and preparation are required to produce these results, for they require not only arduous work by day and night for perhaps twelve hours out of twenty-four—a tax on the strongest when continued for weeks on end—but also the harmonious working from the front to the rear of stretcher-bearers, regimental medical officers, field ambulances, ambulance convoys, and ambulance trains, any one of which is liable to interruption by accident or by the act of the enemy.

The staffing of the Casualty Clearing Stations for the third battle of Ypres especially deserves to be recorded, for on this occasion many of the most leading and representative surgeons from the United States, from Canada, Australia, New Zealand, and South Africa were included in the reinforcing surgical "teams," or else were on the staffs of the Casualty Clearing Stations of the armies concerned.

Thus, for the first time in history, the surgical skill and talent of all the various sections of the Anglo-Saxon race were brought together on a battlefield, and with the happiest possible results to the wounded men. On this occasion, because of the absence of heavy fighting in other armies, more surgeons were available than at any other period, and no Clearing Station had less than two surgeons and twenty-four nurses. It was therefore possible to keep eight operating tables in action in every unit, and there is no doubt that almost every wounded man whose condition made it advisable was passed through the operating theatre before being sent by ambulance train to the base.

The war of movement which characterized the closing stages of the campaign called for the development of new methods for meeting the situation thus created. Of the details of these a great deal might be written which would be too lengthy for the present occasion, but this much may be said: The Clearing Stations were sufficiently reduced in the bulk of their equipment to enable them to be rapidly moved forward, and they were frequently able to take in and treat many hundreds of men within twenty-four hours of their arrival on a new site, while at no time during the whole campaign was there more work done in resuscitating the badly wounded, and in the intravenous administration of blood or of alternative fluids to men who had suffered from severe haemorrhage.

CONCLUSION.

Let me now recall to your attention a phrase of Hunter's which I read to you at the beginning of this address. "It (the appointment to the Belleisle expedition) drew my attention to inflammation in general, and enabled

me to make observations which have formed the basis of the present Treatise." The war was to him not merely a sphere for the exercise of his surgical skill, but also an opportunity for observing and studying conditions of which he had hitherto had no experience. What has this war been to the surgeons of the present day? It may truly be said that very many of them, and in all parts of the world, have entered into this work imbued with the spirit of our great master. To them also it has not only afforded immense opportunities of helping their fellow countrymen, but has also provided problems for study and for solution. The spirit has been one of progress and of development, and of unwillingness to rest content with conditions that might be bettered or with methods which proved unsuitable. It is not too much to claim that each year of war has seen better surgical measures devised and consequently better results obtained. The sufferings of the wounded have been lessened, the dangers they run have been diminished, and lives and useful limbs have been saved in constantly increasing numbers. Surgeons have not been content merely to guess at possible answers to the never-ending questions suggested by the complications of war. They have devised new methods to meet new conditions and have put them to the test of experience; and when they have failed they have tried and tried again until they have compelled success.

In this great tragedy of war the Royal College of Surgeons of England has played no unimportant part. Hundreds of its Fellows and thousands of its Members have willingly pressed forward for service. Some of these, like our President, have occupied with credit and honour the most prominent and important positions, and others of them, often less prominent no doubt, have not only given their services, but have also given their lives. The position I have had the honour to hold in the Army Medical Service has afforded me very abundant opportunities of appraising the performances of others, and I am full of admiration both for the skill and ability of our surgeons and for the splendid work done by the Royal Army Medical Corps in rescuing the wounded in conditions of unprecedented difficulty and danger, and in organizing the hospitals for the subsequent treatment and restoration to health of the British soldier.

CAPACITY FOR WORK IN AMPUTATIONS OF THE LOWER EXTREMITY.

BY

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THE accompanying diagram is intended to demonstrate in a graphic manner how capacity for work varies in amputations in the lower limb. Textbooks on operative surgery afford little information on this important aspect of a subject which is now an economic as well as an operative problem.

"Capacity for Work."

The term "capacity for work" ought to mean not merely the ability to do a certain class of work, but rather the ability to keep on doing it from day to day. A man's value in the general labour market depends as much on his being able to "keep time" as on the actual amount of work which he can do. In regard to discharged soldiers, this question is put to the medical officer: "By how much is the man's earning capacity lessened by his amputation?" The answer to this question does not depend alone on the length of the natural as compared with the artificial limb, for whilst some low amputations are bad, giving a low capacity for work, other comparatively high amputations are good, allowing the man to become a very efficient and steady worker.

Before considering the special features upon which capacity for work depends, let the functions required of an amputation of the leg with its prosthesis be for a moment considered.

1. *Support.*—This demands an investigation of how the weight of the body is transmitted to the ground through the natural and the artificial limb. The best form of support is that obtained through a direct end-bearing stump. Indirect or lateral bearings at some time or other cause fraying and ulceration of the skin, and require much more care on the part of the patient if broken time is to be avoided.

2. *Stability.*—This varies directly with the length of the natural limb, and with the length of the segment in which the amputation has been performed. With short stumps the grasp of the socket may not be sufficient, and must be improved by a splice in the form of a laced socket, or in thigh stumps a pelvic band. In some cases stability has to be attained by stiffening of the joints of the artificial limb at the hip or knee, but this interferes with the gait.

3. *Progression.*—This depends on the use of natural rather than artificial joints, good muscular power in the lever which activates the artificial limb, a long lever, and painless bearings. In short stumps we find progression accompanied by fatigue. This could be diminished by decreasing the weight of the artificial limb. The excuse of limb makers that the natural limb weighs much more than the artificial one is really irrelevant, for the muscular power of acting muscles is greatly diminished by disuse, by interference with their insertions, and only a few muscles are effective at all.

4. *Appearance.*—Appearance is of no importance as far as function is concerned. Compared with a limb giving comfortable support, efficient stability, good progression, and lightness, appearance counts for nothing. The French have long since recognized this by supplying a peg leg with a broad base for special workers like farm hands who have to be on foot all day.

Estimation of Capacity for Work.

Having laid down these general principles, what further considerations influence "capacity for work"? They are:

1. The length of the natural as compared with the artificial limb.

2. The specific value of the ideal amputation at the particular level.

3. The type of prosthesis most suitable for the particular stump. Prostheses for some amputations are constantly requiring repairs whilst others last for years.

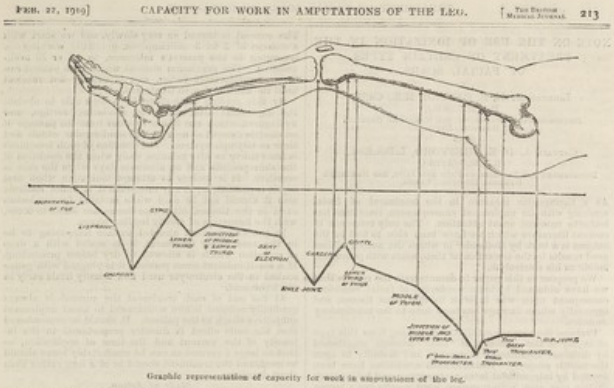
4. The special conditions which prevail in the case under review—that is, how far the particular amputation falls below the ideal amputation at the same level.

All these points ought to be considered in estimating the capacity for work of a man who has had an amputation in the lower limb. The fourth point will be governed by the disposition of the flaps, position of the scar, the presence or absence of pain, adhesions between bone and skin, condition of joints, and by whether the surgeon has succeeded in obtaining an end-bearing stump. These points will demand consideration in every individual case, and therefore cannot be reckoned with in attempting to map out a curve of "capacity for work" in amputations of the leg in general.

I have tried to represent in a graphic manner the fact that capacity for work does not vary in a regular manner as we pass up the limb, though it will be seen by reference to the graph, and conceded on general principles, that the longer the natural as compared with the artificial limb the greater the capacity for work. The secondary irregularities on the curve are due, therefore, to variations included under heads 2 and 3—namely, the value of the ideal amputation, and the type of artificial limb or appliance supplied for amputations at the given level.

Following the graph from left to right it will be seen that amputation of the great toe is, in my experience, followed by some slight fall in capacity for work, though amputation of the other toes may be performed with impunity, the operation not being followed by diminution in the man's capacity for "keeping time."

With a Lisfranc amputation there is a further drop in the capacity curve, which, however, falls much more with the Chopart operation. The French orthopædists, especially Trèves, have shown that of all the amputations in front of the ankle the Chopart is the worst. Trèves points out that every centimetre that can be saved in amputations on the foot increases the value of the anterior *point d'appui*, and therefore increases the efficiency.



Graphic representation of capacity for work in amputations of the leg.

An amputation in front of the scaphoid is an improvement on the Chopart; one through the shaft of the metatarsals is better than a Lisfranc, and so on till we reach the toes.

To explain why the capacity curve falls so low in a Chopart amputation we take the two heads already mentioned, and we find (1) that even the ideal amputation interferes radically with the mechanics of the foot by removing completely the anterior pillar of the arch; the scar, at first placed anteriorly, or even above, the ends of the bones, will work its way downwards; the bones themselves are gradually drawn upwards by the tendo Achillis, and this gives rise to an increasing potential equinus, nearly always associated with some varus; and (2) the prosthesis for Chopart's amputation requires very frequent alteration and repair owing to changes in shape of the stump and to the very nature of the prosthesis itself.

With Syme's amputation we find the curve rising abruptly, indicating that the ideal performance of this amputation leaves a stump which is, from the point of view of function, as nearly as possible perfect. It gives (a) a complete and permanent end-bearing; (b) there is a long lever affording perfect stability; and (c) the preservation of the natural knee gives almost, if not indeed quite, perfect gait. The only criticism to be offered is that the artificial ankle, owing to the presence of the side bars, is rather bulky and *disgracieuse*.

Proceeding upwards to the lower third of the leg we find the curve dropping. According to Huggins, an amputation should never be done at this level, because of the atrophic condition of the skin which tends to ulcerate, so precluding the possibility of a good end-bearing. The absence of an end-bearing entails a lateral bearing at the level of the tibial tuberosities with the disadvantages of irritation, blistering, and often sepsis of the skin. The presence of the fibula causes a bunion, often painful, and pressure on the external popliteal nerve, as it winds round the neck of the fibula, will demand at some time or other surgical intervention.

In the middle third of the leg the graph is gradually falling as we shorten the lever till we come to the "seat of election" problematically so called. This point must be regarded as the extreme "limit of shortness" in below-the-knee amputations. The curve above this point rapidly drops, reaching its lowest point in the Stephen Smith disarticulation through the knee-joint. This is decidedly bad as a definitive operation, because (a) a complete end-bearing is never possible; (b) the skin over the condyles is stretched, thin, and very prone to ulcerate, even apart from pressure; and (c) the fitting of an artificial limb is handicapped by the very shape of the stump, consisting as it does of a large bulb on the end of an attenuated shank.

In the lower half of the thigh there is a gradual fall in capacity for work, dependent on the shortening of the lever formed by the stump. But with a perfect Stokes-Gritti operation there are advantages over the slightly longer Carden amputation, in that it gives a complete and permanent end-bearing, and the presence of a layer of compact bone, rather than a sawn surface, prevents any risk of adhesions between the bone and the skin over it. Above the mid-thigh there is, in addition to shortness, the disturbing factor of the pelvic band, which frequently gets out of order and calls for repairs. Therefore we find a rapidly diminishing capacity for work above this point till the "limit of shortness" in thigh stumps activated by the stump in an ordinary bucket is reached. Huggins lays it down that this point must be not less than three inches below the lesser trochanter. In amputations between this point and the lesser trochanter no satisfactory fitting can be supplied, and they are, therefore, the worst of all amputations, and should never be performed as definitive operations. At the level of the small trochanter it again becomes possible to fit an artificial limb through the intervention of a hip platform. The thigh bone, being flexed by the psoas, does not interfere with the fitting, though an amputation carried through the great trochantor or the femoral neck, or a disarticulation through the hip-joint itself, gives a slightly better result.

My thanks are due to Lieut.-Colonel A. B. Mitchell, OC the Special Surgical Military Hospital, Belfast, for advice and assistance freely given at all times; to Captain R. J. M'Connell, my house-surgeon, for his helpful criticism, and to Mr. E. W. H. Blackwood for the great pains he took to make the drawing a clear representation of the subject.

A SPANISH medical mission headed by Professor Martinez Vargas, dean of the faculty of Barcelona, and comprising a number of professors, hospital physicians and surgeons, and heads of laboratories, recently visited the Hôtel-Dieu, Cochin, Saint Louis and Buffon hospitals in Paris, the military medical school at Val-de-Grâce, the Colonial hospital at Nogent, the Spanish hospital at Neuilly, the Canadian hospitals at Saint Cloud and Joinville, the physiotherapeutic services at the Grand-Palais, various laboratories, the Pasteur Institute and hospital, the Edith Cavell school, and the general workshops of the health service. The mission was received by the Société de Médecine, at a meeting presided over by the Minister of Health and attended by representatives of all the medical societies of Paris and the profession of France, and the Allied and neutral countries.

NOTE ON THE USE OF IONIZATION IN THE TREATMENT OF CERTAIN TYPES OF FACIAL SCARS.

BY

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As a therapeutic measure in the treatment of facial scarring with its unpleasant consequences, ionization has hitherto received scant attention. The only reference in current literature which we have been able to find on the subject is a book by Hollande[1] in which the author claims good results by the ionization of these scars with potassium iodide as his electrolyte.

We propose in this paper to demonstrate the results that we have obtained by ionic treatment of facial cicatrices consequent upon war injuries to the facial tissues, and especially where damage has been done to the masticatory muscles.

Perhaps the commonest disability arising from this type of injury is the condition of "false" trismus, manifested by deficient mandibular movement and inability to open the mouth properly. Hitherto such conditions have been treated by intermittent intra-oral gagging, and by massage of the scar area, with transient good results but a strong liability to recurrence. We have already noted elsewhere[2] that this clinical condition is due commonly to one of three causes:

1. Fracture of the ascending ramus of the mandible, with actual damage to contiguous tissues.
2. In the absence of fracture, injuries of such a nature as to involve some fibres of the masseter, temporal, or pterygoid muscles, the scar tissue limiting movement.
3. Reflex spasm of all the masticatory muscles consequent upon organic injury of remoter parts.

In the more marked cases, as will be seen from the list recorded below, the degree of separation possible between the upper and lower incisor teeth may be as small as three millimetres.

We have found that the treatment of the scars by ionization results in a progressive decrease in their densities and an increased flexibility, both subjective and objective, with marked permanent improvement in ability to open the mouth and masticate. This has definitely occurred even when ionization has been unaccompanied by the use of intra-oral gagging or facial massage. Adherence of the scar to osseous tissue offers greater resistance, and the treatment has to be prolonged in these cases, often for a period of three months or more.

Method of Ionization.

We have used the alternating current from the city mains, which is run through a motor transformer so as to give a constant current of 100 volts E.M.F. This is conveyed to the patient through a distributing board, fitted with a wire resistance rheostat for the purpose of varying the strength of the current, and with a milliammeter for registering the amount of current used. The electrodes consist of small zinc plates about two inches square, between which and the skin we place from sixteen to twenty-four layers of folded lint. These coverings are about half an inch larger all round than the metallic electroden, in order to prevent possible burns by contact of the metal with the skin. The pad of the negative or active electrode is soaked in the therapeutic agent (in our cases $NaCl$, KI, or sodium salicylate) in 1 or 2 per cent. solution in hot distilled water. The pad of the positive pole is soaked in hot water to which a trace of sodium chloride has been added to ensure easy passage of the current. The negative electrode is placed over the cicatricial area, whilst the positive electrode is placed under the chin (most often) or over the deltoid or on the nape of the neck. These are made secure by bandages which also ensure efficient contact with the skin area to be treated. The current is turned on very slowly, and we start with a current of 2 to 3 milliampères, gradually working up, according to the patient's tolerance, to 15 or 20 milliampères. The maximum current which each patient can support comfortably varies, and is usually not reached until the third or fourth treatment.

By this gradual method we have been able to obviate the unpleasant after-effects of headache, vertigo, and nystagmus, which are liable to occur from the passage of an electric current so near to the semicircular canals and their endolymph system. The duration of each treatment is from thirty to fifty minutes, daily when the condition of the skin permits and on alternate days when the skin is sensitive. It is useless to attempt ionization when oral sepsis is present, or, at any rate, until it is under control; also it should not be used while metallic foreign bodies exist in the tissues, otherwise burns are liable to occur, with the formation of slowly healing ulcers.

In the event of an abraded surface happening to be in the area under treatment, it is sealed with a drop of collodion which is allowed to dry before proceeding. If a small indolent sinus persists, it is plugged with gauze soaked in the electrolyte used and usually heals early in the treatment.

At the end of each treatment the current is always gradually reduced before withdrawal to avoid unpleasant subjective shock to the patient. It should be remembered that the ionic effect is directly proportional to the intensity of the current and the time of application, so that as large a current as can be comfortably borne should be used, and the treatment should be of a long rather than short duration.

Mode of Action.

Ionization with sodium chloride as an electrolyte has given us the best results; ionization with iodides is more apt to cause irritation of the skin, but is useful, as is ionization with sodium salicylate, in the alleviation of painful conditions. As far as softening the scar is concerned, the latter two drugs are less effective, in our opinion, than sodium chloride (chlorine ions).

It is said that the liberation by secondary reaction at the cathode of the hydroxyl ion, which like the hydrogen ion is one of high velocity, may contribute to the resultant effects, and we can confirm that the results obtained with the negative pole as the active electrode are greater than those obtained with the positive. There seems to be no doubt, however, that a considerable portion of the resultant good effects, is due to the condition of induced hyperæmia which persists for an hour or two after the cessation of treatment. It would seem highly improbable that the ions penetrating the tissues, or formed in the tissues by the passage of the current, retain their ionic or active state locally for more than a fraction of time, but that they immediately enter the general circulation in combination as inert substances. It has been stated that ions are introduced into the endocellular plasma and not into the general circulation, but we fail to see why such a permeable membrane as the cell wall should act as a confining barrier to the highly active ion, or why the cell plasma, which is isotonic with the surrounding exocellular plasma, should exercise any chemiotactic effect upon the ion. Hence any benefit due to introduction of ions or to ionic dissociation in the tissues, must be limited to the time of passage of the current and to the period of active bombardment during the actual treatment.

The following list summarizes the nature of 24 cases with the results of treatment. Chlorine ions were used where there is no statement to the contrary. Supplementary treatment is indicated where any was employed.

1. Pte. O'C. Dense scar, masseter; limitation of opening. Fourteen treatments; current up to 20 milliampères. *Result:* Scar very soft and pliable; complete restoration of ability to open mouth.

2. Sgt.-Maj. E. Small dense scar, right masseter; limitation of opening. Twenty-five treatments; current up to 25 milliampères. *Result:* Scar much softer; mouth opening increased from 7 to 15 millimetres.

3. Cpl. P. Two dense scars (adherent to underlying bone) in right masseter region; limitation of opening 3 millimetres. Fifteen treatments; current up to 20 milliampères; gag used. *Result:* Improvement; scar softer; mouth opening increased 3 to 7 millimetres.

4. Pte. S. Dense radiating scar of left cheek. Eighteen treatments; current up to 22 milliampères; iodine ions. *Result:* Scar decreased considerably in size and density.

5. Pte. W. Extensive radiating scar, right cheek and right submaxillary region; limitation of opening. Fifteen treatments; current up to 22 milliampères. *Result:* Scar decreased in density (scar adherent to bone).

6. Lce.-Cpl. P. Long dense scar in right temporal region; limitation of opening. Fifteen treatments; current up to 26 milliampères. *Result:* Scar considerably softer; opening increased from 5 to 20 millimetres.

7. Driver W. Dense scar, left temporal region; limitation of opening. Twenty-five treatments; current up to 20 milliampères; gag used. *Result:* Improvement very slight.

8. 2nd Lieutenant J. Small dense scar, left masseter and left internal pterygoid region adherent to bones. Fifteen treatments; current up to 10 milliampères. *Result:* Scar softer; ability to open mouth increased 10 to 25 millimetres.

9. Sgt. C. Dense radiating scars from angle of mouth to angle of mandible on same side; limitation of opening. Twelve treatments; current up to 14 milliampères; iodine ions. Massage employed. *Result:* Mouth opening increased from 4 to 12 millimetres; scar softened and loosened considerably.

10. Pte. H. Small depressed scar, left temporal region; painful; limitation of opening. Fourteen treatments; current up to 15 milliampères; iodine ions. *Result:* Pain decreased; otherwise improvement slight.

11. Pte. M. Dense depressed scar, right masseter region; limitation of opening. Twelve treatments; current up to 20 milliampères. *Result:* Scar considerably softer, but developed of an abscess interferes with continuation of treatment.

12. Pte. F. Dense scar, right masseter region; limitation of opening. Eighteen treatments; current up to 20 milliampères; gag used. *Result:* Mouth opening increased from 3 to 10 millimetres; scar much more flexible.

13. Pte. K. Extensive cicatrization in left angle of mandible region; painful. Twenty-four treatments; current up to 20 milliampères; salicyl ions. *Result:* Scar considerably softer and more pliable; total absence of pain.

14. Pte. J. Extensive dense depressed scar, right masseter region; limitation of opening. Twenty treatments; current up to 20 milliampères. *Result:* Improvement slight.

15. Pte. P. Large depressed scar, right masseter region; limitation of opening. Twelve treatments; current up to 24 milliampères. *Result:* Mouth opening improved; scar less dense.

16. Pte. L. Dense scar, left masseter region (adherent to bone); limitation of opening. Eight treatments; current up to 9 milliampères. *Result:* Scar softer; mouth opening increased from 5 to 10 millimetres.

17. Cpl. W. Depressed scar, left masseter region; limitation of opening. Sixteen treatments; current 9 to 14 milliampères; gag used. *Result:* Mouth opening 5 to 8 millimetres; improving slowly.

18. Sgt. O'H. Long depressed scar, left temporal region; limitation of opening. Twelve treatments; current 7 to 11 milliampères; gag used. *Result:* Considerable improvement; mouth opening increased 5 to 10 millimetres.

19. Pte. W. Injury pterygoid region; passage of bullet from supraorbital region to lower border of mandible of same side; limitation of opening; complete closure. Eighteen treatments; current up to 20 milliampères; iodine ions; gag used. *Result:* Mouth opening increased from almost complete closure to 2 centimetres.

20. Lce.-Cpl. R. Dense depressed scar, right temporal region; limitation of opening. Fifteen treatments; current up to 20 milliampères; iodine ions; gag and massage employed. *Result:* Improvement slight.

21. Pte. B. Small scar, right angle of mandible; limitation of opening. Fifteen treatments; current up to 10 milliampères. *Result:* Mouth opening increased from 4 to 9 millimetres.

22. Pte. T. Dense scar, right temporal region. Six treatments; current up to 6 milliampères. *Result:* Improvement so far very slight.

23. Pte. W. Small depressed scar, masseter region; limitation of opening. Ten treatments; current up to 15 milliampères; massage employed. *Result:* Improvement marked; mouth opening increased 8 to 14 millimetres.

24. 2nd Lieutenant M. Long dense depressed scar, left tempero-mandibular region; limitation of opening; incomplete facial palsy. Eighteen treatments; current up to 20 milliampères; massage employed. *Result:* Marked improvement; mouth opening increased from 2 to 12 millimetres.

From the above notes we may conclude that ionization in the treatment of facial cicatrices is of undoubted value. The circulation through the scar tends to become re-established; there is loss of stiffness and adherence, permitting the play of underlying muscles and reduction of the limiting effect of the scar upon the masticatory muscles. It is a therapeutic measure which we think may be with advantage combined with the mechanical procedures of intermittent intra-oral gagging and massage. We find the results best when the gag is applied for an hour immediately before treatment. In cold weather it is a good thing to thoroughly warm the area to be treated with hot water, or by the use of radiant heat by means of a small cup reflector for fifteen minutes before commencing ionization.

In cases also where the edges of the flaps, after facial plastic operations, are rolled and thickened, causing retraction of surrounding normal tissue, we have found ionization of use in increasing the softness and flexibility, and so in diminishing the deformative effects of such scars.

In conclusion, we should like to thank Lieut.-Colonel Liddiwood, C.M.G., the administrator of this hospital, for the encouragement and facilities he has afforded us; Captain J. le F. Barrow, R.A.M.C.(T.), officer in charge of the Neurological Department, for much help and criticism, and Captain W. Maxwell Mumby, R.A.M.C.(T.), and Captain J. E. Mawer, R.A.M.C.(attd.), for their courtesy in sending us additional cases.

REFERENCES.

[1] Hollande: *La Restauration Maxillo-faciale*, Paris, February, 1918.
[2] *British Journal of Surgery*, No. 21, 1918.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SHELL WOUND OF THE HEAD WITH LARGE FRAGMENT LODGED IN CEREBRUM: AFTER-HISTORY OF PATIENT.

As a rule the medical officer serving with the forces abroad is unable to follow cases of gunshot wound of the head and to hear what eventually happens to them, though probably those who are on pension boards see a number of old cases. It would be interesting to determine what proportion of these cases recover and how many later on develop cerebral abscess or mental symptoms, and when these dangers may be considered past. In the following case—of which I regret that, owing to the great pressure of work, I was unable to keep better notes—I had the opportunity of observing the condition nearly three years after the wound.

Pte. F. was admitted to my ward in a base hospital towards the end of September, 1915. He was quite unconscious, with flaccid paralysis of all limbs and symptoms of cerebral compression. There was a wound 4½ in. above and ½ in. anterior to the left external auditory meatus. A skiagram showed a large shell fragment lying in the right cerebral hemisphere. I trephined without delay (he had been wounded two or three days previously) at the site of the wound, enlarging the trephine hole with nibbling forceps. A large intracranial clot was evacuated and a few fragments of bone were removed from the superficial part of the track in the cerebral tissue. No attempt was made to remove the shell fragment.

The patient made an uneventful recovery, except for the fact that a few days after the operation he developed a small cerebral hernia, which soon subsided. He was then evacuated to England.

After-History.—About six months after receiving his wound he had his first fit. For a time he had a fit about every fortnight, and then about every six weeks. Eleven months ago he married, and had no fit till six months later. This fit was succeeded by an interval of three months without a fit, after which he had two fits on the same day. When seen in August, 1918, he had had no fit for two months. He had been working as a labourer for ten months, and for the last six months had been in a chinawarehouse earning 35s. a week. His wife stated that mentally he was quite normal. He stated that he gets practically no warning that a fit is coming on, and his chief anxiety is that he may get one while crossing a road in traffic. The fit involves the whole of the right side, including the face, arm, and leg, the head being turned strongly to the right. The twitching lasts about a minute, after which he remains unconscious for about another minute. For half an hour after he feels dazed.

When he was examined in August, 1918 (nearly three years after the receipt of the wound), no abnormality in reflexes, etc., was found. He did not suffer from headache. All the cranial nerves appear to function well.

A skiagram taken for me by Dr. R. T. Cooke showed a large oblong foreign body. Dr. Cooke calculated that the shell fragment is 3¼ in. deep (from left side), and that it is lying slightly to the right of the middle line.

Personally I do not consider any further operation advisable, as I think it might well leave him in a worse condition than he is in at present.

E. N. RUSSELL, M.B., B.C.Cantab.

CONDITION OF MUSCLES IN DISABILITY OF THE KNEE.

In certain cases of unilateral knee-joint disability there is hypertrophy of the calf with atrophy of the thigh on the affected side.

In a typical case, in which the left patella had been injured by gunshot but recovery took place with normal range of flexion, the left thigh was 1½ in. smaller, while the calf was ½ in. larger, than the right.

This association may be found in cases of trouble inside or outside the knee-joint or affecting the extensor muscles, but, I believe, only in cases of moderate disability where the patient walks with slight or no limp, and the action of the lower extremity as a whole is maintained and increased action at the ankle and foot compensates the knee defect.

In a series presenting increasing knee-joint disability there may be shown less and less hypertrophy of the calf; a case with great disability will probably present moderate atrophy of the calf with great atrophy of the thigh.

I would be glad to know where in the literature I may find further information on this interesting point, as it appears to have definite value in estimating disability.

Liverpool. H. GRATTAN JOHNSTON, M.D., F.R.C.S.E.

PNEUMOCOCCAL PERITONITIS IN AN ADULT.

J. M., aged 53, was admitted to hospital on December 24th, 1918. He stated that for about two weeks he had had a little abdominal pain and slight cough, but he remained at his work until the evening of December 23rd, when the pain suddenly became more severe.

On admission the temperature was 99.6°, the pulse 100, respirations 30; the lower part of the abdomen was very tender and rigid, and there was hyperalgesia rather worse on the right side, but a little lower down than is usual in appendicitis.

As appendicitis seemed the most likely cause for the symptoms, I opened the abdomen by the usual gridiron incision. On cutting the peritoneum a quantity of pus appeared; this was diffused through the whole cavity and no primary focus could be discovered. It resembled the pus frequently found in empyema—a thin fluid with masses of fibrinous material in it. The coils of intestine showed a few loose adhesions. The appendix was removed, but, except for the fact that the surface took part in the general peritonitis, the organ was healthy. The pus was mopped up and the cavity drained. The pneumococcus was found in smears and cultures from the pus.

The temperature rose to 100.6° on the day after the operation, but fell to normal on the following day, and the patient was discharged cured on January 20th.

HENRY H. MACWILLIAM, M.B., D.P.H.

Walton Infirmary, Liverpool.

Reports of Societies.

SITE OF MALIGNANT STRICTURE OF THE OESOPHAGUS.

AT a clinical meeting of the West London Medico-Chirurgical Society held at the West London Hospital on February 7th, with the President, Lieut.-Colonel E. M. WILSON, C.B., C.M.G., in the chair, Dr. REGINALD MORTON showed a series of radiograms illustrating a short paper which he read on the most common site of malignant stricture of the oesophagus. The author stated that during the previous nine years he had examined in the West London Hospital many cases where this condition was supposed to be present, a proportion of which gave a negative result. Ignoring the latter, there remained sixty-six cases of definite obstruction practically all of a malignant character—less than half a dozen where the spasmodic element was the sole or predominating feature. He suggested that by *x*-ray methods the most common site of malignant stricture of the oesophagus would soon be decided. To determine this, radiologists should agree on some uniform division of the tube for purposes of description, and these divisions must have relation to familiar landmarks seen in that locality during *x*-ray examination. The division that he had adopted was above the sterno-clavicular joint; the next corresponded to the aortic arch and extended from the sterno-clavicular joint to as far below the arch as the joint was above it; the third portion included that part of the tube where it pierced the diaphragm; and the last one was the region immediately at and including the cardiac orifice. They might be described as (1) the upper, (2) the aortic, (3) the diaphragmatic, and (4) the cardiac portions. Applying this division to the series of sixty-six cases, eliminating one that was purely spasmodic as subsequent events proved, stricture occurred with equal frequency in the first and third portions, and also with almost equal frequency in the second and fourth portions. The disparity between the first pair and the second pair—"the odds and the evens"—was very striking, the latter being nearly four times that of the former. This contrast could be well shown in a tabular summary, thus:

1. Upper (supersternal)	...	...	...	7
2. Aortic ...	...	...	...	25
3. Diaphragmatic ...	...	...	...	7
4. Cardiac ...	...	...	...	26
Total	...	...	...	65

ERYTHRAEMIA.

At a meeting of the London Association of Medical Women held on February 4th at the rooms of the Medical Society of London, with the President, Lady BARRETT, in the chair, Dr. FRASER showed a case of erythraemia.

The patient, a married woman of 60, had for many years noticed some blueness of the face and hands during cold weather, with occasional epistaxis, but it was only after the death of her son in France eighteen months ago, which distressed her greatly, that she noticed swelling of the abdomen and other symptoms—for example, frontal headache, a feeling of fullness in the head, pain in the upper abdomen, and some loss of flesh. When admitted to the South London Hospital for Women in February, 1918, there was congestion and cyanosis of the skin of the face, ears, and neck; the mucous membrane of the mouth and tongue was purplish in colour, and the conjunctivæ were injected; there was discoloration of the forearms and hands, and some dilatation of the veins of the legs. The arteries were thickened, the blood pressure measured 128 mm. of mercury; the heart was normal. A blood examination showed: Red blood cells 9,510,000, and white blood cells 30,000 per c.mm.; haemoglobin 130 per cent.; colour index 0.7. A differential count gave: Polymorphonuclear cells 86.8, lymphocytes 8.6, hyaline cells 1.4, and eosinophil cells 1.5 per cent.; no abnormal cells were seen.

The liver was enlarged, the edge being palpable three inches below the costal margin in the mid-clavicular line; the spleen formed a hard, somewhat nodular mass in the left hypochondrium, extending to the level of the umbilicus. The urine contained a trace of albumin, the specific gravity was 1013 to 1018, the urea excretion was fairly good, and there was no evidence of organic kidney disease.

The case was treated with calomel and saline aperients and a somewhat restricted diet. X-ray treatment was applied to the spleen. Venesection was not done. The subjective symptoms had now to a great extent disappeared, the liver was smaller, and the spleen, though not much changed in size, felt less hard; the abdominal pain was relieved by a belt, and the patient was living an ordinary life with little discomfort. The last blood count showed 8,000,000 red blood cells, 13,000 white cells.

Dr. FRASER then briefly discussed the etiology and pathology of the disease.

Dr. ISSES PEARSE referred to the mental improvement sometimes seen in these cases after the performance of venesection, and mentioned a case of death closely following on *x*-ray treatment of such a spleen.

THE DANGER OF METAL ARTICLES WORN BY RADIOLOGISTS.

IN the course of a discussion at the Röntgen Society on February 4th, on the subject of protection in diagnostic work in view of the effects of scattered and secondary *x* rays, Dr. F. HERNAMAN-JOHNSON said that metal articles worn about the body, such as watches, rings, sock suspenders, or even coins in the pocket, might be a source of danger while working on *x* rays if the protection arrangements of the tube and couch were imperfect. Otherwise, given adequate protection of the apparatus, the only part for which the radiologist need feel concern, or which he need protect by body armour, was the hand used in examination. Dr. J. METCALFE gave some details from his own

experience. He said that he had been accustomed to wear a silver watch on his wrist under his lead-rubber glove, while doing *x*-ray work, and an ulcer had developed, corresponding in size and position to the watch. It proved to be an *x*-ray burn; it was curious that the leather strap of the watch which came between the metal and the skin was not sufficient to protect the skin from burning. He had also had trouble from burns developing on both legs under nickel suspenders attached to the socks. He thought it probable that if metals of higher atomic weight were used trouble would not arise. Dr. N. S. FINZI expressed doubt as to whether the burn on the wrist could be due to secondary radiation, because he believed the secondary rays from silver would be completely absorbed by less than the 2 or 3 mm. of leather between the watch and the skin, but Dr. HERNAMAN-JOHNSON said that by photographic experiment he had proved that the secondary *x* rays produced from silver had an effective therapeutic range of 1½ cm. in the body (or in water), and experiments carried out by the ionic methods showed that the range was even greater; he did not believe that the leather would wholly absorb them.

Reviews.

CRIME AND CRIMINALS.

DR. MERCIER has embodied in his new book, *Crime and Criminals*,[1] the results of his lifelong study of the subject. His early writings on this and cognate subjects—psychology, conduct, responsibility, and insanity—which to his mind are all bound up together, have been illuminating, and have shed new light upon aspects of the human mind and of its operation in the individual in his personal and social relationships. For this new book Dr. Mercier has been awarded the Swiney Prize—a distinction now twice obtained by him for works on criminal jurisprudence—in itself a high tribute to his ability to deal with the subject on which he now writes.

In a short introduction by Sir Bryan Donkin, who is well acquainted with the criminal by practical experience during many years, the book is commended as "an outstanding and lasting contribution to the study of criminal jurisprudence, and as differing widely from the numerous and unsatisfactory writings on crime and criminals."

Theologians, sociologists, anthropologists, psychologists, and anthropometricians have each in turn used theories and statistics in the study of the causation of crime, have claimed the criminal for their own, and laid down laws for his reformation, deterrence, segregation, or extinction. Dr. Mercier will have none of these. He sweeps aside their theories and their statistics, and, surveying the field of crime and criminality from the pedestal of common sense, declares crime to be merely a matter of conduct, reduces its votary to the category of an ordinary human being, and ascribes all his lapses, occasional or habitual, from the path of rectitude to deviation from the standard laid down by all civilized communities. The foundations of this standard are set on the basis of custom, religion, and social-protective law.

Dr. Mercier uses the term "crime" in a comprehensive sense and not in the more narrow sense of some writers on "criminology," who would limit its application to the more serious and indictable class of offence, and he includes in the term "criminal" all offenders against the law.

His first postulate is that "crime is merely a form of conduct, and therefore is subject to the usual laws regulating conduct, is marked by the characters of conduct, and is analysable into the elements into which all conduct can be analysed." He then proceeds to argue that crime, as well as all other varieties of conduct, is a form of action, and that all action—criminal and non-criminal—is due to the influence of two factors, the one inherent in the constitution of the individual, and the other dependent upon external circumstances and surroundings—the first factor internal or temperamental, the second external or environmental. In discussing these two factors Dr. Mercier, with his customary close, cogent, and incisive reasoning, sets out to show that all action by the individual is prompted by instinct and guided by reason, and that the internal factor is alike in no two persons, and is modified in strength and degree by hereditary predisposition and intellectual capacity, by powers of self-restraint, and by formed habits. The external factor in the production of crime is opportunity or temptation.

From these two factors of conduct Dr. Mercier evolves his theory of crime. Certain laws to regulate conduct having been laid down by society, the offender against these laws becomes a criminal. His crime may be a petty offence against some municipal by-law, or it may be theft, forgery, or murder. All men are potential criminals, and if one man in certain circumstances commits a crime and another does not there must be something in the nature or experience of the two persons to account for their difference in conduct. In Dr. Mercier's opinion, this difference is quantitative not qualitative. All men have certain internal qualities of mind. Their mentality is composed of the primary compartments of Desire, Intellect, Feeling, Will, and Memory, and it is to the predominance of one or more of these qualities of mind in different individuals that deviations from, or continuance in, the path of rectitude results. In those with better balanced minds, Desire—which with its antithesis, Aversion, is the root cause of criminal actions—is kept within bounds by the other faculties, and self-control and self-denial counterbalance and render ineffective the instinctive promptings to offend when temptation and opportunity offer. In those with less well-balanced minds selfishness and self-indulgence are the predominating factors. They cannot or will not control the desires, emotions, and passions, and, given favourable opportunity, an offence results. "Each man has his breaking point. This breaking strain varies in different people, and in the same person is different for different temptations, but every one has his breaking strain in some direction or other, and if in this direction he is tempted beyond his strength he will fall." "There but for the grace of God goes Richard Baxter." "But for the absence of sufficient temptation every man is a criminal." This, shortly, is Dr. Mercier's explanation of the cause and origin of criminal conduct.

In applying his deductive reasoning to the individual offender Dr. Mercier divides criminals into two classes, his test being their temperamental tendency to succumb to temptation, according, first, to the ease with which they succumb, and secondly, to the kind of temptation to which they are most fallible.

He whose breaking point is low, and who consequently will easily succumb to temptation, will frequently succumb and become an habitual criminal. He whose breaking point is relatively high, or whose low breaking point is in a region not much exposed to temptation, will seldom succumb, and if he becomes a criminal at all, will be only an occasional criminal.

This is an entirely common-sense view, and affords a valid explanation of so-called criminal tendencies and the "criminal diathesis." If Dr. Mercier's reasoning be sound—and it will not be easy to prove it erroneous—it sweeps aside the doctrinaire teaching of the various schools of criminology, whether they ascribe the genesis of the criminal to purely hereditary causes, to defective mind or body, to antisocial proclivities, to improper early environment, or to Divine wrath.

That certain of these factors do take a part in the formation of the criminal Dr. Mercier admits, but that the individual's mode of life depends entirely on any one of these he denies. Temptation is held to be a very potent factor in the commission of crime of any kind, and previous writers on the subject, it is contended, have not attached sufficient importance to this factor. Dr. Mercier recognizes two classes of the habitual criminal—the ordinary oft-convicted criminal who leads a life of crime but is to be considered fully responsible, and the moral imbecile, who at an early age deviates into crime, who is mentally defective, and has not the will power to organize his life in a normal manner or to settle down to steady honest work. For him there is no hope of reform. Institutional life is best for him, and this, it is to be expected, will soon be arranged under the Mental Deficiency Act.

For the confirmed ordinary criminals—men who do not try to avoid crime, whose breaking point is low in the presence of temptation and opportunity, and whose selfishness and aversion from honest labour lead them on the line of least resistance, gamblers on the chance of escaping

[1] *Crime and Criminals.* Being the Jurisprudence of Crime—Medical, Biological, and Psychological. By Charles Mercier, M.D., F.R.C.P., F.R.C.S. London: University of London Press, Limited. 1918. (Demy 8vo, pp. xvii + 291. 10s. 6d. net.)

punishment and lured by the desire for easy gain—for these hope of reformation is small: preventive detention for a period of years is the only means of ridding society of their presence, and of giving them a fair chance of reformation. If they can be caught young there is greater hope, as in many such instances want of moral training and bad associations and companionships contribute to their character and conduct. To meet their cases detention in a Borstal institution for a period has been found effective. In many instances they have made good.

It is to the successful working of these three institutions—mental deficiency institutions, preventive detention prisons, and Borstal institutions—that we must look in the future for a decrease in crime. All of these owe their initiation to the policy of the chairman of the Prison Commission and his board, among whom the past and present medical members have been prominent.

Into other sections of Dr. Mercier's most interesting and instructive volume space will not permit us to enter. His classification of crime is new, based as it is on international, state, private, and family or racial crimes. The three chapters devoted to this subject are deeply interesting, and will well repay perusal. The book is epoch-making in many respects, and can be read with both pleasure and profit. It is an intellectual treat as well as a closely reasoned scientific treatise, and both from a literary and an educational point of view it is a work of very high order.

NOTES ON BOOKS.

We doubt whether there exists in any country an annual so compact and comprehensive as *Whitaker's Almanack*. The new edition for 1919 appears later than usual, but through this delay the editor has been able to bring some of the information down to a late date. There are few things more difficult than to recall the facts of recent history, and even in a matter of such overwhelming interest as the war it is not easy to set in order at short notice the sequence of events. Therefore we may give praise to the diary of the war, which occupies some twenty pages of this volume. As is the custom, a certain number of special articles on topics of the day are inserted. There is an innovation in the shape of two maps, one showing the racial divisions of Europe and the other the roads, rivers, and cities of Mesopotamia. The volume has again increased in size, and for this reason and because of the increased cost of production the price has been raised, a result which appears to distress its editor as it certainly will its purchasers.

The New Hazell Annual and Almanack for 1919[1] has been edited by Mr. T. A. Ingram, M.A., LL.D., and is published as one of the Oxford University Press publications. It is compiled on lines similar to its rival, but has certain characters of its own. In the first place the print as a rule is larger, there are fuller data with regard to secondary education, and very many useful particulars with regard to pensions, and a series of maps, including one showing "how the Germans were pushed" during the operations recorded by Field-Marshal Haig in his historical dispatch of last December.

[1] London: 12, Warwick Lane, E.C. (6s. net.)
[2] London: Henry Frowde, and Hodder and Stoughton. 1919. Thirty-fourth year of issue. (Crown 8vo, pp. 976 + liv. 6s.)

EXTENSION OF INSTITUTIONAL MEDICAL SERVICES.

We have received from Dr. J. Middleton Martin, county medical officer of health for Gloucestershire, a memorandum on institutional services, written for the information of the various bodies in the county concerned with these matters. Dr. Martin begins with the proposition, with which few will disagree, that the facilities for institutional treatment are most inadequately distributed and do not effectively provide for the needs of the community. This shortage has become more acute at the present time for various reasons, such as the difficulty in providing special treatment for disabled ex-service men and for persons suffering from venereal disease. One way of overcoming the difficulty would be the development of a series of special services for each purpose somewhat on the lines of a tuberculosis scheme. Against this is the fact that separate schemes with separate staffs in the same area would not be economical.

Dr. Martin has excluded the consideration of domiciliary treatment from his memorandum. Assuming that some extensions of institutional treatment, including that for out-patients, are likely to take place at once, and that further extensions will probably come in the near future, Dr. Martin contrasts the alternative two lines of development. Many will agree with him in opposing the creation of a new organization in water-tight compartments for the treatment of specified ailments, or of special groups of patients. Dealing with the argument that *ad hoc* institutions are necessary in order that specialists might attend them, he agrees that specialists will form an essential part of the plan which he favours—that is, the development of existing institutions—but holds that their place would be in the special institutions, since the great bulk of cases do not require specialist treatment. Here the experience of the tuberculosis dispensaries is valuable. A large part of the work of a tuberculosis officer has proved to be general consultant work, in a wide variety of cases presenting symptoms which might be due to tuberculosis, but which are often due to other conditions. In any case, therefore, a medical man attending at *ad hoc* clinics must necessarily have had a wide training.

Thus, as an alternative to the building up of a system competing with existing arrangements, Dr. Martin advocates an extension of the present facilities for institutional treatment, so that they may provide adequately for the whole of the areas they are supposed to serve, and the scheme he suggests is briefly as follows: In the first place out-stations should be opened in connexion with each hospital in all populous parts—in fact, a series of "forward" out-patient departments for each hospital. These out-stations would be attended by a whole-time medical practitioner of consultant standing, who would examine all the patients in consultation with the medical attendant, give such treatment as is practicable in an out-patient department, and arrange for the admission of cases needing in-patient treatment. Instead of a whole-time consultant it has been suggested that the out-stations might be run by the hospital visiting staff with the co-operation of local practitioners. Intermediate treatment would also be given at the out-stations by trained masseuses, orderlies and nurses, under medical direction. One great advantage of such out-stations would be the opportunity for real consultation between the medical attendant and the consultant in cases in which this is impossible under present conditions. In the next place Dr. Martin would link up existing general and special hospitals and cottage hospitals to form a coherent system with facilities for interchange of patients when necessary. The additional beds needed could, he suggests, be found partly in existing Poor Law infirmaries, and partly by the establishment of a few special and small general hospitals.

The object of the scheme is thus to provide, with the minimum of outlay and the maximum of efficiency, co-ordinated facilities for the treatment of special cases—for example, tuberculosis, venereal disease, and conditions needing massage and other simple subsidiary surgical treatment—which could otherwise be made generally available only by the opening of a special centre for each purpose in each place, with separate staffs. The advantages that would follow the abolition of all *ad hoc* centres, and the development of a system of out-stations in connexion with each general hospital for the treatment of all conditions under a whole-time travelling consultant, are set out by Dr. Martin as follows:

1. It would be economical.
2. Existing hospitals are already the recognized centres of the best treatment given to the public.
3. General practitioners would be able to consult effectively with the hospital staff, and medical services of the community would be greatly improved from the increased facilities for the treatment of all conditions.
4. Such a scheme would not only provide for all immediate requirements for the care of ex-service men, and the treatment of tuberculosis, venereal diseases, and defects of school children, but would also fit in well with the probable developments of the future.

A resolution by the local War Pensions Committee in favour of the principle has been approved by the Gloucestershire County Council, which has generally adopted it also for a scheme of treatment of school children. The scheme has been submitted to the Govern-

ment departments concerned, and much may be learnt from a practical trial. The experiment would be watched with keen interest by all concerned in the provision of an adequate medical service, and a county is a convenient area for its application.

THE HUNTERIAN FESTIVAL.

The Hunterian Festival of the Royal College of Surgeons of England was, for the first time since the war began, celebrated with full honours on Hunter's birthday (February 14th). Sir Anthony Bowlby delivered the Hunterian oration (published at p. 205) in the afternoon, and in the evening the President and Council entertained to dinner in the library a large company, including many men distinguished in public life and in the medical profession.

After the usual loyal toasts, and after the memory of John Hunter had been honoured in silence, Sir George Makins, G.C.M.G., in giving the toast of "The Visitors," recalled how we had been heartened at the beginning by the forwardness of the Dominions to stand with us in this as in the South African war, and how later we had been cheered by the tangible evidence of America's co-operation afforded by the arrival in this country, at a time of great need, of American medical officers, the first of the American army actually to serve in Europe. He dwelt on the fine response of the civil profession at home to the call for officers for the medical services of the navy and army, and expressed the hope that the same spirit would be shown in the work of reconstruction. In coupling the toast with the name of Sir Arthur Stanley, Chairman of the Joint War Committee (Red Cross and St. John), and Treasurer of St. Thomas's Hospital, he deprecated any changes which would do away with the individuality of voluntary hospitals. In reply, Sir Arthur Stanley spoke of the success of medical work in the field and the courage of medical officers, and Lord Sandhurst, Treasurer of St. Bartholomew's Hospital, paid a tribute to the way in which the staffs of hospitals at home had worked without stint to supply the place of members serving abroad.

General Sir William Robertson, G.C.B., who gave the toast of "The Hunterian Orator," began by saying that he doubted whether the public realized what had been achieved by the medical profession in this war. It was, he said, the one section of the community the Government allowed to do its own work in the war in its own way—a statement much applauded by the audience. How well the work was done, he said, was a matter of history. At the beginning the Army Medical Service had about 3,000 officers and about 25,000 men; those numbers had increased to 14,000 officers and 140,000 men, so that the R.A.M.C. had become larger than the old British Expeditionary Force of 1914. But the work had entailed large sacrifices. The pecuniary sacrifices were not yet at an end, for those who had served so long abroad would not easily re-establish themselves in practice; moreover, at least a thousand medical officers had given not only their work and their prospects, but their lives. The work of the R.A.M.C. had been wonderfully efficient, and Sir Anthony Bowlby, who had gone out to France within a month of the beginning, had a large share in that result; he had seen Sir Anthony Bowlby in those early days going his round in all weathers and circumstances, visiting the dressing posts and casualty clearing stations, serving, through his tact, by his skill, and above all by his humanity, as an essential link between the regular officers and the large number of temporary officers who had come in to make the medical machine efficient.

Sir Anthony Bowlby said that there was no one from whom the medical service was more gratified to receive praise than Sir William Robertson. It must be remembered that the good health of the army was based upon and largely due to the splendid supplies of food and clothing, and for these Sir William Robertson was to be thanked, for he had been the Quartermaster-General at the War Office before the war, and it was as Quartermaster-General that he went to France with the original British Expeditionary Force in August, 1914. That force was one that held a very special place in the minds of the English people. The country was properly proud of the deeds of its navy and army, of the sweeping advances in Mesopotamia and Palestine; of the thrust on the Italian front which broke the foundations of the Austrian line on the Piave; of our splendid leader—Sir Douglas Haig—in France, and of the determination and gallantry of the troops in the great advance which began there on August 8th. But not only was there pride in the feeling towards the old Expeditionary Force of 1914, there were also feelings of gratitude and almost of affection. These men had stood fast at Mons, had turned so fiercely upon their pursuers at Le Cateau that all the heart was taken out of the German advance, had stood in the breach at Ypres and held fast the keys of the Channel Ports. Those deeds were done by the troops of the old "regular army," whose extraordinary skill with the rifle was only equalled by the stoutness of their hearts. But it should be remembered that with these regular troops were a few hundred civilian officers—the only civilian group with this force—the civilian medical officers who had joined as soon as ever war was declared. It was their great good fortune to share in the work of those eventful days, and the Royal College of Surgeons should never forget that its Members and Fellows played their part in the great events of that time. Wars were naturally associated with the making of enemies, but he preferred to remember only the making of friends. Many friendships were made between the civilians and the regulars in all ranks of the armies, and especially, as far as the medical profession was concerned, between the civilian medical officers and those of the army medical service. But the most important friendships of all were those between the Mother Country and the Colonies and United States. Men had come to know each other in camps and billets in a way which was only possible in war. They had learnt more of each other's ways of living, outlook on life, and ideals than could be learnt in a hundred years of peace. However much the army was indebted to the Dominions for fighting men, the medical services were at least equally indebted to them for their work in all medical units. Nothing had ever given him greater satisfaction than the arrangements he had been able to make, in conjunction with Sir Arthur Sloggett and the President, for the battle of Passchendaele. The very best of the Dominion surgeons and of the surgical talent of the United States met and worked there in the most complete harmony with the surgeons of Great Britain, and the thanks of the whole British army were due to them.

The toast of "The President" was given by the Lord Mayor of London and acknowledged in a few words by Sir George Makins.

CONFERENCE ON TUBERCULOSIS.

A conference of tuberculosis officers from all parts of the United Kingdom, called by the Tuberculosis Society, was held on February 15th, at the house of the Royal Society of Medicine, to consider a scheme for the national prevention and treatment of tuberculosis.

Dr. Halliday Sutherland, who presided, said that since 1914 the death-rate from pulmonary tuberculosis in England and Wales had risen 12 per cent. This proved that existing measures against the disease had failed. Schemes which had seemed admirable in theory had failed in practice, and even broad principles accepted by experts had not been enforced generally throughout the country. Under present conditions the failure of sanatoriums was almost inevitable; there were more patients than beds, and the average period of treatment was not sufficient for cure. The success or failure of the best planned schemes depended, he considered, upon the clinical tuberculosis officer; but the present salaries and prospects of tuberculosis officers were not likely to induce the best qualified men to devote their life to this work. A special tuberculosis service was needed, and the position of tuberculosis officers must be improved.

The conference then proceeded to consider the draft scheme for a tuberculosis service. In its final form—which will be submitted by a deputation to the Prime Minister or to the Minister responsible for the setting up of a Ministry of Health—the scheme advocates the creation of a special department of the Ministry of Health, in England, Scotland, Ireland, and Wales, for the prevention and treatment of tuberculosis. It proposes that the personnel of these departments should include Commissioners for each part of the United Kingdom, advised

by a committee in each country representing medicine, the public health service, local authorities, the Ministry of Pensions, trade unions, friendly societies, and other organizations interested in social welfare. The department of tuberculosis would undertake the following duties:

(a) To be responsible for general administrative measures against tuberculosis in the countries concerned.
(b) To be responsible for statistics relating to the disease, and to furnish an annual report as to the results of all forms of treatment.
(c) To suggest, advise, direct, and if necessary finance, schemes of after-care and employment of tuberculous patients.
(d) To direct, finance, and supervise an educational programme.
(e) To direct and finance research work in relation to the disease; and
(f) To study housing and conditions of work in relation to the incidence of tuberculosis, and to promote legislation dealing with this matter.

The scheme also provides for the appointment of deputy commissioners of tuberculosis, responsible for administrative areas, with tuberculosis officers acting as administrative and supervising clinical officers, and directly advising the local authorities regarding the prevention and treatment of tuberculosis in each district. A tuberculosis officer, it is urged, should have the help of assistants, nurses, and trained health visitors.

MEDICAL MEMBERS OF PARLIAMENT.

DINNER GIVEN BY THE MEDICAL PARLIAMENTARY COMMITTEE.

A DINNER to Dr. Addison, President of the Local Government Board, and to the medical Members of Parliament was given at the Café Royal, on February 12th, by the Medical Parliamentary Committee, Sir WATSON CHEYNE, M.P., presiding. Nine medical members of the new House of Commons were present. Before the toasts were submitted, Dr. ARTHUR LATHAM stated that the Medical Parliamentary Committee was a temporary body formed merely for the purpose of considering how the views of the medical profession on medico-political questions could be placed before the public.

Dr. SQUIRE SPRIGGE, in proposing "The Medical Members of Parliament," dwelt upon the responsibility and opportunity of a man who was at once a member of the medical profession and of the House of Commons. Medical members of Parliament did not go there to represent medicine in the exclusive professional sense; they were members of Parliament first and medical men afterwards.

Dr. ADDISON, in responding, agreed with this definition of the function of a medical member of Parliament, though, on a large view, the public and professional interests were identical. Medical men until lately had been curiously unaware of the political significance either of their own profession or of current events. But it was now becoming clear that, whether they wished it or not, they would have to take a more public part in affairs. The reason why existing bodies did not satisfactorily represent the profession in this public sense was that those bodies had been designed and developed for quite other purposes. Now that the need had arisen, however, he was very hopeful that they would find their way to some working organization. He did not think the medical profession would ever hold one view, and for his own part he hoped it would not. The process would be one of compromise, adjustment, and finally agreement, but an agreement different from the policy of any of the parties who originally started negotiations. The Ministry of Health Bill proposed to set up advisory or consultative councils, and he was determined that these should be a reality. In the absence of one medical organization which could be recognized as speaking for all, it would be the business of his department to ask the different organizations to offer suggestions and advice. Good advice, not the representation of interests, was wanted. He had been asked whether it was possible to substitute "shall" for "may" in that part of the bill which dealt with the establishment of the medical advisory council. But the form of Acts of Parliament was not that of prescription; the form was that "His Majesty may," and as this particular matter related to Orders in Council, it could be taken that if Parliament put in "may" it meant that His Majesty "would." He hoped that all who came in to advise would take a wide view of their functions, and would regard prevention of disease as better than its treatment. Out of this scheme of advisory committees a sort of cabinet of consultation, representing all the different sections, might gradually evolve to give form to the settled health policy for the nation.

SIR BERTRAND DAWSON, in proposing "The Unity of the Profession," said that lack of unity was a characteristic of the profession far back in its history. In *Shakespeare's England* it was stated that in the year 1576 two members were censured by the Court of Barber-Surgeons for using scoffing words and jests at one another; and again, in the year 1577, other members were called to account that they, contrary to order and the good and wholesome rules of the house, misused each other and fought in the fields together. Allowing for certain changes of manners, that might be regarded as an Elizabethan meeting of the profession at Wigmore Hall. On that very recent occasion they found not only two sets of earnest-minded people contending with one another, but a third party intervening in the spirit of the Irishman who inquired whether this was a private quarrel or whether anybody might join in. While the medical profession had not yet learnt the discipline of unity, a situation was developing in which professional unity was urgently needed. But a profession as yet untrained in collective action could not be moulded suddenly into a perfect political cohesion; the conversion must be gradual. Medical men were still in the habit of leaving their organizations for reasons which amazed the politician, who was accustomed every day of his life to the arts of compromise and the reconciliation of differences. A cabinet of politicians had an almost archiepiscopal aptitude for making a negative into a positive, but the profession had not so learned the lesson. He disliked to hear the accusation levelled against any body which was trying to help them in this emergency that its character was unrepresentative, although in the parliamentary sense that might be true. Organizations should not be tested in this case by their constitutional correctness, but by their capacity to do good work. He paid a tribute to the British Medical Association for its foresight in working on the Ministry of Health problem for over a year before the proposals matured, and for bringing into the scope of its conferences other bodies with which it had attained unanimity. He hoped that this work would be continued, and, as he understood, it was the desire of his friends and colleagues who were present that such other bodies should have increasing strength. He hoped that in time the Medical Parliamentary Committee would evolve from a rough and ready and half crystallized organization into a more constitutional and methodical one. The advisory committees would act as a stimulus to cohesion. In them there would be a body of medical men, carefully chosen by the best method possible in the circumstances, and having the right of access to the Minister.

In a brief reply Mr. E. B. TURNER made a strong plea for team work, for unison in the ranks, for willingness on the part of all the different organizations to work together in the spirit of give and take. The unity of the profession was what he had striven for during the eight years since he entered the jungle of medical politics. Colonel HUBERT FENWICK, who also responded, expressed the belief that the advisory councils would go far to achieve the unity they desired. Sir JAMES GALLOWAY, who found what he regarded as an unjustifiable depression prevailing among the preceding speakers, instanced the Royal Society of Medicine as an example of fusion which might give encouragement even in the sphere of medical politics. An enlivening speech was delivered by Dr. F. H. STANCOMB, who, in proposing the Chairman's health, made play with the fact that Sir Watson Cheyne had gone from the silent Navy to the "disgraceful Sabbath-breaking of Wigmore Hall," but having got into medical politics he would have to remain in. Great tasks of peace awaited the profession, and medical men should not only give their services to the community, but should awaken in that community a sense of the corporate value of the medical profession.

Sir WATSON CHEYNE was disposed to think that the present unrest and suspicion in the profession was a passing phase due to reaction after the war. He had accepted the chairmanship of the Medical Parliamentary Committee because he found that while it had no political policy of its own to further, it represented all sorts of medical opinion, and was willing to collect and correlate the information of which he and his fellow members in Parliament stood so often in need.

THE hospital of the University of Pennsylvania has resolved that women shall be eligible as interns. The faculty of the School of Medicine of the Western Reserve University has decided to admit women as students next year.

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SATURDAY, FEBRUARY 22ND, 1919.

REFRESHER COURSES.

IN a recent article on the overfull medical curriculum it was suggested that a review of the situation led to the conclusion that the curriculum must not only be shortened at the beginning by getting the preliminary sciences taught at the secondary schools, but that it must also be extended after graduation. The term "post-graduate instruction" is not elegant, and has come to be used in a double sense. Originally, and still most commonly, it signifies a scheme affording to those who have been engaged in practice for some years facilities for bringing their general knowledge and practice up to date, or for making themselves acquainted with the theory and practice of a special department. The term has recently been applied to the holding of resident hospital appointments immediately after graduation. It is the ambition of every young medical graduate worth his salt to hold a resident appointment in his own teaching hospital, or failing this in some other general hospital, but its realization is often beyond his reach because there are not enough appointments of this kind to go round. Dr. Addison, in introducing the Ministry of Health Bill last November, said that the Government considered it urgent to arrange that all the services relating to the care and treatment of the sick and infirm should cease to be administered as part of the Poor Law, and should become part of the general health service of the country. We make no doubt that he will be anxious to ensure that the change foreshadowed shall conduce to the improvement of medical education, and that resident appointments in what are now the large city Poor Law infirmaries will be thrown open to graduates from the schools. Other valuable opportunities in this stage are afforded by appointments, some resident, in the special hospitals, and in laboratories perhaps with the help of a research scholarship. If the teaching of the clinical subjects is to be organized on the system outlined in the memorandum of the Board of Education more and better opportunities for practical training on the scientific side will doubtless become open to the young graduate.

But this paulo-post-graduate training—already to a very considerable extent, but not completely, provided in this country—is not what is ordinarily understood by the term post-graduate instruction—namely, the refreshment of knowledge desired by one who has been in independent practice for some years. The distinction is important. The one man has modern instruction but little experience, the other considerable general experience but no modern instruction. The one must extend his training into new departments; the other seeks to make himself acquainted with new knowledge and method in the diagnosis, treatment, and prevention of diseases with which he has long been in practical contact. It is doubtful whether the paulo-post-graduate training needed by the young graduate and the refresher courses for the elder graduate can, with due regard to economy of the time of both sets of graduates, profitably be carried out in the same hospital and with the same staffs.

There are many opinions on the best way of providing what we have for convenience called refresher courses, but we suspect that the plan of a single graduate hospital school will not work in London or any other populous centre. The Royal Commission on University Education in London (1911) recommended that nothing should be done until "Medical Colleges of sufficient size and number to provide for all the university medical students in London had been established." Then, the Commission said, "there would be no objection to organizing a hospital of smaller size as a post-graduate school for the reception, partly of graduates from abroad and the colonies, and partly of students from the other university hospitals who desired to pursue their studies further."

There seem to be two fallacies here. The first is that only from the Dominions and abroad would graduates come to such a school: facilities are desired probably quite as much by graduates at home. The second is that what is wanted is a single hospital. What is wanted is a graduate school organization, and in that respect the emergency scheme of the Fellowship of Medicine seems to be on the right line. A graduate who has been some years in practice wants, as a rule, either to do laboratory work, or to give such time as he has to following some specially or perhaps the practice and teaching of some individual by whose reputation he is attracted. The memorandum of the Board of Education seems to recognize the truth of this contention for the paulo-post-graduate without, however, stating quite as clearly as would have been desirable its application to the elder graduate.

THE EPIDEMIOLOGY OF PLAGUE.

AN interesting report entitled "Twenty years of plague in India, with special reference to the outbreak of 1917–18," has recently been presented to the Government of India by Major Norman White, C.I.E., I.M.S. In it the history of plague in the several provinces of British India since 1896 is reviewed, and attention specially directed to the relation between plague mortality and humidity, a relation which helps to account for the severe visitation of 1917–18. Major White concludes that, notwithstanding the untoward events of last year, the general trend is in favour of the view that plague is a declining force, probably, he thinks, owing to increasing immunity amongst the rodent population.

Although more general attention has been attracted by experimental work—such, for instance, as the brilliant demonstration by Dr. C. J. Martin and Mr. Bacot of the Lister Institute of the exact mechanism by which the flea infects its host with plague—many additions to our knowledge of the more prosaic but equally important subject of epidemiology have been made during the last ten years. The late Major Lamb was the first to undertake an adequately documented study of the distribution of epidemics and their recurrences in villages. He and Mr. Major Greenwood of the Lister Institute established a differentiation between villages of large size liable to recurrent attacks and smaller villages not so distinguished, and they also effected a regional classification. Subsequently Greenwood provided a statistical proof of the connexion between means of transit and the recurrence of epidemics (a connexion suggested by earlier work), and, from an elaborate analysis of the Punjab evidence, concluded that village plagues were fed by importation from towns; that the chance of infection varied as the size and, in villages of the same

size, as proximity to means of transit, a first requisite of epidemic prevalence being the realization of certain conditions of temperature and humidity; that the severity of the epidemic when engendered depended upon the date of importation and the size of the village, small villages being less likely to become infected, but, if infected, suffering more severely than large ones; and, lastly, that in addition to these general factors, local conditions constant for any one epidemic, but varying from epidemic to epidemic, raised or lowered the mortality rates of contiguous hamlets in a remarkable way. Evidence of greater immunity against plague in rats from severely plague-stricken areas was furnished in a report issued by the Advisory Committee in 1913. The factor of humidity was the object of special study by Majors Gloster and White in a report on the Agra and Oudh plague of 1911–12 which appeared in 1917, and they reached the conclusion that the association of unusual humidity during the winter months in certain districts with severe epidemics was so constant a phenomenon that one might well stand to the other in the relation of cause to effect.

In a paper read before the Epidemiological Section of the Royal Society of Medicine last year, Dr. Brownlee, of the Medical Research Committee, made further contributions to the subject. He showed that the November humidity in many parts of India is, unlike that of this country, highly correlated with the humidity of subsequent months, even with of March, and that the logarithm of the size of the epidemic was linearly related, to a first approximation, with the humidity. Brownlee also called attention to a point not remarked by his predecessors. He found evidence of true periodicity; this he illustrated by the case of Poona, where the period was about 61.5 weeks, with the result that in due course the date of recurrence falls into a season of the year when weather conditions (doubtless those involved in the humidity factor) make a serious epidemic impossible; in such circumstances another outbreak was to be expected when the period again coincided with favourable external conditions. Allied to this true periodicity was a pseudo-periodicity, the epidemic falling later and later in the year until, as before, the external conditions were unfavourable and, unless a throw-back occurred, the disease died out.

From this rapid summary it will be seen that workers attacking the subject from different angles have reached harmonious conclusions, some of which give grounds for optimism, while others should keep that optimism within limits. The concordant findings as to the relation between humidity and plague prevalence should restrain us from reflecting too gloomily upon the events of 1917–18—an exceptionally humid season. The statistics so far available for the last quarter of 1918 show a very remarkable decline even in Bombay and the Bombay presidency. It must be remembered, however, that a similar temporary fall has been noted before, and that there have been months during the last five years when the total plague mortality in Bombay was only 468, and the Central Provinces, Bengal, and Central India were, so far as was known, quite free. The evidence as to the relatively limited numbers of disseminating foci and the part played by means of transit, however, gives ground for hope that, as the standard of education rises and the purpose of sanitary measures becomes better appreciated, administrative action may be more effective. On the other hand, the possible influence of a periodic factor, perhaps representing a phase of the life-history of the organism, is a warning against drawing too confident conclusions from a decline in mortality, such as is, we are glad to say, evident now. For all these reasons the very optimistic forecasts founded on Major White's report by some commentators in this country are too likely to be falsified. He is himself at pains to point out that the decrease in virulence, of which he finds evidence in most of the areas in India severely infected, can in no wise be attributed to increasing efficiency of antiplague measures. He does not make any very definite recommendations on which the Government can act beyond advising it to improve markets and grain stores in towns at present excessively infested by rats and to control movements of grain from and through plague-infected centres.

TAXATION OF WAR SERVICE GRATUITIES AND PENSIONS.

On more than one occasion the Government of the day has had to meet hostile criticism of its proposals with regard to the taxation of the pay issued to officers of the army or navy. From the introduction of the first of the War Budgets to the present time it has been contended that to levy war taxation on men who have given up the emoluments of their civil calling to help their country in a more direct and perilous service was neither necessary nor just; and beginning with the comparatively small concession of a lower rate of taxation to the officer whose total income did not exceed £300, the Government proceeded to institute a new scale of rates of income tax for "service" emoluments which is now markedly below the corresponding "earned income" scale, and to a large measure thereby met—though with a lamentable lack of promptitude—the original unfairness of the uniform application of the increased rates of tax levied for war purposes.

But officers generally have been placed under another disability in the matter of taxation, equally unfair, though, since hitherto it has been of comparative infrequent occurrence, not equally appreciated by the general public or even by intelligent critics of national finance. The ruling of the Income Tax Commissioners that "gratuities" and pensions given for war service are liable to the income tax may have been legally correct, but was demonstrably unfair having regard to the nature of such payments and the reasons for which they are made. The increased importance of this question during the demobilization period has raised so much hostile and enlightened criticism that the method of the importunate widow has once more proved successful, and the Government has publicly stated that the Chancellor of the Exchequer will seek power in the next Finance Bill to regard gratuities made to officers on discharge as free of income tax as from the beginning of the war, and to regard wound and disability pensions as not being liable to taxation as from April 5th, 1918.

The question is, of course, a general one, but that the medical profession is noticeably affected by this change is clear from a parliamentary answer given on the same day as the announcement referred to above was made. In that answer it was stated that since the signing of the Armistice 1,446 doctors had returned to civil life, while another 1,235 had been noted for release, and would return as and when their services could be spared. But there is one phase of this question which especially concerns the medical profession: this is, whether the new rule will apply to the annual gratuities of temporary R.A.M.C. officers as well as to the gratuities paid to Territorial medical officers on demobilization, who seem clearly to come within the somewhat general terms of the Government statement. We see no reason why these two classes of gratuity should not receive precisely similar treatment, and we trust that the Government will lose no time in making a clear statement on the point.

In dealing with the wound and disability pensions Mr. Baldwin, speaking on behalf of the Chancellor of the Exchequer, made it clear that the ground on which the objection to taxing the pensions had succeeded was that they were in the nature of compensation for injury received and analogous to awards under the Workmen's Compensation Act, which are not taxable, but he did not state the reason for the Government's conversion on the question of the gratuities. His colleague, the Secretary of War, however, in another parliamentary answer, appears to have supplied the omission, when he explained that "the gratuity to regular officers is less than that to temporary officers, because the latter have generally to re-equip themselves for a fresh start in civil life," thereby admitting that the gratuity is, in part if not entirely, paid not as a bonus or addition to income, but as a grant towards the cost of starting or restarting those professional activities on which the future income of the recipient depends. On this ground, and in accordance with the desire to comply with public sentiment to which Mr. Baldwin referred, there can, we suggest, be no doubt but that the relief from taxation should be extended to all gratuities whether paid annually or in a single sum; the time and manner of payment seem to be entirely irrelevant to the merits of the question.

Mr. Baldwin declined to state definitely the precise method by which and the time when the necessary re-adjustments of the income-tax deductions would be made, but hinted that although legislative sanction could not be obtained for some months some attempt would be made to deal with the question departmentally. It may therefore be some time before individual officers will receive any notification of what adjustment will be made in their respective accounts, but we suggest that the Government should immediately consider the desirability of issuing as early as possible a detailed statement of their new proposals and the methods by which they will be carried out, either through the public press or to all individuals who are or may be affected.

THE CLINICAL MEETING OF THE BRITISH MEDICAL ASSOCIATION IN APRIL.

THE names of the large number of distinguished members of the profession who have given their support to the Clinical Meeting of the British Medical Association next April by joining the General Committee are printed in the SUPPLEMENT. The meetings of the three sections—Medicine, Surgery, and Preventive Medicine and Pathology—will be held on the mornings of Wednesday, April 9th, Thursday, April 10th, and Friday, April 11th, in the Imperial College of Science and Technology, which the Rector, Sir Alfred Keogh, has very readily placed at the disposal of the Association. The programme of the sections, which is still subject to revision, is also printed in the SUPPLEMENT. It will be seen that the subjects selected are all of immediate interest and raise civil medical problems upon which the experience gained during the war will throw valuable light. On the second day, for instance, there will be a joint discussion in the Sections of Medicine and Preventive Medicine and Pathology, on influenza, in which the epidemics in France and in England will be compared and the etiology and epidemiology of the disease discussed. In the Section of Medicine there will be, on the first day, a discussion on war neuroses, introduced by Lieut.-Colonel F. W. Mott, and on the third day, on the newer methods in the prognosis of cardio-vascular infections, introduced by Dr. Thomas Lewis, F.R.S. There will also be a discussion on venereal diseases, introduced by Colonel L. W. Harrison, who will in addition give demonstrations at the Military Hospital for Venereal Diseases, Rochester Row. In the Section of Preventive Medicine and Pathology there will be discussions on the dysenteries, introduced by Lieut.-Colonel L. Dudgeon, C.M.G., and on malaria, introduced by Lieut.-Colonel S. P. James, I.M.S., one of the expert officers now employed by the Local Government Board to advise as to the prevention of the disease in this country. In the Section of Surgery the subject of gunshot wounds of the chest will be introduced by Colonel T. R. Elliott, F.R.S., on the medical side, and by Colonel G. E. Gask, C.M.G., on the surgical side. One of the special features of the meeting will be the number of demonstrations, and two of the subjects selected in this Section lend themselves particularly well to this method; the one is wound shock, the theory of which will be discussed by Professor Bayliss, F.R.S., and Dr. H. H. Dale, F.R.S., while demonstrations of methods actually used in France will be given. The other discussion, on reconstructive surgery, to be introduced by Major R. C. Elmslie, will be illustrated by a series of demonstrations at the Military (Orthopaedic) Hospital, Shepherd's Bush, and elsewhere. At the Royal College of Surgeons of England three special demonstrations of the War Collection will be given, the first by the President of the College, Sir George Makins, G.C.M.G., on injuries of arteries; the second, by Professor Arthur Keith, F.R.S., on fractures of the skull; and the third, by Mr. Cuthbert Wallace, C.B., C.M.G., on abdominal injuries. On the evening of Tuesday, April 8th, a conversazione, arranged by the Metropolitan Counties Branch, will be held in the Guildhall of the City of London, kindly lent for the occasion by the Lord Mayor. Those attending will be received by the President of the British Medical Association, Sir Clifford Allbutt, K.C.B., F.R.S. On the evening of Wednesday, April 9th, the Royal Society of Medicine will give an "at home" at which members will be received by the president of the society, Sir Humphry D. Rolleston, K.C.B. On Thursday there will be a dinner at the Connaught Rooms. The success of the meeting seems to be assured so far as interesting scientific work and agreeable social opportunities for making or renewing friendships are concerned. The only difficulty will be the matter of accommodation for visitors. Hotels in London are, and have been for some months, very full, and members proposing to attend the meeting are advised to make early arrangements. It is desirable to secure accommodation at once, and it may be necessary to pay a deposit at the time of ordering rooms. A certain amount of private hospitality will, it is anticipated, be offered.

UNIVERSITY HOSPITAL SCHOOLS FOR LONDON.

IT seems probable that we are about to see changes in the machinery of medical education, especially in London, which it is believed will increase the scientific character of the teaching in clinical subjects. The Royal Commission on University Education in London recommended the creation of university medical schools, and suggested three such schools, each having at least three whole-time professors in the three main subjects—medicine, surgery, and obstetrics—with, in addition, when circumstances made it appropriate, chairs in special subjects, such as pediatrics, neurology, psychiatry, and so on. A whole-time professor would be at the head of a "hospital unit," would have the control of wards, and of an out-patient department; he would be provided with assistants nominated by him, to assist him in carrying on the research, and would have laboratory accommodation in close proximity

to the wards not only for the service of the wards but also for research. The assistants would also be engaged in teaching, and it was contemplated that members of the profession in active practice should be invited to co-operate. The scheme was to a large extent imitative, and was clearly influenced not only by the method of German universities, but also by the movement which eventually resulted in the appointment of whole-time professors in the Johns Hopkins Hospital, Baltimore. It was feared that if the imitation were too slavish, the essentially practical clinical training in English schools, which has made the English doctor a better man than the German, would be lost, but the Board of Education, which is now taking a definite interest in the matter, seems to be fully aware of this danger. That Board already, as is well known, makes grants to the majority of medical schools, and it is understood to be willing to increase these grants on condition that any scheme adopted shall provide for the appointment and adequate remuneration of professors of clinical medicine, surgery, and obstetrics, and, where advisable, of other subjects, who would devote the greater part of their time to teaching and research. While it would not be advisable wholly to debar such a professor from private practice—success in which is a valuable asset in teaching work—he should be prepared, so long as he continues to be the head of a clinical department, to be primarily a teacher, and only in a minor degree a practising consultant; that is to say, his first and predominant interest would be the university. The Board in its memorandum suggested that the professors should have the control of wards (50 to 100 beds) and an out-patient department, and ample laboratory accommodation for research in clinical pathology, including cardio-respiratory work, bacteriology, microscopy, and x-ray and electrical work. Another condition was that the professors should have an adequate staff of teachers and assistants of university status, properly paid and graded, consisting of men, some whole-time and some part-time engaged in practice, sufficient in number to permit of small clinics and the representation of the various branches of medicine or surgery, all of which cannot be taught by a single professor. Finally it was laid down that an appropriate arrangement must provide for the close and integral association of the laboratory method with the clinical method, and for the full exercise of the two great branches of clinical teaching which Great Britain has taught to the world—the hospital bedside teaching system and the clinical lecture-demonstration of university standard. We understand that proposals on these lines have been made by the Board, and that they are under the serious consideration of four of the chief medical schools in London. Similar proposals have been made to the provincial universities, where, however, the need for reorganization is perhaps less urgent.

FILTER-PASSING VIRUS.

In their preliminary report on the presence of a filter-passing virus in certain diseases, published in our columns on February 1st, Bradford, Bashford, and Wilson stated that they had made investigations resulting in the detection, isolation, and culture by the Noguchi method of an organism from cases of acute infective polyneuritis which produced the malady when inoculated into animals. They gave particulars showing that the same method had revealed the presence of a comparable virus in trench fever, influenza, and nephritis, and added that organisms differing from one another but belonging to the same group had been recovered by culture in mumps, measles, rose measles, and typhus. The full text of the paper by these authors on acute infective polyneuritis has now been published.[1] Sir John Rose Bradford gives a detailed description of the clinical phenomena of acute febrile polyneuritis in man. There is often a history of an initial illness of a mild type, accompanied by headache and pain in the back, and a rise of temperature to 100° or 101° F. Then follows a period of latency of variable duration, up to a month or even six weeks. The fully declared or paralytic stage of the disease often develops suddenly; weakness in the legs is usually the first complaint, and a man may fall down on parade or even on the march, although still able to stand or even to walk with assistance. A characteristic feature is the marked degree in which the palsy affects the proximal segments of the limb. It is common to observe that the movements of the shoulder and hip are extremely weak or absent at a time when the patient can still move the fingers or toes freely. Though a group of large muscles, such as those of the hip, may be more affected than other muscles, the palsy never picks out individual muscles and is never limited even to a group of muscles. The muscles of the back, abdomen, chest, and neck are prone to be affected in all the more severe cases, so that the patients are not only unable to raise themselves, or sit up in bed, but cannot turn in bed, and often cannot raise their heads from the pillow. Facial paresis, usually bilateral, is characteristic and rarely absent. Paralysis affecting the oculomotor nerves is rare. Muscular wasting occurs only in severe and long-lasting cases. The sensory apparatus is disturbed, as indicated by pain at first and numbness and tingling in the palsied parts later. The disease seems to attack generally young men, but there was one case as old as 69. It is a fatal disease, since of the 30 cases upon which the paper is founded eight died. In two cases death took place on the fifth day, in one on the sixth, in one on the eighth, in one on the eleventh, and in one on the twentieth. Death appears to be usually brought about by respiratory embarrassment and pulmonary complications, due to palsy of the respiratory muscles, both the intercostals and the diaphragm being frequently affected. Bradford concludes that the disease is a very definite entity, due to a diffuse affection of the nervous system affecting the spinal cord, spinal ganglia, and peripheral nerves, with but slight incidence on the cortex. Bashford describes the morbid anatomy of the disease in man and in the monkey, and records its experimental production in the monkey. He amplifies the details given by Gordon Holmes in this JOURNAL (July 14th, 1917, p. 57), and adds a number of new observations. He found a gradually ascending involvement of the grey matter of the entire nervous system, the appearances pointing to a systemic poison which entered the central nervous system by way of the nerve trunks, both motor and sensory. The nature of the virus is described by Wilson in a paper which may be commended as a model of clear and precise statement, so excellently expressed as to make the details easily comprehensible to the non-expert. He isolated an organism of definite micro-scopical and cultural characters, cultivated it, and reproduced the disease by subdural inoculation in a monkey. The method of cultivation is described, and the results illustrated in some excellent coloured drawings by Mr. A. K. Maxwell. The method is as follows: A fragment, about the size of a pea, of sterile guinea-pig kidney is placed at the bottom of a sterile test tube, and alongside it a fragment of a similar size of the nervous tissue from the suspected case. The fragments are covered with a small quantity of a special serum agar. When this is set a special serum bouillon is added, the whole sealed with a moderately thick layer of vaseline, and the tube kept at 37° C. On the fourth or fifth day a granular haze appears in the vicinity of the nervous tissue, and about the seventh day minute semi-translucent colonies are seen on the surface of the agar, and grow rapidly. The surface colonies assume a faint yellow colour, and their upper limits become irregular. All the features are reproduced in subcultures, but the growth becomes more scanty in successive generations. No strain has been carried beyond the fifth generation, so that it would

[1] *The Quarterly Journal of Medicine*, vol. xii. Nos. 45 and 46. October, 1918, and JANUARY, 1919.

appear that the organism, which is an anærobe, possesses feeble saprophytic powers. In stained specimens of cultures from five to ten days old it appears as a minute rounded, oval or kidney-shaped body, measuring 0.2 to 0.5 μ in diameter and presenting a darkly-stained rounded spot, eccentrically placed, surrounded by a narrow faintly-stained area. As the cultures become older the organisms, which are grouped in colonies, swell up, lose their selective staining, and become indefinite in outline. The general resemblance to the globoid body of poliomyelitis is discussed, but the two organisms are shown to be distinct. These observations on acute infective polyneuritis and those on the other diseases mentioned in the preliminary report published on February 1st afford much material for speculation, but Sir John Rose Bradford does not go further than to point out that the facts suggest that the virus of poliomyelitis instead of being an isolated and peculiar thing, is one member of a class of organisms which await further study. We may share Dr. Bashford's hope that a new impetus has been given to the investigation of much that still remains obscure in the diseases of the nervous system, and not only in them, but of some general infections the etiology of which has hitherto evaded investigation.

DYSENTERY PATIENTS, CONVALESCENTS, AND CARRIERS.

An Army Council Instruction, No. 78 of 1919, dated February 1st, gives in detail the procedure to be adopted in Home Commands with regard to the treatment and disposal of convalescents from dysentery. All patients suffering or convalescent from dysentery, whether contracted in the United Kingdom or whilst serving in an Expeditionary Force, will, if fit to travel, be sent to one of thirteen selected dysentery hospitals, where they will be examined, treated, and disposed of as directed. The central dysentery hospital at Addington Park, Croydon, will provide both for the completion of convalescence, and also for the special treatment of carriers and chronic cases; it will be known as the Addington Park Military Hospital. Ordinary patients and carriers and certain cases of severe and relapsing dysentery will ultimately be transferred to the central hospital from the other twelve selected hospitals. Each of these, it is laid down, should have on its staff a competent bacteriologist and proto-zoologist, the laboratory in which the diagnostic work is done being either in the hospital itself or in very close proximity to it. The dysentery cases should be in charge of medical officers specially selected for their experience of, or aptitude for, the work, and as few changes as possible should be made in these appointments. Close collaboration between the clinical and laboratory staffs is regarded as of the utmost importance. Precise instructions are given for the classification and disposal of cases of bacillary and amœbic dysentery. The latter will undergo a course of specific treatment as laid down in the instructions drawn up by the War Office Committee on Dysentery. "Clinical dysentery" is recognized as a diagnosis for cases in which the specific organism cannot be demonstrated, but in which the clinical evidence is considered clear. Bacillary carriers are divided into "temporary" and "chronic." In no case should a chronic bacillary carrier be allowed to join, or rejoin, a force serving overseas. Cases classified as uncured or healthy amœbic carriers will be dealt with on the principle that specific treatment, or re-treatment, is optional, the medical officer in charge explaining fully the position to the patient, who, if he elects to be discharged while still a carrier, will be required to sign a paper stating that his condition has been explained to him, and that he has been offered and has refused a course of specific treatment. The Local Government Board will be informed of the discharge from hospital of any uncured or chronic case of dysentery (amœbic or bacillary), and any bacillary carrier. The Local Government Board, as was noted last week, made an order, dated January 7th, 1919, making it compulsory for a medical practitioner to notify any case of dysentery (among other diseases) which he is attending professionally. The medical officer of health on becoming aware of a case of dysentery in his district is to investigate the source of the infection and take steps to prevent its spread, including, if necessary, the treatment of the patient in a suitable hospital, and to inform the Local Government Board. Further, he is empowered, if necessary, to notify the person in writing that he shall discontinue any occupation connected with the preparation or handling of food or drink for human consumption, to forbid children in the care of any such person to be sent to school, and to specify measures that must be taken with respect to cleansing, disinfection, disposal of excreta, destruction of flies, and prevention of contamination of articles of food or drink for human consumption. The M.O.H. is also empowered to give notice to the responsible manager of a business concerned with the preparation or handling of food or drink that a person employed is suspected to be a dysentery carrier, and if the suspicion is confirmed by bacteriological or protozoological examination, the M.O.H. may give notice to the manager and to the person to prevent, during a specified period, the employment of such person in the conduct of that business, or any other business concerned with the preparation or handling of food or drink for human consumption.

THE RECRUDESCENCE OF INFLUENZA.

The surmise ventured in our last issue, that a third wave of epidemic influenza was gathering head, is unfortunately confirmed by the latest available figures. In London the smallest number of deaths attributed to influenza in any week after the beginning of the late outbreak was 33, in the week ending January 25th. In the two following weeks the numbers were 58 and 100, while for the week ending February 15th the return is 273, which has not been exceeded since December 14th. If we assume for the moment that that week (February 15th) corresponds to the week ending October 19th in its place in the cycle of epidemic evolution (in the week ending October 19th the deaths from influenza rose to 371 from 80 in the previous week), we should have reason to suppose that the third wave, although likely to cause a large number of deaths, would not reach the height of the autumn tide. Thus the autumn figures were 80, 371, 1,256, 2,458, 2,433, 1,665, 1,170, 942, 660, 332, 186, 95, 65, the last figure relating to the week ending January 4th. If, now, we express the series as percentages of the first item (the 80 deaths in the week ending October 12th), we have 100, 464, 1,570, 3,073, 3,041, 2,081, 1,473, 1,178, 825, 403, 233, 119, 81. The percentage ratio of 273 to 100 is 273, and, were the successive ratios reduced in the same proportion, we ought to have for the present series the above figures multiplied by $\frac{273}{100}$—that is, the gross mortality of the epidemic would be 100, 273, 924, 1,808, 1,789, 1,224, 867, 693, 485, 237, 137, 70, 48, or, say, about 70 per cent. of the previous mortality. It is, however, hazardous in the extreme to make predictions of this kind, and we merely desire to point out that the present indications, although warranting caution, do not justify the alarmist attitude which, we fear, sensational articles in lay journals tend to foster. The figures for the great towns show that the wave is affecting the country as a whole, but so far the prevalence to the north of the Trent seems greater than to the south of it. The influenza figures for Scotland have not been published weekly, but we notice that the deaths from pneumonia, bronchitis, and pleurisy in the sixteen towns of Scotland for which returns are published were 275 in the week ending January 25th, 307 in the following week, and 425 in the week ending February 8th. We would remark that in drawing deductions from the death returns for respiratory affections allowance ought to be

made for the meteorological factors, so that the whole of the excess mortality must not be credited to the reigning epidemic.

THE MEDICAL WORK OF THE MINISTRY OF NATIONAL SERVICE.

We have received the following announcement for publication: It has been agreed by the Ministers that the medical side of the Ministry of National Service shall be transferred to the Ministry of Pensions. Arrangements are now in progress to effect this transfer. The medical and secretarial staffs affected by this arrangement are at the head quarters of the Ministry of National Service and at the offices of regions and areas of the Ministry. They will continue to carry out their duties as at present under the current instructions of the Ministry of National Service. These officials will receive notice in due course of time of the arrangements proposed for their transfer. The only officers not affected by the transfer are the Chief Commissioner of Medical Services and the branch (M 4) dealing with demobilization of medical and dental officers on service with the armed forces of the Crown. These will remain as at present in the Ministry of National Service.

A COMMONS MEDICAL COMMITTEE.

A House of Commons Medical Committee has been formed to include all medical members and other members of the House of Commons interested in scientific matters akin to medicine. All the medical members, excepting the Ministers, have joined, and also Sir Philip Magnus (member for the University of London) and Sir Henry Craik (one of the members for the Scottish Universities). The chairman is Sir Watson Cheyne, and the secretary Major A. C. Farquharson, R.A.M.C. The executive committee consists of Sir William Whitla, Lieut.-Colonel Nathan Raw, R.A.M.C., and Captain Elliott, R.A.M.C. The objects of the committee are to exchange opinions so as to secure representation of agreed views on medical subjects in Parliament. The committee is open to receive representations on all such matters from the colleges and corporations, and from societies and associations, and will hold conferences when considered desirable. It will not allow itself in any way to be identified with any one particular body. The committee is to have a conference with Dr. Addison as to the Ministry of Health Bill on Monday. It has appointed a subcommittee, consisting of Colonel Nathan Raw (England), Sir Watson Cheyne (Scotland), and Sir William Whitla (Ireland), to watch the bill in its progress through the House.

The King has been graciously pleased to approve of the appointment of Field-Marshal His Royal Highness Arthur W. P. A. Duke of Connaught and Strathearn, K.G., K.T., K.P., G.C.B., G.C.S.I., G.C.M.G., G.C.I.E., G.C.V.O., G.B.E., as Colonel in Chief of the Royal Army Medical Corps.

We regret to record the death, in his 57th year, of Lieut.-Colonel A. M. Paterson, Professor of Anatomy in the University of Liverpool, who had held the office of Assistant Inspector of Military Orthopaedics for several years. We hope to publish a short biography in an early issue.

At the meeting of the governors of Westminster Hospital on February 18th it was decided that the question of amalgamation with another hospital should be referred to the decision of arbitrators to be appointed by King Edward's Hospital Fund for London. It seems now very probable that, should the arbitration result in recommending amalgamation, this will take place with King's College Hospital.

Colonel A. Bertram Soltau, C.M.G., M.D., who is about to resume his duties as physician to the South Devon and East Cornwall Hospital, Plymouth, has accepted the invitation of the Minister of Pensions to act as honorary consultant to the Ministry on the effects of warfare gas poisoning and the after-care of officers and men suffering from gas poisoning. Colonel Soltau, who went to France in 1914 in command of a Territorial field ambulance, has been a consultant physician to the forces since 1916, and has had special experience in the treatment of gassed cases.

Dr. Addison, President of the Local Government Board, has appointed Sir George Newman, K.C.B., M.D., F.R.C.P., Principal Medical Officer of the Board. Sir George Newman will for the present retain his position as Chief Medical Officer of the Board of Education and Medical Assessor to the Universities Branch of that Board. The arrangement whereby Sir George Newman undertakes for the present the duties of chief medical officer in both departments indicates a step towards the co-ordination of the public medical services which will be one of the principal objects of the Ministry of Health. The post of Principal Medical Officer to the Local Government Board is a new post. The holder will have the status of a Secretary of the Board, and will have administrative responsibilities in respect of the work of his department.

Medical Notes in Parliament.

Ministry of Health.

The Ministry of Health Bill was introduced by Dr. Addison, with the support of Mr. Fisher, Mr. Munro, and Major Astor, on February 17th. The text is nearly identical with that of the measure introduced last November. Sub-clause 3 of Clause 5, relating to the transfer of powers to and from the Minister, has been made wider, and provides that any powers and duties of the Minister other than those enumerated in the first schedule may be transferred to another Government department if they appear to relate to matters affecting or incidental to the health of the people. The following explanatory paragraph is inserted relating to the Poor Law:

> And it is hereby declared that it is the intention of this Act that, in the event of provision being made by Act of Parliament passed in the present or in any future session for the revision of the law relating to the relief of the poor and the distribution amongst other authorities of the powers exercisable by boards of guardians, there shall be transferred from the Minister to other Government departments such of the powers and duties under the enactments relating to the relief of the poor then vested in the Minister (not being powers or duties relating or incidental to the health of the people) as appear to His Majesty to be such as could be more conveniently exercised and performed by such other departments.

The After-care of Tuberculous ex-Service Men.—In answer to Mr. Pennefather, Sir James Craig, on February 12th, said that an expenditure of £30,000 a year on the after-care of tuberculous ex-service men was sanctioned in May, 1918, and a scheme for domiciliary visits was considered in consultation between the Ministry of Pensions, the Local Government Board, and the Insurance Commission. On December 4th the Local Government Board issued an explanatory circular to the local authorities. Special appointments would not be necessary in all areas as the scheme was an extension of the arrangements which in many districts were already in existence. In the debate on the address on February 14th, Lieut.-Colonel Nathan Raw said that it was estimated that there were between 40,000 and 50,000 soldiers and sailors affected with tuberculosis, a large proportion of whom had contracted the disease owing to the rigors of active service. The Government had been sympathetic, but a few months in a sanatorium and payment of a pension was not sufficient to cure tuberculosis, and a more comprehensive scheme was required. He appealed to the Government to appoint a special committee to deal with tuberculosis as it affected men invalided from the services and to establish some general form of adequate treatment which could be immediately put into effect. He suggested the formation of a department under the Health Ministry, concerned solely with the treatment of tuberculosis, to provide the necessary colonies and open-air methods. Ex-service men should not be passed on to the local authorities; special provision should be made for them. Sir Kingsley Wood said that at the present time there were in London about 2,500 soldiers who were receiving no treatment, and every week there were several hundreds of men waiting to go into sanatoriums. He severely criticized the administration of some of these institutions. Sir James Craig, Parliamentary Secretary to the Ministry of Pensions, said that disabled men received priority over other cases of tuberculosis, the accommodation in institutions was to be increased, after-care and home treatment improved, treatment of early cases extended, and steps taken to find for the men who did well graduated employment in agriculture and other suitable industries.

Artificial Limbs.—Sir James Craig stated, on February 13th, that the Minister of Pensions had appointed a committee to report on the existing arrangements with regard to supply, fitting, repair, and refitting of artificial limbs, and whether the Ministry should provide one or more institutions for the supply and repair of limbs, and should employ therein partially disabled or limbless men. The Committee consisted of Mr. Herbert Guedalla (Chairman), Brigadier-General G. H. Cockerill, C.B., and Captain Albert Smith, who had consented to act with Sir Charles Kemkerine and a leading surgeon, subsequently announced to be Mr. Raymond Johnson, O.B.E., F.R.C.S., Hunterian Lecturer in Clinical Surgery, University College Hospital. The number of men whose stumps were healed awaiting the fitting of artificial limbs on February 1st was 2,832, and the number of men whose stumps were not sufficiently healed for fitting was 5,322. Arrangements for the repair of artificial limbs were now being made by the local committees, and appeared to be working well. Limbs were supplied also to officers. There would not be any general provision of spare limbs until the arrears of first limbs had been worked off. In urgent cases, such as those of men going abroad or of men in special need by reason of their particular occupation, spare limbs had been provided. When asked subsequently the reason why so large a number as 2,832 men whose stumps were healed were still awaiting the fitting of artificial limbs, Sir James Craig replied that the rate of progress in fitting artificial limbs was governed by the limits of accommodation in the fitting hospitals and by the output of limbs by the limb makers. The number of men on the waiting list was large, but it represented what was now a normal two months for the fitting hospitals. The question of delay would be examined by the committee already announced.

The Search for Missing Soldiers.—Mr. Churchill stated in writing, on February 13th, that the present net total of officers and men reported "missing," including prisoners of war for all theatres and all services (Imperial and Colonial), was approximately 359,830. Of this total it was estimated that about 198,000 had been made prisoners. Death was presumed in the case of about 97,000 owing to the absence for a long period of any indication that they were alive; hence there were about 64,800 whose fate remained to be determined. Medical units, fully staffed and equipped, had been sent into each army corps district in Germany with orders to search every camp, prison, mines, asylum, hospital, and elsewhere. The sick were concentrated in central hospitals in each army corps district and moved from there in hospital train. Other Allied powers undertook the same service, and each collected all of any Allied nationality. The German authorities called for a complete roll of all Allied prisoners still in the country on January 25th, with heavy penalties against non-disclosure. A list of those who were known to be prisoners of war and who had not yet been repatriated or whose death had not been reported officially was in preparation. It would be presented to the German Government with demand that they should account for every one of them. A central inquiry office under British supervision would be established at Frankfort. It was possible that a certain number of men might elect to stay in the country and not make their presence known.

Training Statistics.—Asked by Mr. Pennefather, on February 17th, why only 7,939 men are now in training under the Pensions Warrant, Sir James Craig said that the large majority of disabled men were either ineligible for training in that they could resume their pre-enlistment occupations, or did not seek training because they had accepted munitions and probably well-paid employment. The number of men awaiting training was approximately 1,500. Of this number 835 desired to take up electrical or mechanical engineering, training for which was suspended pending certain negotiations with the National Trade Advisory Committee. Of the remainder a large proportion wished to be trained in boot and shoe making and repairing, but as there was a limit to the absorbing capacity of this trade an endeavour was made to see how possible to induce the man to take up some other form of training.

The War Bonus to Panel Doctors.—In a written answer to Sir Kingsley Wood, Mr. Prait, for the National Insurance Commissioners, on February 17th, stated that early in last year the Chancellor of the Exchequer received a deputation of insurance practitioners and promised them a supplementary remuneration in respect of the increased cost of living and practice in certain cases. The total cost could not be accurately estimated until all cases had been dealt with, but it was not expected to exceed £250,000. It would be paid under the statutory authority of the Appropriation Act from Exchequer moneys voted by Parliament for the purpose, supplementing the Exchequer moneys, approximating to some two million pounds annually, expended on medical remuneration apart from the funds derived from insurance contributions.

THE WAR.

CASUALTIES IN THE MEDICAL SERVICES.

ARMY.

Died on Service.

Captain J. S. Cocks, R.A.M.C.(S.R.).

Captain John Stanley Cocks, R.A.M.C.(S.R.), was reported as having died on service, in the casualty list published on February 10th. He was educated at Guy's Hospital, and took the diplomas of L.D.S. R.C.S.Eng. in 1912, and of M.R.C.S. and L.R.C.P.Lond. in 1914. He took a commission as lieutenant in the Special Reserve of the R.A.M.C. on October 7th, 1914, and was promoted to captain on April 7th, 1915.

Lieutenant F. P. M. Lunt, A.A.M.C.

Lieutenant F. P. M. Lunt, Australian Army Medical Corps, was returned as having died on service, in the casualty list published on February 14th.

HONOURS.

A special Supplement to the *London Gazette*, dated February 15th, contains a further list of awards in recognition of "gallantry and devotion to duty in the field." The following medical officers are included:

Bar to D.S.O.

Major (temporary Lieut.-Colonel) Francis Cornelius Sampson, D.S.O., 92nd Field Ambulance, R.A.M.C. (D.S.O. gazetted January 14th, 1916.)

Captain (acting Lieut.-Colonel) James Henry Fletcher, D.S.O., M.C., R.A.M.C., commanding 36th Field Ambulance. (D.S.O. gazetted July 18th, 1917.)

D.S.O.

Lieut.-Colonel Stanley Paulin, 11th Field Ambulance, C.A.M.C.

Major Leonard May, M.C., A.A.M.C., attached 11th Battalion, Australian Infantry.

Temporary Major Charles Fraser Knight, 133rd Field Ambulance, R.A.M.C.

Captain Patrick Augustine Ardagh, M.C., N.Z.M.C., attached 1st Battalion, Auckland Regiment.

Second Bar to Military Cross.

Temporary Captain (acting Major) Maurice Aloysius Power, M.C., R.A.M.C., attached 148th Field Ambulance. (M.C. gazetted January 18th, 1918. First bar gazetted January 11th, 1919.)

Temporary Captain George Oliver Fairclough Alley, M.C., R.A.M.C., attached 2nd Battalion, Royal Irish Regiment. (M.C. gazetted June 4th, 1917. First bar gazetted September 16th, 1918.)

Lieutenant (temporary Captain) William John Knight, M.C., R.A.M.C., attached 89th Field Ambulance. (M.C. gazetted May 31st, 1916. First bar gazetted 18th, 1918.)

Bar to Military Cross.

Captain (temporary Major) Robert Alexander Hepple, M.C., R.A.M.C.(S.R.), attached 28th Field Ambulance. (M.C. gazetted July 26th, 1915.)

Captain (acting Major) John Bernard Cavenagh, M.C., R.A.M.C.(S.R.), attached 113th Field Ambulance. (M.C. gazetted September 17th, 1917.)

Captain (acting Major) Thomas Frederick Corkhill, M.C., R.A.M.C.(S.R.), attached 139th Field Ambulance. (M.C. gazetted September 26th, 1917.)

Captain (acting Major) Frederick Gamm, M.C., R.A.M.C. (S.R.), attached 2/3rd (Home Counties) Field Ambulance R.A.M.C.(T.F.). (M.C. gazetted July 26th, 1918.)

Captain (acting Major) William Clavering Hartill, M.C., 55th Field Ambulance R.A.M.C. (M.C. gazetted January 1st, 1917.)

Captain (acting Major) William Archibald Miller, D.S.O., M.C., R.A.M.C.(S.R.), attached No. 6 Field Ambulance. (M.C. gazetted November 16th, 1916.)

Captain (acting Major) James Calvert Spence, M.C., R.A.M.C. (S.R.), attached 38th Field Ambulance. (M.C. gazetted September 17th, 1917.)

Captain Franklin Fletcher Dunham, M.C., C.A.M.C., attached No. 5 Field Ambulance. (M.C. gazetted October 16th, 1917.)

Captain John Shaw Mackay, M.C., 12th Field Ambulance, A.A.M.C. (M.C. gazetted January 18th, 1918.)

Captain Laurel Cole Parker, M.C., 12th Field Ambulance, C.A.M.C. (M.C. gazetted February 1st, 1919.)

Captain Joseph Gregor Shaw, M.C., 12th Field Ambulance, C.A.M.C. (M.C. gazetted February 1st, 1919.)

Captain Donald George Kennedy Turnbull, M.C., 11th Field Ambulance, C.A.M.C. (M.C. gazetted July 26th, 1917.)

Temporary Captain (acting Major) John Edgar Davies, M.C., 131st Field Ambulance, R.A.M.C. (M.C. gazetted September 13th, 1918.)

Temporary Captain (acting Major) Benjamin Knowles, M.C., R.A.M.C., attached 86th Field Ambulance, R.A.M.C.(T.F.). (M.C. gazetted March 26th, 1918.)

Temporary Captain (acting Major) Harold Dunmore Lane, M.C., R.A.M.C., attached 1/1st North Midland Field Ambulance, R.A.M.C.(T.F.). (M.C. gazetted October 18th, 1917.)

Temporary Captain Frederick Orlando Clarke, M.C., R.A.M.C., attached 149th Field Ambulance. (M.C. gazetted January 11th, 1919.)

Temporary Captain Claude Norman Coad, M.C., 74th Field Ambulance, R.A.M.C. (M.C. gazetted July 26th, 1917.)

Temporary Captain Alexander Campbell White Knox, M.C., R.A.M.C., attached 2nd Battalion, Royal Sussex Regiment. (M.C. gazetted January 1st, 1918.)

Temporary Captain James David MacKinnon, M.C., R.A.M.C., attached 4th Battalion, Liverpool Regiment. (M.C. gazetted September 16th, 1918.)

Military Cross.

Captain (acting Major) Hubert Roy Dive, 1/2nd Mounted Brigade Field Ambulance, R.A.M.C., attached 230th Field Ambulance.

Captain (acting Major) Arthur Leonard Shearwood, R.A.M.C. (S.R.), attached 33rd Field Ambulance.

Captain Alan Fenton Argue, C.A.M.C., attached 87th Canadian Battalion, Quebec Regiment.

Captain Frederick Grant Banting, 15th Field Ambulance, C.A.M.C.

Captain James Harold Blair, C.A.M.C., attached 72nd British Columbia Regiment.

Captain Edwin John Bradley, R.A.M.C.(S.R.), attached 1/3rd North Midland Field Ambulance, R.A.M.C.(T.F.).

Captain Miles Gillespie Brown, C.A.M.C., attached 85th Canadian Battalion, Nova Scotia Regiment.

Captain Edwin Thomas Cato, A.A.M.C., attached 1st Battalion, Australian Infantry.

Captain Herbert Troughton Chatfield, R.A.M.C.(S.R.), attached No. 6 Field Ambulance.

Captain Lewis Hayes Fraser, C.A.M.C., attached Royal Canadian Horse Artillery.

Captain Gerald Wallace Grant, No. 4 Field Ambulance, C.A.M.C.

Captain Albert Robert Hagerman, C.A.M.C., attached 75th Canadian Battalion, Manitoba Regiment.

Captain James Mann Henderson, A.A.M.C., attached 12th Battalion, Australian Infantry.

Captain Charles Terrell Lewis, C.A.M.C., attached 10th Brigade, Canadian Field Artillery.

Captain Iorworth Hubert Lloyd-Williams, R.A.M.C.(T.F.), attached 5th Battalion, Lincoln Regiment (T.F.).

Captain Harry Clarke Moses, C.A.M.C., attached No. 5 Field Ambulance.

Captain John Archibald Nicholson, R.A.M.C.(S.R.), attached 1st Battalion, Seaforth Highlanders (Egypt).

Captain Kenneth Chad Parnell, A.A.M.C., attached 11th Brigade, Australian Field Artillery.

Captain Allan Melrose Purves, A.A.M.C., attached 2nd Tunnelling Company, Australian Engineers.

Captain George Alexander Smith, C.A.M.C., attached 47th Canadian Battalion, West Ontario Regiment.

Captain Clifford Hallsley Kerr Smith, R.A.M.C.(T.F.), attached 1/4th Battalion, King's Own Scottish Borderers (T.F.).

Captain John Stirling, R.A.M.C.(S.R.), attached Head Quarters, 112th Brigade, Royal Field Artillery.

Captain Joseph Townsend Stirling, 11th Field Ambulance, C.A.M.C.

Captain Richard Chapman Weldon, C.A.M.C., attached 2nd Canadian M.G. Brigade.

Temporary Captain (acting Major) John Richard Percy Allin, 20th Field Ambulance, R.A.M.C.

Temporary Captain (acting Major) Basil William Armstrong, R.A.M.C., attached 100th Field Ambulance.

Temporary Captain Thomas Clapperton, 141st Field Ambulance, R.A.M.C.

Temporary Captain Robert Donald, R.A.M.C., attached 35th Field Ambulance.

Temporary Captain Alexander John D'Souza, I.M.S., attached 22nd Punjabis (Egypt).

Temporary Captain William Balfour Gourlay, R.A.M.C., (N. Russia).

Temporary Captain Norman Frankish Graham, R.A.M.C., attached 6th Battalion, London Regiment.

Temporary Captain Richard Percoit Hadden, 83rd Field Ambulance, R.A.M.C., attached 152nd Brigade, Royal Field Artillery.

Temporary Captain Alexander Hunter, R.A.M.C., attached 62nd Divisional Engineers.

Temporary Captain William Boyd Jack, R.A.M.C., attached 5th Battalion, Leicester Regiment (T.F.).

Temporary Captain Matthew James Johnston, R.A.M.C.

Temporary Captain Charles William Berry Littlejohn, 140th Field Ambulance, R.A.M.C.

Temporary Captain Alfred Mason, R.A.M.C., attached 229th Field Ambulance.

Temporary Captain Edward Rogerson, R.A.M.C., attached 2nd Battalion, King's Royal Rifle Corps.

Temporary Captain James Scott, R.A.M.C., attached 12th Battalion, Manchester Regiment.

Temporary Captain Thomas McFall Sellar, R.A.M.C., attached 1/18th London Regiment.

Temporary Captain George Burkett Wilkinson, 28th Field Ambulance, R.A.M.C.

Lieutenant William Percival Nelson, R.A.M.C.(S.R.), attached 1/28th Battalion, London Regiment.

EAST AFRICAN CAMPAIGN.

The following awards to medical officers are announced for services rendered in connexion with military operations in East Africa:

C.M.G.

Temporary Lieut.-Colonel Hugh Basil Greaves Newham, R.A.M.C.

Major (acting Lieut.-Colonel) Richard Edmond Humfrey, R.A.M.C.

C.I.E.

Lieut.-Colonel (temporary Colonel) William Wellesley Clemesha, I.M.S.

O.B.E.

Temporary Majors: Robert Semple, R.A.M.C.; Robert Standish White, R.A.M.C., attached Northern Rhodesia Medical Corps.

Captains: Charles Percivale Bligh Wall, S.A.M.C.; Isidore Jack Block, S.A.M.C.; George McGregor Millar, I.M.S.

Temporary Captains: Arthur George Eldred, Special List, Nyasaland Medical Service; Charles Reginald Howard, R.A.M.C.; Quintus Madge, R.A.M.C.; Legh Richmond Herbert F. Marshall, R.A.M.C.; Samuel Mason, S.A.M.C., attached 2/1st Battalion, King's African Rifles.

M.B.E.

Temporary Lieutenant Arthur William Joblins Pomeroy, West African Frontier Force, attached Medical Services, East Africa.

To be Brevet Majors.

Captains (acting Lieut.-Colonels) J. D. Kidd, M.C., R.A.M.C., J. A. Manifold, D.S.O., R.A.M.C.

Captain E. A. Sutton, M.C., R.A.M.C.

Military Cross.

Captain Atholl Robertson, R.A.M.C.

The Meritorious Service Medal has been awarded to ten warrant and non-commissioned officers and privates of the R.A.M.C.

ORDER OF THE BRITISH EMPIRE.

The *London Gazette* of February 18th announces the following appointments to the Order of the British Empire for valuable services rendered in or in connexion with military hospitals, war hospitals, auxiliary and civil hospitals, command depôts, convalescent camps, or other duties of a similar nature in the United Kingdom in connexion with the army during the war.

C.B.E. (Civil Division).

Reginald Alcock, M.B., F.R.C.S.; Alexander Richard Anderson, F.R.C.S.; Herbert George Franklin, M.R.C.S.; William Henry Clayton Greene, M.B., F.R.C.S.; Robert George Hogarth, F.R.C.S.; Russell John Howard, M.S., F.R.C.S.; William James Howarth, M.D., D.P.H.; Professor Bennett May, M.B., F.R.C.S.; William Cuthbert Morton, M.D.; Frank Nicholson, M.D.; Alfred James Rice-Oxley, J.P., M.D., M.R.C.P.; Thomas Young Simpson, M.D., M.S., F.R.C.S.

O.B.E. (Civil Division).

Robert Young Aitken, M.D., F.R.C.S.; George Edward Gonge-Andrews, M.B., B.S.; George James Mouncey Atkinson, M.R.C.S.; Isaac Banks, M.D.; Richard Henry Barker, M.B., B.Ch.; William Charles Bentall, F.R.C.S.; Edward Joseph Blackett, M.R.C.S.; Joseph Blomfield, M.D.; Frederick Lennox Bazman Brown, M.B., C.M.; Lieut.-Colonel William Hobson Corge, I.M.S.; John Cashin, F.R.C.S.I.; James John Day, M.H.C.S., D.P.H., John Elliott, M.D., F.R.C.P.; Henry Brown Elliott, M.B., B.C.; David Ewart, M.D., Ch.B., F.R.C.S.; Francis Harold Fairweather, M.D., M.S.; Henry Dawson Farnell, J.P., F.R.C.S.; Edmund Towers Fison, M.D., D.P.H., F.R.C.S.; James Finlayson Fleming, M.B., Ch.B.; Joseph Vincent Fox, M.B., C.M.; Robert Broom Giles, M.D.; Herbert James Godwin, M.B., F.R.C.S.; James Edward Gordon, M.R.C.S.; Bernard James Guillemard, M.D.; John Atkinson Harrison, M.B., C.M.; Joshua Harold Harvey, M.R.C.S.; Edward Drummond Hay Hawke, M.R.C.S.; Alfred William Hunton, M.R.C.S.; Miss Mary Ethel Jeremy, M.B., B.Ch.; John Rushworth Keeie, M.R.C.S.; Charles Gilbert Burrington Kempe, M.D., B.S.; Martin Aston Key, M.B., B.Ch.; Miss Mary Forbes Lindsay, M.B., Ch.B.; Cecil John Read MacFaddan, M.D., C.M.; John Macintosh, M.D.; Arthur Martin Mitchell, M.D., B.C., D.P.H.; Herbert Charles Orrin, F.R.C.S.; Reginald Christopher Peacocke, M.D.; George Henry Percival, M.B.; Charles James Pinching, M.R.C.S.; Arthur Young Pringle, M.R.C.S.; Frank Radcliffe, M.B., Ch.B.; Bernard Rice, M.D.; Kenneth Rogers, M.D.; Miss Winifred Margaret Ross, M.B., Ch.B.; Steward Henry Rouyeatte, M.B., B.Ch., F.R.C.S.; Lewis Erle Shore, M.D., B.Ch.; Edward Walpole Simmons, M.D.; Charles Dudley Somers, M.B.; Miss Florence Ada Stoney, M.D., B.S.; John William Taylor, M.D., Ch.B.; Berthold Beely Thorne Thorne, M.D., B.S.; John William Thomson Walker, M.B., C.M., F.R.C.S.; Arthur Douglas Webster, V.D., M.D., D.Sc., F.R.C.P.; Cyril George Ross Wood, F.R.C.S.; Robert Alfred Worthington, M.B., B.C., F.R.C.S.

England and Wales.

THE EAST MIDLANDS UNIVERSITY.

An article by Professor Frank Granger in the issue of *Nature* for February 13th shows that the movement in favour of creating a university for the East Midlands, with its seat at University College, Nottingham, has made considerable progress. The decision to apply for a charter was reached at a meeting presided over by the Duke of Portland (president of University College, Nottingham) and attended by representatives of the counties of Derby, Leicester, Lincoln, Northampton, Nottingham, and Rutland. The meeting affirmed the need for a university providing university and advanced technical education, and promoting scientific research in the East Midland area, and began the formation of a committee to take the necessary steps. At present University College, Nottingham, and the Midland Agricultural College are the only institutions within the area which, in a systematic manner, provide instruction and pursue research of the highest standard; but there are in existence, or immediately contemplated, a considerable number of institutions providing instruction of a special character, which will become parts of the new university, ranging through various degrees of affiliation to the position of schools in the university. Schools of engineering, lace, and hosiery will, it is expected, take their respective places on a footing like that of the existing Agricultural College, and plans for the establishment of colleges of pure science and arts are being developed. The proposed university would be of a federal character as the various schools rise towards and obtain recognition. Nottingham, as has been said, is to be the centre, and it is pointed out that Derby and Leicester are within half an hour by rail, while the remoter centres of population, such as Lincoln and Northampton, are within easy reach of one at least of the cities already mentioned.

CONTROL OF TUBERCULOSIS IN WALES.

The Welsh Outlook has published a supplement on the campaign against tuberculosis carried out by the King Edward VII Welsh National Memorial Association. It was founded in 1910 with a gift of £125,000 from one family. It commenced the actual work of treating patients in July, 1912, and now has contracts with all the Insurance Committees in Wales and Monmouthshire for the treatment of insured persons suffering from tuberculosis, in return for the sums of 9*d.* a head per insured person out of the sanatorium benefit fund of each committee. The cost of maintenance in respect of the institutions and of administration is met out of the income derived from the invested funds of the association, the contributions from Insurance Committees, and Treasury grants in respect of income from sums invested and of interest on capital invested. The deficiency is allocated among the county and county borough councils in Wales and Monmouthshire and the Treasury, the association having undertaken, in return for the moiety from the local authorities named, to extend treatment to non-insured persons. The association is managed by a council of 80 members, of whom 32 are appointed by county councils and county borough councils, and 21 by the Insurance Committees.

Before the establishment of the association there existed the West Wales Sanatorium and the open-air home for children, erected and maintained by Miss A. M. Davies of Treborth, Bangor. Both these institutions have been presented to the association, and the accommodation at the former has been increased from twenty-three beds to eighty-two, while at the latter the accommodation has been exactly doubled. The Pontypool estate in Breconshire was purchased by the association, and a sanatorium providing 304 beds, believed to be the largest in the United Kingdom, has been built. Sir D. S. Davies some years ago presented an estate at Llangwyfan, in the Vale of Clwyd; here the North Wales Sanatorium, with 184 beds, has been erected, and the donor has built on the estate a block for the treatment of persons suffering from surgical tuberculosis. Altogether the association owns 361 hospital beds, and has arranged with various authorities for 318 more.

In a short article on treatment in sanatoriums, Dr. H. E. Watson, medical superintendent of the North Wales Sanatorium, writes:

> The most complete scheme of graduated exercises is that laid down by Dr. Marcus Paterson, the late medical director of the association, and now practised in the sanatoria of the association. As a result patients are restored to working capacity more quickly than formerly, and on leaving the sanatorium are, in the majority of cases, fit at once to re-enter the ranks of the wage earner, and with a better prospect of remaining well. The success of the sanatorium depends largely on the degree of supervision exercised over the whole lives of the patients, and on the degree of co-operation which can be induced on the part of the patient. One point which should be emphasized is that the success of the sanatorium is further dependent on the early recognition of the disease, and where this is delayed a successful issue to treatment becomes more remote and unlikely.

In a note on the factors in a successful fight against tuberculosis, Sir William Osler lays down the following conditions:

> The essential factors in the fight are (*a*) the improvement in the social and hygienic surroundings—better homes, better habits, more fresh air, more food, shorter hours, less beer; (*b*) the most watchful care about the beginnings of ill health, particularly in children, who should be systematically inspected, etc.; (*c*) early diagnosis, for which purpose the tuberculosis dispensary is all important, and as a centre for the examination of contacts, and for the education of the public; (*d*) sanatoriums in which early cases may be cured or the disease arrested, and all educated; (*e*) the extension of the home treatment under the supervision of the tuberculosis officer; (*f*) hospitals for advanced cases, and the most rigid supervision of all *open cases* in their homes; (*g*) a larger staff of specially trained nurses for dispensary, home, and sanatorium work; and, lastly, a central institute which will (1) house the general staff; (2) organize the work to the smallest details; (3) be in sympathetic touch with every tuberculosis officer and nurse; and (4) conduct actively researches into the pathology and treatment of the disease.

Scotland.

THE NEONATAL MORTALITY RATE IN EDINBURGH.

The *Scotsman* newspaper included recently in its weekly report on the health of the city of Edinburgh a few lines on the neonatal death-rate for the month of January. It will be remembered that Dr. J. W. Ballantyne, in an address given at the annual meeting of the National League for Health, Maternity, and Child Welfare in London last July, made a strong appeal for the separate and prominent publication of the neonatal mortality rate in all large towns and districts of the country (BRITISH MEDICAL JOURNAL, July 13th, 1918, p. 32). He gave reasons for regarding the neonatal rate (that is, the number of deaths in the first month of life per 1,000 live births) as the most sensitive index of the general welfare or ill health of the community; for this and other reasons he urged that this mortality rate should be picked out for separate publication and placed alongside of the general birth-rate, the general death-rate, and the infantile death-rate, so that the public might know how matters stood in this important section of vital statistics. The large national annual statistical reports give this rate along with those of various other months and years in life, but these reports do not always reach the general public.

The Edinburgh report for January, after referring to the prevalence of the zymotic diseases, to the general and infantile mortality rates, and to the birth rate, adds: "During the month of January 30 deaths occurred in the case of infants under the age of one month, being equal to an annual neonatal mortality rate of 67·4 per 1,000 births. For the corresponding month of last year the rate was 37·2 per 1,000 births." Probably temporary or local causes account for the great increase which this rate shows over that of the corresponding month in last year—the prevalence of influenza, perhaps—but the striking fact remains that there are periods when in these first four weeks of life 67 out of every 1,000 babies born alive may perish. Obviously efforts must be made to lessen this great mortality if child welfare work is not to be loaded with a dead weight of disaster that must go far to take all the hopefulness out of its propaganda. For this reason the new departure made by the Edinburgh health authorities in supplying the newspapers with the neonatal mortality rate (a practice which we understand is to be continued monthly) may be timeous and helpful, although

it must be confessed that this first announcement is depressing. It would be well if other large centres of population were to be afforded the opportunity of clearly recognizing the incidence of disease and death in these early and most deadly weeks.

Correspondence.

THE TEACHING OF OBSTETRICS AND GYNAECOLOGY.

SIR,—In your leading article in the BRITISH MEDICAL JOURNAL of February 15th on the teaching of obstetrics and gynaecology there is a paragraph beginning, "We are not prepared to follow Dr. Fairbairn in his suggestion that the care of the infant up to nine months or a year might advantageously be the province of the obstetrician." I made no such suggestion, and rather argued for the reverse of this, but apparently my open mind as to where the dividing line between obstetrics and pediatrics should be drawn left room for ambiguity, as some of the speakers at the meeting obtained a similar impression to that conveyed by your leading article. As time did not allow of my clearing the matter up at the meeting I beg your indulgence to do so now.

I took it for granted that the baby for the first few weeks must be in charge of the obstetrician, as he teaches by example as well as precept. Throughout pregnancy and labour his teaching has been directed towards the prospect of two patients, and to one thoroughly imbued with this idea the handing over the charge of one patient the moment that prospect has been realized seems almost impossible. Your leading article speaks of birth as the logical point to draw the dividing line, but there is no logic in treating mother and child separately from birth; there is the all-important question of breast-feeding, for instance, to which consideration has been given throughout pregnancy and which is not established till some days after birth. From the standpoint of preventive medicine, the head of the clinic must be responsible for seeing that his students pay full attention to both patients, and cannot delegate his responsibility in regard to one of them to a colleague without detriment to his influence and his teaching. The example of his interest and thought for the baby patient is a most potent factor in creating that preventive atmosphere about the training of his students which it was the object of my paper to urge.

I think the misapprehension as to my view arose through my describing the baby clinics at St. Thomas's as having "evolved" from the obstetric department and being in its charge. But it was clearly described as a stage in evolution and not as a fully developed scheme, which I suggested would be "the appointment of a special officer for the child welfare clinics, who would begin by taking part in the teaching on the infant in the maternity ward, where he will become known to the mothers and learn to know them, and thus preserve continuity from the maternity clinics to the baby clinics." This "liaison" officer, as I termed him, was meant to be a pediatrician, but perhaps I ought so to have labelled him, though his office ought to have been understood, as immediately afterwards the impossibility of the obstetric officers undertaking the infant clinics is stated. My argument was that so close a co-ordination is required between obstetrics and pediatrics—both for success in working the centre and for the training of students—that the pediatric officer, as one of the team, must know from the start what is being done for mother and infant, and should be responsible for continuity of policy from maternity ward to infant clinic. I felt it impossible to draw any hard and fast dividing line between obstetrics and pediatrics, and left it open because there must be an intermediate stage of co-domision, of handing over and taking over, during which the obstetric child is responsible for mother and infant, and insists on his students following his lead; but, at the same time, he seeks the advice of, consultation with, and the aid in teaching of his pediatric colleague. Till mother and child are discharged from hospital to clinic their supervision is not taken over by the pediatric side of the team.—I am, etc.,

London, W., Feb. 18th. JOHN S. FAIRBAIRN.

THE PRESENCE OF A FILTER-PASSING VIRUS IN CERTAIN DISEASES.

SIR,—In the BRITISH MEDICAL JOURNAL of February 1st, 1919, a preliminary paper by Bradford, Bashford, and Wilson briefly refers to a group of filter-passing organisms in typhus and in other diseases which appears to be identical with a group of filter-passing organisms which were first described by Hort and Ingram in May, 1914, in connexion with typhus fever. Between that date and the present day numerous publications have appeared under my name in which I have referred to the presence of similar filter-passing organisms, not only in typhus fever, but also in scarlet fever, measles, German measles, mumps, epidemic pneumonic affections, and cerebro-spinal meningitis.

In each case except the last the organisms in question were found in Chamberland F filtrates, the use of Berkefeld filters of all meshes being discarded by me as not affording satisfactory evidence of genuine filterability in the usual bacteriological sense. In each case the filtrates proved, when inoculated in the fresh, or nearly fresh, condition, to be highly pathogenic to monkeys, and often to guinea-pigs and rabbits. These inoculation experiments were in all cases elaborately controlled. In many cases, especially in typhus fever, the organisms could be cultivated for a short time in filtered citrated human blood, and on slices of sterile rabbit kidney. The organisms frequently occurred as minute coccoids, varying from about 0.2 μ, or less, to about 0.5 μ, being seen singly, in pairs, or in short chains. They prefer aërobic to anaërobic conditions, and were demonstrated in filtered blood, cerebro-spinal fluid and urine in all the acute typhus cases examined, as well as in unfiltered blood, cerebro-spinal fluid and urine. They were also demonstrated in filtered throat washings, and in unfiltered throat washings, in the early stages of scarlet fever, as well as in the blood and urine. In measles, German measles, and mumps, they were invariably to be found in fresh urine during the early stages of the disease, each disease presenting its own morphological variations, though these are slight, in stained and unstained films. Control observations of normal urines, of normal bloods, and of normal specimens of cerebro-spinal fluid, in the case of typhus fever observations, invariably gave negative results.

Speaking from memory, on duty in France, the number of cases examined was roughly as follows in the five years in which I have been almost continuously engaged in the study of this remarkable group of organisms: Typhus fever 40 cases, scarlet fever 20 cases, measles 12 cases, German measles 8 cases, mumps 12 cases, epidemic bronchopneumonic and pneumonic affections 7 cases, epidemic cerebro-spinal fever 30 cases.

In addition to numerous references in the medical press, I have given several demonstrations, both in public and in private, of the morphology of various members of this group of organisms as exhibited by film preparations, and by photographs by F. M. Duncan of filtrates showing their presence. The chief of these demonstrations was in a private meeting in 1915 at which Sir Alfred Keogh, G.C.B., A.M.S., Professor Adami, Surgeon Captain Bassett-Smith, Professor Farmer, Sir Humphry Rolleston, and others were present, and at meetings of the Royal Microscopical Society in Hanover Square. These demonstrations were accompanied by exhibitions of a long series of temperature charts, illustrating on the one hand the high degree of pathogenicity of these organisms in filtrates, and on the other the complete absence of fever in uninoculated selected animals. As a result of the meeting in 1915, I was officially instructed by the D.G.A.M.S. to pursue the study of this group of organisms on a much more extensive scale than had up to that date been possible. For eighteen months, therefore, after that date, an exhaustive study—bacteriological and experimental—of this group of organisms was made by me in typhus fever, and independently by Captain A. H. Caulfeild in the Addington Park laboratory, and in cerebro-spinal fever by Captain Caulfeild and myself in conjunction. Some of the work in cerebro-spinal fever has already been published, the very considerable mass of fresh data with regard to typhus now awaiting publication and the advent of less laborious days to arrange these data. Here I must be content with saying that in typhus fever the presence of the same group of organisms has been repeatedly established by me by passage through a long series of human cases, monkeys, and guinea-pigs; the infectivity of the filtrates of the blood and cerebro-spinal fluid, Chamberland F filters being again exclusively employed, from the human cases and from the animal carriers being established beyond any possibility of doubt. Much work, however, still remains to be done in typhus and in all the other diseases mentioned in order absolutely to establish full etiological relationships.

This is one of the reasons I have hitherto been content with fragmentary preliminary accounts of my work on these filter-passing organisms, in the hope that meanwhile the original observations of Hort and Ingram in 1914 in typhus fever would be confirmed by other workers. This hope appears now to have been fulfilled by independent workers, clearly unaware of my earlier publications, and I sincerely trust that their interesting and valuable paper will stimulate further efforts in a most difficult field of study. Not the least of the difficulties to be encountered is the fact, as Captain Bashford and Captain Wilson will soon discover, that the appearance of the particulate organisms demonstrable in the blood and cerebro-spinal filtrates is preceded by the appearance of an organic virus the intimate structure of which is more difficult optically to determine, and which is at the same time more highly infective, than is the case when development has proceeded to the point at which definitely visible organisms appear. The significance of this observation in all filtration experiments, provided that good filters are employed, will not escape notice.—I am, etc.,

HOWARD C. HORT,
Hon. Lieut.-Colonel R.A.M.C. (temporarily).

France, Feb. 8th.

REFERENCES.
BRITISH MEDICAL JOURNAL, July 6th, 1918, p. 15. Proceedings, British Medical Association Meeting, Aberdeen, July, 1918. BRITISH MEDICAL JOURNAL, April 17th, 1915, p. 671. *Journ. Roy. Army Med. Corps*, February, 1916. Ibid., September, 1916. *Journ. Roy. Microscop. Soc.*, December, 1916. *Proc. Roy. Soc.*, vol. 89, 1917, etc. The article in the BRITISH MEDICAL JOURNAL of April 17th, 1915, containing references to the filter-passing organisms found in typhus fever, was translated into French, Russian, and Serbian, and was circulated in Serbia during the summer of 1915 by the British Red Cross Society.

DIFFUSE EMPHYSEMA OF THE WALL OF THE SMALL INTESTINE.

SIR,—Under the above heading Mr. C. A. R. Nitch and Professor S. G. Shattock, F.R.S., reported a case before the Pathological Section of the Royal Society of Medicine recorded in your issue of February 15th. From the description the case was evidently an example of the disease usually designated "Gas Cysts of the Intestine," a case of which was investigated and described by Professor T. Sheuman and myself in 1909 (*Journal of Pathology and Bacteriology*, vol. xiv, p. 259). In this case, as in at least ten of the twenty previously recorded, there was a stenosis from ulceration in the pyloric region, the patient dying from haemorrhage from the ulcer.

The cysts in our case, as in the majority of others recorded, were situated in the last two feet of ileum, the jejunum being entirely unaffected. Some cysts were situated on the peritoneal surface of the intestine and were pedunculated, others were found in the submucosa. Microscopic examination of the smaller cysts showed them to contain and to be partly lined by giant-cells, some of which were vacuolated and appeared to be secreting the gas. Cultures taken from the cysts both during life and after death gave a growth of *B. coli communis*. Whilst placing little reliance on the evidence of *post-mortem* culture, the leucocytic infiltration round most of the cysts made us conclude that the primary factor in their origin was probably bacterial.

Whether the condition is the result of organismal infection or is a form of new growth is as yet undecided. I think, however, we may definitely exclude the theory advanced by Mr. Nitch and Professor Shattock that it is an emphysema the result of gas being driven into the wall of the gut by way of the edge of an ulcer in the duodenum, as in all recorded cases the duodenum itself has been free of the cysts which have been most numerous in the lower ileum.

It is of interest to know that John Hunter described a similar condition in pigs, and an investigation of this condition by the Department of Agriculture in Washington revealed the presence, in the cysts, of an organism of the colon group in every case examined.—I am, etc.,

Edinburgh, Feb. 19th. D. P. D. WILKIE, F.R.C.S.

METHODS OF INFANT FEEDING.

SIR,—As an infant welfare doctor, I cannot let Dr. Laing's criticism of some modern methods of infant feeding (BRITISH MEDICAL JOURNAL, February 8th, p. 159) pass unchallenged. I agree with him that a hard-and-fast rule for infant feeding will lead to many disasters. Every infant is a law unto itself; not only have *age* and *body weight* to be taken into consideration in determining the dietary, but a third factor more important than either of the others—the *individuality* of the child. Thus the thin, active, muscular type of baby usually needs a bigger feed than a quiet placid infant of the same age and of perhaps even heavier weight. Or a baby who has lost weight through illness requires, once convalescence is established, an apparently excessive diet. The *atrophic* babies, again—that difficult class of infants who from birth, or more frequently from the time the breast milk ceases, fail to thrive satisfactorily—once their metabolism (as a result of treatment) becomes normal, require feeds of caloric value out of all proportion to their body-weight.

As a general rule the baby at the breast knows when it has had enough, and provided it be not allowed merely to use the nipple as a dummy to go to sleep with, I consider, with Dr. Laing, that it should be allowed to suck as long as it likes, and not for any stated number of minutes; for a vigorous infant will obtain in ten minutes what a more weakly one will spend half an hour in acquiring.

When we come to deal with the bottle-fed baby, however, I do not agree that the infant's inclination can be entirely followed. Dr. Laing says it is difficult to overfeed such a baby, "if the mixture be of suitable strength, the teat not too large, and the baby *not allowed to suck too long*" (the italics are mine). That is just the point: with the bottle-fed baby we have to some extent to regulate the feeds. The ideal teat has still to be invented. Teat bores should be graded so that a hole of any required size could be obtained. In practice it is difficult to secure a teat with a suitable bore; should one succeed, a very few days' use enlarges the hole so that it becomes too big, and in consequence the bottle is gulped down so rapidly that no feeling of satisfaction results. Less frequently the bore is too fine, and the infant becomes tired with sucking—satisfied in a sense for the moment—before the full ration is taken, whereupon the anxious mother, seeking the aid of a red-hot needle, enlarges the hole and usually oversteps the mark.

Turning now to the *interval between feeds*. When first qualified I advised as I had been taught, and advocated two or two and a half hourly feeds for very young babies, with four-hourly feeds at night. I have long since given this up and have become a firm convert to the "three-hourly, no night feeding" school. In the course of some nine years' experience at schools for mothers and infant consultations the conviction has become deeply rooted that for the great majority of babies this method gives the best results. Unlike Dr. Laing I find flatulence is usually attributable to too frequent or irregular feeding and once the infant has adopted the three-hourly routine the trouble tends to disappear, provided of course the bowels be kept regular. In this part of the country at any rate the unta ught mother feeds her infant not at any set time, but simply whenever it cries. If subsequently it sleeps for several hours on end she is thankful for the respite to attend to her over-numerous other duties. The process of feeling a baby, including the necessary "toilet" and the procedure known as "getting the wind up" occupies not far short of an hour. The infant is then (theoretically at any rate) laid in its cot or pram to sleep, but some time probably elapses before it finally settles off, so that the next two-hourly feed becomes due just as it is in a deep restful sleep. To awaken it at this juncture seems to me absolutely wrong; both mother and child would suffer.

The *three-hourly* method on the other hand allows time for a good sleep between feeds, and if there is a little waking interval before the next meal time arrives, a suitable opportunity is afforded for exercise and for fondling and nursing.

The "pitiful cries" of the babies to which Dr. Laing refers may be due to many causes other than hunger—cold feet, thirst, lack of sleep, constipation, to mention only a few. Labour saving is the cry of the moment: we want to simplify life. The task of bringing up a family is difficult enough even amongst the affluent. Amongst mothers

of the infant welfare class the strain involved is enormous; a baby is often said to be one person's work, but here, in addition to baby tending, one pair of hands has to wash and cook and mend and clean. In these cases is two-hourly feeding practicable? I say not. Such advice leads merely to irregular feeding. No working-class mother could keep up with it—hence she feeds the baby when awake whenever it cries, and for the rest thankfully lets it sleep as long as it will!

The three-hourly plan she can attempt to follow. Hence by advocating it from the beginning we may lighten her burden. The habit of sleeping all night without a feed is readily acquired if insisted on from the first, and the long rest benefits mother and child alike.

The great majority of nurses of my acquaintance favour the three-hourly plan, not from any lazy motive, but because they are convinced of its superiority to the older two-hourly plan. Premature and weakly infants may need more frequent feeds, lest the total day's intake of food be insufficient to promote growth. A steady gain in weight is the safest criterion of progress, and this can in the vast majority of cases with which we have to deal be obtained with the three-hourly method, provided the food be adapted, qualitatively and quantitatively, to the individual in question.—I am, etc.,

G. H. HICKLING, M.D., D.P.H., B.Sc.

Dalgarth, Romiley, Feb. 7th.

THE UNITY OF THE PROFESSION.

SIR,—We are on the edge of a great abyss, we are on the verge of disaster, we are on the verge of losing our freedom and becoming paid servants, and one of our professions is directing us thereto. Before it is too late, let us examine our strength of resistance, and, for the sake of the professional freedom of ourselves and those who are to follow us, let us organize under a strong leadership and fight to the bitter end.

The work of general practice is not work that can be satisfactorily carried out by salaried men or on contract terms. The treatment of cases, as we are so excellently taught in the wards of our hospitals, cannot be successfully pursued in general practice. Any general practitioner who attempts to treat cases in private as he did when he was house-surgeon or house-physician very soon finds that he has got to alter his ways or look out for something else to do.

If this so-called State medical service is going to be introduced, in a very short time we shall have a large gang of medical men whose one object will be to get their day's work finished as speedily as possible and do as little as they can for the salary offered: that is the natural trend of paid servants.

At the present moment the Government is master of us and, mark my words, is in full knowledge of the fact. Our only Association, the British Medical, excellent as it is in many ways, is being fooled; occasionally a little sop is given to it, but the fact remains that when it comes to bargaining the Association is helpless and the Government will see to it that it remains so if it can possibly manage it.

The sooner the profession realizes that Dr. Addison is not working for it, and cares nothing for it, the better; we are gradually being forced to fight, and unless we can quickly organize our forces and arm them the result is a foregone conclusion.

I am one of those who think there is plenty of room for amicable work between the British Medical Association and the Medico-Panel Union. The British Medical Association is the pioneer, and must uphold the rights of the majority. This it cannot do at the present time because it has no power of punishing any refractory member except by expelling him and thus still further weakening our forces. What is required is that the British Medical Association should have power to say to the Government, "Hands off!" and mean it. If all the members of the British Medical Association would also join the Medico-Panel Union that power is at once in their hands, and I do not think it would have to be used. It would very speedily be seen that instead of being told what we are to do we should be politely consulted on bended knee. At the present time I am a member of neither society, but loyal in every respect to the British Medical Association. I am perfectly prepared to join both if they will work together for our interests.—I am, etc.,

WILLIAM ESCOMBE, M.R.C.S., L.R.C.P.

Grimsby, Feb. 9th.

THE FUTURE OF THE MEDICAL PROFESSION.

SIR,—In view of coming developments in the way of a State medical service, various committees have been formed for the purpose of watching over and guarding the interests of the medical profession. The necessity of rendering these committees as representative of the profession as possible has been repeatedly emphasized, and they have been made to include on their strength consultants, general practitioners, panel doctors, public health and Poor Law officials. Yet in spite of the anxiety shown to guard the interests of all these branches of the profession, there is one great body of medical men that is apparently unrepresented. Nevertheless, it is to this unrepresented group that the coming of any form of State medical service is a matter of such vital importance. I refer to the medical men who have served overseas during the present war, and, having lost their pre-war practices, are now faced with the necessity of starting their professional life over again. Surely those who have staked so much already, and are looking forward to the possibility of State employment as a means of obtaining a decent livelihood, are worthy of direct representation on some of these so-called representative committees.

It may be offered as an explanation of this omission that the very fact that these men were serving abroad at the time of forming the committees made it impossible to find suitable representation. But at the present moment, when many of these medical officers have returned from overseas, this excuse is no longer valid. Suitable representatives can now be selected. Nor can the protestations of those of the profession who have remained at home during the war to the effect that they are fully conscious of their obligations to guard the interests of their absent colleagues be considered sufficient. Wrongly or rightly, the men who have lost their practices through absence are not entirely comfortable about leaving their future in the hands of others. Of the good intentions of many of their home colleagues they are fully conscious, but good intentions are but good intentions, and a future that rests on such a foundation is none too satisfactory.

At the end of the South African campaign an association was formed of medical men who had served abroad during the war. The formation of such a society after the present war would, of course, be a very much bigger undertaking. But is such an idea altogether unfeasible? The bond that links together medical men who have served abroad during the present war is a very real one—a bond that is as great, if not greater, than that which unites those who have been educated at the same school, or university, or hospital. Has this idea, that has doubtless arisen in the minds of many of us, begun to materialize, or is it merely an idea that will never take outward form? The difficulties of realizing such a project may be great, but if thereby something of the comradeship we have known abroad can be preserved at home, surely those difficulties are worth tackling.

Can any one tell me if any steps have been taken in this matter, or if, indeed, such are even contemplated?—I am, etc.,

KENNETH M. WALKER,

London, Feb. 4th. Captain R.A.M.C.(T.C.)

MEDICAL RESETTLEMENT.

SIR,—I have followed with interest the correspondence in the JOURNAL on the questions of demobilization and the subsequent future of junior R.A.M.C. officers. It appears to me that there is a class whose claims may not yet been put forward. This is composed of men who have held hospital appointments before the war, and who then intended to start practice, or to specialize. Many of the latter now cannot do so owing to the lapse of time—four years or more—the lack of opportunity and experience in their special subject in the R.A.M.C., and the necessity, perhaps from family and financial reasons, of now "settling down." The date of their demobilization is still uncertain, and, even when they are free, they have nothing definite to which to return. Many owing to ill health shrink from the struggle of commencing general practice.

Within the last few months I have met many officers in these circumstances, and some definite information on the following points would be very welcome, as it would make future prospects less uncertain:

1. Will there be many whole-time appointments vacant under the Ministry of Pensions? It is presumed there may be, as rumour has it that the Ministry will at some future date take over several institutions now under military control; and there may be other appointments, not institutional.

2. Will such appointments be made widely known, by advertisement or other means, so that all such officers may have the opportunity to apply?

3. Will such officers, if appointed under the Ministry of Pensions before their demobilization, be allowed to demobilize or transfer from the R.A.M.C.?—I am, etc.,

February 3rd. "HOPEFUL."

SIR,—With reference to the demobilization of medical officers, it would appear that, in addition to those who left practices or teaching posts to join up at the beginning of the war, there are others—the then more recently qualified—who were pursuing studies for further or higher professional qualifications. In exceptional cases some by taking up specialist work may have been able to accumulate wholly or partially the material for the examination or thesis they had in view. Others, and this more especially applies to those who have devoted their attention to field ambulance and regimental work, have perforce been prevented from recommencing their studies.

I should like to endorse all that Major Gibbons says in the letter published in your issue of January 25th. It would seem to be only fair that those whose studies were interrupted should be given consideration in the order of demobilization, this applying specially to those who joined up early in the war.—I am, etc.,

R.E.F., Feb. 1st. REGIMENTAL M.O. (S.R.).

The Services.

INDIAN MEDICAL SERVICE.

THE INCREASE IN GRADE PAY.

THE Secretary of State informed the deputation from the British Medical Association on February 10th that improvements had been sanctioned in the rates of pay for permanent officers of the Indian Medical Service on both the military and civil sides approximating in the aggregate to an increase of 33⅓ per cent. on the present rates of military grade pay. He stated that the detailed rates of pay to give effect to the decision are being worked out in India, and will be announced as soon as possible. Meanwhile, taking the old rates of grade pay and adding 33⅓ per cent., we find the following:

Grade Pay: Rupees a Month.

	Old.	New (estimated).
Lieutenant	350	467
Captain	400	533
,, after 5 years' service ...	450	600
,, ,, 7 ,, ...	500	667
,, ,, 10 ,, ...	550	735
Major	650	867
,, after 3 years as major ...	750	1000
Lieut.-Colonel	900	1200
,, ,, specially selected ...	1000	1333

The sterling value of the pay in rupees, which is, of course, of importance to a European who has to remit money to London, depends on the rate of exchange. By an Act of 1899 the value of the rupee cannot fall below 1s. 4d. It has appreciated during the last few years and is at present (February 20th) 1s. 6d. It is not thought probable that it will go back to 1s. 4d. We have, however, calculated the sterling equivalent of the new grade pay at both 1s. 4d. and 1s. 6d.

Grade Pay: New Scale: Sterling Equivalents (approximate).

	Sterling Yearly.	
	At 1s. 4d.	At 1s. 6d.
Lieutenant	378	421
Captain	427	481
,, after 5 years	480	541
,, ,, 7 ,, ...	534	602
,, ,, 10 ,, ...	586	663
Major	693	781
,, after 3 years	800	902
Lieut.-Colonel	960	1085
,, ,, specially selected ...	1066	1205

The new grade pay is to have retrospective effect from December 1st, 1918. The new rates for officers in military employment set out in Army Instruction (India) No. 1343 (published in the BRITISH MEDICAL JOURNAL on February 8th) came into force on the same day. To know what the exact effect of the increase of 33⅓ per cent. will prove to be in the case of officers in military employment we must wait for the promised announcement of the details now being worked out in India.

WAR GRATUITIES FOR OFFICERS.

THE Admiralty and the War Office have issued Orders with regard to the grant of special war gratuities to officers of the navy and army respectively.

Naval Service.

Separate scales are laid down (a) for permanent officers on the active lists of the Royal Navy and Royal Marines, and (b) for temporary officers R.N.R., R.N.V.R., retired, and emergency officers. For permanent officers on the active list a sum ranging from £15 in the case of a Paymaster Cadet, to £720 in the case of an Admiral of the Fleet, will be paid for the first year's service or part thereof. For each additional month after a year's service there will be an increment of £1, £2, or £3 according to rank, in the case of officers who have served at sea or overseas; or of 10s., £1, or £1 10s. in the case of officers who have not so served. Generally speaking, all naval service on full pay during the war will count towards the gratuity, but the maximum service is limited to five years, or to the statutory date for the termination of the war, whichever is reached first. The gratuity will be based on the relative rank (acting or confirmed) held on November 11th, 1918, but provision is made for subsequent advancement in rank. Retired officers or officers on the emergency list who are reinstated on the active list during the war will receive the gratuity under this Order instead of that laid down for officers on the retired lists.

Officers of the R.N.R. and R.N.V.R. receiving naval rates of pay will be granted a gratuity of 100 days' pay for the first year's service, or part of a year's service, and fifty days' pay for each subsequent year or part of a year's service. The case of temporary medical officers are being dealt with separately, though it is not stated how. Further on the Admiralty Order lays down that gratuities will not be paid to, among others, officers serving under special contracts which provide for the issue of a gratuity. In such cases an officer may elect to take the gratuity under this Order instead, if more advantageous. Surgeon Sub-lieutenants R.N.V.R., who were allowed to resign to resume their medical studies are ineligible only when less than six months' service as an officer has been rendered. The gratuities will be issued on demobilization, and will be based on the full pay (exclusive of any allowances) of the acting or confirmed rank held at the date of demobilization, or if such is later than November 11th, 1918, on the latter date if more advantageous to the officer.

In the case of deceased officers the gratuity will be payable to the estate.

Military Service.

In the case of officers holding permanent commissions on the active list of the Regular Army the gratuities issuable in recognition of war services are set out in a schedule to a Royal Warrant, dated February 10th, 1919. War service is defined generally as commissioned service within periods beginning from August 4th, 1914, inclusive, and ending at the date of the termination of the war as statutorily defined, or August 3rd, 1919, whichever comes first. It includes any war service with the Egyptian Army, West African Volunteer Force, King's African Rifles, or in the Navy, Marines, or Air Force, which will qualify for a war gratuity under this Warrant had such service been in the Army. The minimum gratuity varies according to rank, thus: For a second lieutenant it is £35; for a lieutenant, £40; for a captain, £45; for a major, £60; for a lieut.-colonel, £75; for a colonel, £100; for a brigadier-general, £140; for a major-general, £200; and for a lieut.-general, £300. The definition of rank for

the purpose of the war gratuity is prescribed by the Army Council. Officers who have completed more than one year's commissioned war service will receive a further sum in respect of each additional month or portion of a month of commissioned war service, subject to a maximum of forty-eight such increments. If with service overseas this monthly increment will be £1 for officers of ranks or appointments carrying a minimum gratuity up to and including £75, £2 where the minimum gratuity is £100 or £140, and £3 for officers of higher rank. If with no service overseas the monthly increments will be reckoned at half the above rates.

The gratuity will in no case be issuable in addition to any gratuity under Article 497 of the Royal Pay Warrant; nor to an officer whose services are dispensed with, or who resigns his commission for misconduct or for other causes held by the Army Council to disqualify; nor to one who has relinquished his commission owing to ill health due to his own misconduct; nor to one who before November 11th, 1918, voluntarily resigned his commission after less than two years' service; nor to one who relinquished it on account of ill health not due to military service after less than six months' commissioned service. The gratuity will be credited to the estates of deceased officers direct from the War Office.

The British Medical Association is making inquiries as to the position of temporary surgeons R.N. and of Territorial, Special Reserve, and temporary officers of the R.A.M.C. in respect of war gratuities.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

The following medical degrees have been conferred:

M.B. AND B.CH.—F. Gray.
M.D.—H. W. Bates.

UNIVERSITY OF LONDON.

UNIVERSITY COLLEGE.

Mr. T. B. Johnston will begin on March 3rd, at University College, London, a course in anatomy for the Primary Fellowship Examination, specially suited for R.A.M.C. officers who are entering for the examination in May, 1919, under the special terms arranged by the Royal College of Surgeons. Particulars can be obtained from the Secretary of University College.

UNIVERSITY OF BRISTOL.

The following have been approved at the examinations indicated:

FINAL M.B., CH.B.—*Part II* (completing examination): A. G. Bodman, Elizabeth Casson, Evelyn B. Salter, A. D. Symons, E. F. White. *Part I.*: Subhasagar Datta, T. H. A. Pinniger.
D.P.H.—J. W. Gilbert.

UNIVERSITY OF LEEDS.

Dr. J. B. Hellier has retired from the chair of obstetrics which he has held since 1906. He has been connected with the Leeds School of Medicine from his student days. He was appointed demonstrator in anatomy in 1881, became lecturer in materia medica and therapeutics in 1884, and was lecturer on diseases of women and children from 1889 to 1908, when he was appointed to the chair of obstetrics. He was Dean of the Faculty of Medicine in 1917-18. Dr. Hellier, who does not intend to retire from private practice, has been succeeded by Dr. E. O. Croft, who has been lecturer on gynæcology since 1908, and is a member of the staff of the Leeds Hospital for Women and Children and of the Maternity Hospital.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

At the monthly meeting of the Royal Faculty of Physicians and Surgeons of Glasgow, held on February 3rd, Major-General Sir William B. Leishman, K.C.M.G., C.B., F.R.S., was admitted an Honorary Fellow. At the same meeting the following were admitted as ordinary Fellows: Donald MacPhail, M.D., Coalbridge, and John Nalru Marshall, M.D., Rothesay.

M. M. Lafferre, the French Minister of Public Instruction, recently appointed a scientific commission to report on the faculties and laboratories in Alsace and Lorraine. It presented a scheme of reorganization of the University of Strasbourg. In accordance with a wish expressed by Alsatian students, the university was reopened on January 15th. Most of the professors of the Paris and provincial faculties, entrusted with the teaching till final arrangements can be made, were present at the ceremony. The immediate task of the new university is to afford Alsatian students the means of rapidly completing studies already begun or of commencing a first year curriculum drawn up in accordance with French methods.

Obituary.

E. O. PRICE, M.D.EDIN., J.P., Bangor.

Dr. Ents Owen Price, who died on February 7th, was born at Holywell, Flintshire, on July 19th, 1857. He was educated at St. Asaph Grammar School and the Edinburgh High School, and graduated M.B., C.M. in the University of Edinburgh, 1879, and M.D., 1891. He was one of the founders of the Students' Union at Edinburgh. In 1882 he took the practice of Dr. Ellis at Bangor, and had immediately to face a severe epidemic of enteric fever. He was appointed medical officer and public vaccinator of the Bangor District and Workhouse, and later to the University College of North Wales and to the Normal College, Bangor. After some years he was elected honorary medical officer to the Carnarvonshire and Anglesey Infirmary and later honorary surgeon to the same institution, a post which he held with increasing interest and efficiency until the end. He had been president of the North Wales Branch of the British Medical Association, and for years the annual representative of his Division to the Council of the Association. While the National Insurance Act was under consideration and negotiations were proceeding between the medical profession and the Government, he was elected by the British Medical Association on the Advisory Committee. In that capacity he had to sacrifice a great deal of his time and energy, his visits to London were frequent and his labours were strenuous and valuable. In recognition of such splendid services the medical men of North Wales presented him with a motor car. He became the first chairman of the Panel Committee of the county, and continued to retain that position until about a year ago, when he found it necessary to ask to be relieved of its duties. A few days before that date, and when his strong and clear mind was in full vigour and activity, the shadow of the dread angina pectoris fell upon his brave and noble spirit with all the superadded force of the knowledge that at about his own age then, his father had succumbed from the same cause. Nevertheless, he responded with admirable courage and success to the many extra calls of the war period upon his time and strength. He continued to attend the operating theatre of the Infirmary at any hour of the day and night. He became one of the medical officers to the Military Hospital at Bangor, took his share of the duties left to the remaining men by those local colleagues who had taken commissions in the R.A.M.C., was the chairman of the Local Medical War Committee, and worked hard to find fit and available men for the front; took a very active part in the establishment of the V.A.D. centre at Bangor, and took charge with keen interest of the maternity and child welfare clinic. Finally, he even had the alertness to seize with vigour an opportunity to think out and prepare a scheme for a public health laboratory for North Wales in connexion with the proposed new science department as a soldiers' memorial in the University College of North Wales. He visited the various county councils of North Wales to present this scheme, and with convincing eloquence succeeded in carrying the scheme through. He was a justice of the peace for the county of Carnarvon. It is feared that the strain during the severe epidemic in November taxed his strength too greatly. His condition since Christmas had caused anxiety, but no one was prepared for the end, which came on February 7th suddenly.

This were no place to refer at length to Dr. Price's many and various accomplishments. He was a richly gifted man, strong in character and intellect, widely read, endowed with sound common sense, and possessed an ever ready and witty speech. He will be greatly missed as advisor, friend, and counsellor, both locally and in the Representative Body. He is survived by his wife, three daughters, and one young son.

Dr. John Albert Manton, a well known Sheffield medical practitioner, died on February 4th from pneumonia following influenza. He was born at Wakefield in 1864, and studied medicine at St. Bartholomew's Hospital and at the medical schools of Leeds and the University of Durham, obtaining the M.R.C.S. and L.R.C.P. diplomas in 1886. Two years later he began practice in the Park district of Sheffield. Among other early appointments, he was demonstrator of anatomy in the Sheffield School of Medicine. For many years Dr. Manton took a prominent part in municipal life as a member of the city council and a guardian. In addition to the work of a large private practice, he held the appointments of medical officer to the Sheffield Post Office and to the Education Department. He spent his holidays in travel, and made good use of his experiences, both on the platform and in various literary contributions. He visited Serbia in 1899, and wrote a series of sympathetic articles on life in the Balkans, in recognition of which he was appointed by King Alexander of Serbia a Chevalier of the Order of St. Sava. He was an enthusiastic cyclist, and was for many years president of the Sheffield Road Club, in this way adding year by year to his knowledge of local roads and of the antiquarian lore of the countryside. Dr. Manton leaves a widow, a son, and two daughters. He was for many years a member of the Sheffield Division of the British Medical Association.

The death took place at Pretoria, on October 23rd, of Dr. Donal M. Barry, pathologist on the staff of the Pretoria Hospital. Dr. Barry was born in Ireland, and was educated at Clongowes Wood College and Queen's College, Cork, whence he graduated M.B., B.S., of the late Royal University of Ireland, in 1908. In his student days he was a well-known footballer. After a short period of practice in England, he was appointed house-surgeon to the Pretoria General Hospital. He returned home in 1914, and, after obtaining the D.P.H. diploma, was appointed pathologist to the Pretoria Hospital. The heavy strain of the recent influenza epidemic in South Africa overtaxed his health, and he fell a victim to influenzal pneumonia. Dr. Barry was a member of the Pretoria Branch of the British Medical Association. His untimely death is deplored by a wide circle of colleagues and friends.

In the JOURNAL of February 8th there appeared a brief notice of the death of Dr. H. S. Cosgill, West African Medical Staff. The following further particulars are supplied by one who knew him intimately and had worked much with him: From 1909 to 1911 Dr. Cogbill was demonstrator at the London School of Tropical Medicine. In 1913 he and Dr. H. M. Hanschell were sent by the Colonial Office to Sekondi, Gold Coast, to take part in the investigation of acute malarial fevers. Later Dr. Cogbill left for the Northern Territories of the Gold Coast to investigate a reported outbreak of yellow fever. His careful work there brought to light facts proving that a disease clinically closely resembling yellow fever had been known among the natives for at least two generations. The disease—in recurring epidemics—had always come from the north in the Sudan. *Stegomyia calopus* was found right up to the Sudan frontier. The Hausa traders coming down to the coast from the Sudan and Northern Territories knew the disease. The importance of this—if it be yellow fever and not, say, "infective (spirochætal) jaundice"—is that it explains the infection of the coast periodically with yellow fever, always a puzzle before, for no direct ship communication with known yellow fever centres existed. Cogbill was generosity and honour personified; great patience and care marked his work. A large number of friends in West Africa must mourn his death, and the service itself has suffered a heavy loss.

Medical News.

Dr. John Adams, of Glasgow, happily recovered from a serious illness, was among those who attended the investiture on February 18th to receive the M.B.E.

A course of lectures and demonstrations on surgical dyspepsia will be given at the London Hospital Medical College by Mr. A. J. Walton, assistant surgeon to the hospital, beginning on Monday next.

Major-General William C. Gorgas, formerly Surgeon-General of the United States Army, has been named a Commander, and Dr. Simon Flexner, director of laboratories of the Rockefeller Institute for Medical Research, an Officer of the French Legion of Honour.

The murderous severity of influenza is illustrated by two recent reports. The one is that fully one-seventh of the population of Papetee, Tahiti, have died of influenza, the elder generation having been virtually wiped out. The other is the estimate that in Mexico the epidemic of influenza caused approximately 432,000 deaths.

Major-General Sir Robert Jones, C.B., F.R.C.S., Major R. C. Elmslie, F.R.C.S., and Major W. H. Trethowan, F.R.C.S., have been elected honorary surgeons to the Royal National Orthopædic Hospital, London. Arrangements are being made for the establishment of a country branch for the hospital as well as for the enlargement of the present buildings.

The Medical Research Committee has issued a report by Captains H. Marrian Ferry and H. L. Tidy, R.A.M.C. (H.M. Stationery Office. Price 9d.) on an investigation of an epidemic caused by *Bacillus aertrycke*, a so-called "food poison infection," of which Drs. A. J. Jex-Blake and W. James Wilson gave an account in the BRITISH MEDICAL JOURNAL of September 21st, 1918, p. 310.

The Section of Laryngology of the Royal Society of Medicine has arranged to hold a summer congress on Friday, May 2nd. Papers will be read in the morning; in the afternoon there will be demonstrations of cases, operations, specimens, and instruments, and it is proposed to arrange a pathological museum. The meetings of this section have been well attended during the war, among those present being many American and overseas laryngologists, and they are invited to take part in the summer congress.

Professor F. de Lapersonne will begin a course of ten lectures on the surgery of the eye and orbit on March 11th. The course will be given at the Hôtel Dieu, Paris, and will include operative surgery. It is intended for doctors and students of allied and neutral countries. Professors Lapersonne and Terrien and Dr. Velter will begin on May 6th an advanced course on practical ophthalmology and laboratory work, open to French and foreign students. Further particulars can be obtained on application to Professor Lapersonne, at the Hôtel Dieu.

At the meeting of the Executive Committee of the War Emergency Fund of the Royal Medical Benevolent Fund, held on February 4th, Lieut.-Colonel Sir Alfred Pearce Gould in the chair, several applications for assistance were received, and grants amounting to £450 were made. Applications for assistance, marked "Confidential," should be addressed to the Honorary Secretary, 11, Chandos Street, Cavendish Square, W.1. For this Fund about £21,000 has been raised; it is believed that a further £9,000 will be required. Subscriptions should be addressed to the Honorary Treasurer, at the above address.

The programme of the Rockefeller Foundation for 1919 includes large enterprises in public health and medical education and the completion of its war work. The public health activities will be directed chiefly against yellow fever, tuberculosis in France, malaria, and the hookworm disease. General Gorgas is the head of the Yellow Fever Commission. The Commission on Tuberculosis in France will continue its work with a larger budget; the war against hookworm will be waged in twelve States of the American Union and twenty-one foreign states and countries. Grants have been made for special studies and demonstrations in mental hygiene, for school hygiene and public health at Johns Hopkins University, and for the development of public health nursing. The chief work on medical education will be the development of training in modern medicine in China.

An order by the Food Controller dated February 14th removes the restrictions on the use of lard in the preparation of articles other than foodstuffs, and it may accordingly now be used in the manufacture of ointments and other medicinal preparations. It will be remembered that the committee appointed by the Home Office in August, 1916, to deal with the question of economy in the use of drugs during the war, issued a memorandum on medicinal oils and fats, which was published in the JOURNAL of September 14th, 1918, p. 296. It was stated therein that since lard could no longer be dispensed either as such or as an ingredient of a prescription, a base consisting of 5 per cent. wool fat, 10 per cent. hard paraffin, and 85 per cent. soft paraffin had been placed on the market as a suitable substitute for most cases in which lard would have been ordered. Formulæ were constructed containing this base (named for convenience *Adeps factitius*), and these and other war emergency formulæ were published by the Pharmaceutical Society in the *Codex Addendum*, 1918.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

The postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.

2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.

3. MEDICAL SECRETARY, *Mediscera, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

QUERIES AND ANSWERS.

INCOME TAX.

H. M. D. inquires how much income tax he will have to pay on a total income of £550. He pays £67 6s. 8d. in insurance premiums.

*** As H. M. D. does not state what portion of his income is unearned, the answer cannot be given. It may, however, be sufficient to say that if his income is £500 earned and £50 unearned the total tax payable will be as follows:

		£ s. d.
1. *Earned*		500 0 0
Less abatement	£100 0 0	
,, Life assurance	£67 6 8	—167 6 8
		332 13 4
Duty on £332 13s. 4d. @ 3s.		49 18 0
2. *Unearned*: £50 @ 3s. 9d.		9 7 6
Total		£59 5 6

LETTERS, NOTES, ETC.

A DISCLAIMER.

DR. PAUL BOUSFIELD (London) writes to disclaim all knowledge of the identity of the writer of an article in the lay press eulogizing the psycho-therapeutic treatment at the Ministry of Pensions clinic, or of the fact that any such articles were about to appear.

SHORTAGE OF PRIVATE NURSES.

A CORRESPONDENT in the Midlands sends us a strongly worded request to call the attention of the military nursing authorities and the Ministry of Labour to the great shortage of private nurses which, in view of the fresh outbreak of influenza, is causing serious hardship to private patients. He argues that as a million and a half men have been demobilized many army nurses could now be released, but states that very few have been so released, and these either on compassionate grounds or because they had been asked for by bodies such as health committees or district nursing societies. Apparently the position of the private nurses who form the bulk of the members of the Queen Alexandra Nursing Reserve and Territorial Nursing Association has not been appreciated by the authorities, as they are being retained by the army. The matter is undoubtedly urgent, and will, we trust, receive early attention.

IS INFLUENZA INFECTIOUS DURING INCUBATION?

DR. HELEN G. LEYTON (Oxford) writes: So far as I am aware, little attention has been paid to the possibility—we ought perhaps to say to the probability—of influenza being infectious during incubation. The following pair of cases goes far, I think, to substantiate it: Mrs. A., an invalid, was attended only by her daughter and by Mrs. B. She saw no other visitors. On Monday, February 10th, Mrs. B. last attended her, Mrs. B. being then presumably in the incubation stage of influenza, with which she fell ill on Wednesday, February 12th. On Friday, February 14th, Mrs. A. also was attacked. The inference is that Mrs. B., while in the incubation stage of the disease, infected Mrs. A. Her incubation period appears to have been at least three days, but I have seen several cases in which certainly a week has elapsed from the time of possible infection to the onset of the disease. The possibility of the incubation period being infectious necessitates more drastic though less hopeful prophylaxis.

THE PREVENTION OF VENEREAL DISEASE.

SURGEON COMMANDER P. HAMILTON BOYDEN, R.N., writes: With respect to the article which appeared in your issue of February 8th under the names of Sir Archdall Reid and myself, I desire to make it clear that the prevalence of gonorrhoea amongst those who used nargol jelly as a preventive applied to the period prior to April 1st, 1918. Shortly after this date the issue of nargol jelly was discontinued in the Royal Navy, calomel cream remaining the sole official prophylactic against both syphilis and gonorrhoea.

"A REFORMED MEDICAL BOARD."

MEMBERS of National Service Medical Boards who wished to relieve the tedium of waiting for the next recruit to present himself might have been advised to read the *Short Diary of a Reformed Medical Board*, by J. S. M. (Warrington: Mackie and Co., Ltd.). The essence of the reform is stated to consist in appointing a barrister with the status and emoluments of a recorder as president, since none but a barrister can appreciate the value of evidence. Before this individual Captains Koff and Flem, R.A.M.C., appear to represent the War Office, while Drs. Pessary Smith and Panell Jones represent the recruit through the Local Government Board. The cases are argued at great length, and his Honour's summing up is worthy of the highest traditions of the legal profession. On the whole, an amusing *jeu d'esprit*.

THE TREATMENT OF WAR PSYCHONEUROSES.

DR. J. E. MIDDLEMISS, Medical Officer to the Leeds Mental Deficiency Act Committee, (late) Lieutenant R.A.M.C., writes: In your issue of February 8th Captain Prideaux evidently wishes to pin me down to facts, though I am not conscious of having burked the facts in any remarks I have made. Need I reiterate that it is impossible for me or any other writer to traverse Captain Prideaux's findings? When he states that he finds that "forgotten experiences are the rule in psychoneurotic patients" I must necessarily accept his statement. Apart from my own experience, *haud parvo res*, he will perhaps allow me to extend the same consideration to the observations of other writers in this field. There is fortunately in contemporary medical literature abundant evidence that many cases of psychoneurosis are successfully treated every day without invoking the principles of psycho-analysis. It is, of course, open to Captain Prideaux to object that these cases, like his own, if analysed, might reveal "forgotten experiences." The fact remains that the cases in question have been cured without any reference to such experiences, and this not empirically but by a logical and reasoned process. Many men, for instance, have broken down in the present war simply through a want of adaptability. The recognition of this fact and a restoration of the sufferer to his normal milieu are frequently all that is necessary to bring about a "cure." The treatment may seem rather banal, but this detracts nothing from its efficacy, and it is fundamentally rational. This is the type of case I had in mind when I asserted that "where the all-pervading sense of depression is present, argument, persuasion, and counter-suggestion are usually futile." This may or may not serve to answer my critic's inquiry as to what form of treatment is available other than psycho-analysis, counter-suggestion, etc. It is no part of my business to make an inventory of the recognized forms of mental treatment, but there are quite a number. Assuming that none of them are successful, why not evolve one suited to the exigencies of the case, a sort of mental autogenous vaccine? If the patient will not conform to your method, the only way out of the impasse is to adapt your method to the patient, however destructive it may be to one's personal predilections.

THE following appointments of certifying factory surgeons are vacant: Clevedon (Somerset), Sheffield, East (Yorks, West Riding), Ballyward (Down), Braemar (Aberdeen), Castlederg (Tyrone), Wakefield (Yorks, West Riding), Wrotham (Kent), Gortin (Tyrone), Broughton Astley (Leicester).

SUPPLEMENT TO THE

BRITISH MEDICAL JOURNAL.

LONDON: SATURDAY, FEBRUARY 22ND, 1919.

CONTENTS.

British Medical Association.

CLINICAL MEETING, LONDON, APRIL 8th to 11th, 1919.

GENERAL COMMITTEE.

Sir T. CLIFFORD ALLBUTT, K.C.B., F.R.S., President of the Association (*Chairman*).
Sir WILLIAM OSLER, Bt., Regius Professor of Medicine, University of Oxford.
Dr. NORMAN MOORE, President of the Royal College of Physicians of London.
Sir G. H. MAKINS, G.C.M.G., C.B., President of the Royal College of Surgeons of England.
Sir W. H. NORMAN, K.C.B., Medical Director-General, R.N.
Sir JOHN GOODWIN, K.C.B., C.M.G., D.G. A.M.S.
Sir CHARLES BURTCHAELL, K.C.B., D.G. Medical Services, France.
Major-General M. H. G. FELL, C.M.G., Medical Administrator, Royal Air Force.
Sir R. HAVELOCK CHARLES, G.C.V.O., Medical Adviser to the Secretary of State for India.
Major-General G. LA F. FOSTER, C.B., D.G. Canadian Army Medical Service, London.
Sir NEVILLE HOWSE, V.C., K.C.B., Director of Medical Services, Australian Imperial Force.
Lieut.-Colonel B. MYERS, A.D.M.S. New Zealand Overseas Forces.
Colonel P. G. STOCK, C.B., D.D.M.S. South African Defence Force.

Adami, Colonel J. G., F.R.S., C.A.M.C.§
Arkwright, Dr. J. A.§
Atkins, Colonel Sir John, K.C.M.G., D.D.M.S.*‡
Barr, Lieut.-Colonel Sir James, M.D.
Barry, Lieut.-Colonel T. D., R.A.F.*‡
Bland-Sutton, Sir John, F.R.C.S.
Bowlby, Major-General Sir Anthony, K.C.M.G., K.C.V.O., C.B., F.R.S.
Bruce, Major-General Sir David, K.C.B., F.R.S.
Dawson, Major-General Sir Bertrand, G.C.V.O., C.B.*
De Crespigny, Colonel C. T. C., D.S.O., A.A.M.C.§
Eccles, Major W. McAdam, R.A.M.C. (T.).*‡
Elliott, Colonel T. R., D.S.O., F.R.S., A.M.S.
Ellis, Major A. M. W., C.A.M.C.§
Fletcher, Sir Walter M., K.B.E., F.R.S.§
Foster, Major Michael, R.A.M.C.(T.)*
Fothergill, Major E. R., R.A.M.C.*
Frankau, Mr. C. H. S., D.S.O., F.R.C.S.§
Galloway, Sir James, K.B.E., C.B.*‡
Garstang, Dr. T. W. H. (Chairman of Representative Meetings of the Association)*‡
Geddes, Sir Auckland C., K.C.B., M.P.
Godlee, Sir Rickman J., Bt., K.C.V.O.
Gray, Colonel H. M. W., C.B., C.M.G.§
Harman, Mr. N. Bishop, F.R.C.S.*†‡
Harrison, Colonel L. W., D.S.O.§
Haslip, Dr. G. E. (Treasurer of the Association)*†‡
Herringham, Major-General Sir Wilmot, C.B.*
Hewitt, Surgeon Commander D. W., C.M.G., R.N.§
Holmes, Dr. Gordon, C.M.G.*†‡§
Ivens, Miss Mary F., M.S.
Jones, Major-General Sir Robert, C.B.
Keith, Professor A., F.R.S., LL.D.§
Lane, Sir W. Arbuthnot, Bt., C.B.*‡
Leiper, Dr. R. T. (London School of Tropical Medicine)§
Leishman, Colonel Sir W. B., K.C.M.G., C.B., F.R.S.
Lewis, Dr. T., F.R.S.§
Lister, Colonel W. T., C.M.G.§
Macdonald, Dr. J. A., LL.D. (Chairman of Council of the Association)*
Martin, Lieut.-Colonel C. J., C.M.G., F.R.S.§
Morton, Dr. E. R.*†
Mott, Lieut.-Colonel F. W., F.R.S.§
Moynihan, Major-General Sir Berkeley, K.C.M.G., C.B.§
Rolleston, Sir H. D., K.C.B.*‡§
Ross, Colonel Sir Ronald, K.C.B., K.C.M.G., F.R.S.
Rudolf, Colonel R. D., C.B.E., C.A.M.C.§
Shattock, Professor S. G., F.R.S.§
Shore, Dr. T. W.†*
Smith, Mr. S. Maynard, C.B.*†‡§
Sprigge, Dr. S. Squire.†
Starling, Professor E. H., F.R.S.§
Stewart, Colonel John, C.A.M.C.
Turner, Mr. E. B., F.R.C.S.*†‡
Verrall, Mr. T. Jenner, LL.D.*
Wallace, Mr. Cuthbert, C.B., C.M.G.*†‡§
Whaley, Colonel A. M., M.C.U.S.A.§

* Member of General Arrangements Subcommittee.
‡ Member of Entertainments Subcommittee.
† Member of Premises and Accommodation Subcommittee.
§ Member of Programme Subcommittee.

The General Secretaries of the meeting are:
Mr. CUTHBERT WALLACE, C.B., C.M.G., F.R.C.S., 26, Upper Wimpole Street, W.1.
Dr. GORDON HOLMES, C.M.G., 101, Harley Street, W.1.
Mr. S. MAYNARD SMITH, C.B., F.R.C.S., 28, Wimpole Street, W.

The Chairman of the Programme Subcommittee is Colonel J. G. ADAMI, F.R.S., C.A.M.C.

The Secretaries of the Sections are as follows:
Medicine: Colonel C. T. C. DE CRESPIGNY, D.S.O., A.A.M.C., 429, Strand, W.C.2.
Surgery: Mr. C. H. S. FRANKAU, D.S.O., 7, Tenby Mansions, Nottingham Street, W.1.
Preventive Medicine and Pathology: Dr. J. A. ARKWRIGHT, Lister Institute of Preventive Medicine, Chelsea Gardens, S.W.1.

PROVISIONAL PROGRAMME.

A reception arranged by the Metropolitan Counties Branch of the British Medical Association will be held at the Guildhall, London, kindly lent by the Lord Mayor, on the evening of Tuesday, April 8th. The guests will be received by Sir T. Clifford Allbutt, K.C.B., F.R.S., Regius Professor of Physic, University of Cambridge, President of the British Medical Association.

On Wednesday evening, April 9th, the Royal Society of Medicine will hold a reception at its house, 1, Wimpole Street, W. The guests will be received by Sir H. D. Rolleston, K.C.B., President of the Society.

On Thursday evening, April 10th, a dinner will take place at the Connaught Rooms.

The following is a provisional programme of the arrangements for the sections, which will be held in the Imperial College of Science at South Kensington, the unrivalled resources of this great institution having been placed with great good-will at the disposal of the Association for the purpose by Sir Alfred Keogh, G.C.B., M.D., the Rector.

SECTION OF MEDICINE.

Wednesday, April 9th.—10 a.m. to 1 p.m.

War Neuroses.—Chairman: Colonel H. Maudsley, C.M.G., C.B.E., F.R.C.P., A.A.M.C. Introducer: Lieut.-Colonel F. W. Mott, F.R.S., R.A.M.C. A discussion will follow.

Thursday, April 10th.—10 a.m. to 1 p.m.

Influenza.—(In conjunction with the Section of Preventive Medicine and Pathology, *q.v.*) The subject will be treated under the following headings:

1. Clinical Aspects.
   (*a*) Short account of epidemics of 1918 in France. Contrast between clinical features of spring and autumn epidemics—for example, respiratory complications.
   (*b*) Epidemic in England. Contrasts and resemblances to above.
2. Epidemiology.
3. Etiology.

N.B.—The pathological aspects will be treated by means of demonstrations.

Friday, April 11th.—10 a.m. to 11.30 a.m.

Venereal Disease.—Chairman: Sir William Osler, Bt. The subject will be introduced by Brevet Colonel L. W. Harrison, D.S.O., K.H.P., Lecturer in Venereal Diseases, Military Hospital, Rochester Row. A discussion will follow.

11.30 a.m. to 1 p.m.

Prognosis in Cardio-vascular Affections.—Chairman: Sir James Mackenzie, M.D., F.R.S. Introducer: Dr. Thomas Lewis, F.R.S. A discussion will follow.

Demonstrations.

It is hoped that the following demonstrations may be arranged to take place in the afternoon beginning at 2.30:

Wednesday, April 9th.
Interesting Neurological Cases. National Hospital for Paralysed and Epileptic, Queen Square.
Diseases of the Chest. Brompton Hospital.
Mine Gas Poisoning. Lieut.-Colonel D. Dale Logan, D.S.O., R.A.M.C.

Thursday, April 10th.
Newer Methods in Cardio-diagnosis. National Heart Hospital, Westmoreland Street.
Air Force Tests.
Cases and Specimens illustrating Cardio-vascular Disease. Dr. Thomas Lewis, F.R.S., at University College Hospital.

Friday, April 11th.
Venereal Diseases. Colonel L. W. Harrison, D.S.O., Military Hospital, Rochester Row.
War Neuroses. Lieut.-Colonel F. W. Mott, F.R.S., Maudsley Clearing Hospital, Denmark Hill.
Diseases of Children. Hospital for Sick Children, Great Ormond Street.

It is probable that other demonstrations will be arranged and that some of the above will take place on more than one afternoon.

SECTION OF SURGERY.

Discussions on the following subjects have been arranged to take place in the morning of the day indicated.

Wednesday, April 9th.

Gunshot Wounds of the Chest.—Chairman: Sir George Makins, G.C.M.G. Introducers: Colonel T. E. Elliott, D.S.O., F.R.S., and Colonel G. E. Gask, C.M.G., D.S.O.

Thursday, April 10th.

Wound Shock.—Chairman: Sir Anthony Bowlby, K.C.M.G. Introducers: Professor W. M. Bayliss, F.R.S., and Dr. H. H. Dale, F.R.S.

Friday, April 11th.

A Review of Reconstructive Surgery.—Chairman: Sir Robert Jones, C.B. Introduced by Major R. C. Elmslie and Major W. R. Bebstow, R.A.M.C.

Demonstrations.

The following demonstrations have been arranged to take place in the afternoon, beginning at 2.30:

Wednesday, April 9th.
1. On Orthopaedic Methods, etc.; at the Military (Orthopaedic Hospital, Shepherd's Bush.
2. Specimens illustrating Wounds of Arteries; at the Royal College of Surgeons.
3. On X Rays.

Thursday, April 10th.
1. On Facial Injuries; at Silcup.
2. On Injuries of the Eye.
3. Specimens illustrating Fractures of the Skull; at the Royal College of Surgeons.

Friday, April 11th.
1. On Orthopaedic Methods, etc.; at the Military (Orthopaedic Hospital, Shepherd's Bush.
2. Specimens illustrating Gunshot Wounds of the Abdomen: at the Royal College of Surgeons.
3. On X Rays.

SECTION OF PREVENTIVE MEDICINE AND PATHOLOGY.

Discussions have been arranged for the morning meetings on the following subjects:

Wednesday, April 9th.—10 a.m. to 1 p.m.

The Dysenteries: Bacillary and Amoebic.—Introduced by Lieut.-Colonel L. Dudgeon, C.M.G.

Thursday, April 10th.—10 a.m. to 1 p.m.

Influenza.—(At a joint meeting with the Section of Medicine, *q.v.*) Clinical Aspects: Introduced by Major-General Sir Wilmot Herringham, C.B., A.M.S. Epidemiology: Introduced by Captain M. Greenwood, R.A.M.C. Etiology: Introduced by Major Bowman, C.A.M.C.

Friday, April 11th.—10 a.m. to 1 p.m.

Malaria.—Introduced by Lieut.-Colonel S. P. James, I.M.S.

Demonstrations.

Demonstrations have been arranged to take place in the afternoon, beginning at 2.30:

Wednesday, April 9th.—On Malaria.
Thursday, April 10th.—On the Pathology of Dysentery; at St. Thomas's Hospital.
Friday, April 11th.—On the Anaerobic Bacteria which infect Wounds; and On the subject of Filter-passing Viruses in Influenza and other Diseases, and Rickettsia Bodies. At the Lister Institute of Preventive Medicine.

THE WAR COLLECTION AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The collection of pathological specimens from the seat of war in France will be on view daily from 10 till 6 (on Saturday 10 till 1) at the Royal College of Surgeons, Lincoln's Inn Fields, W.C. It comprises a large and complete series of gunshot fractures of the bones; and another series, equally complete, of gunshot injuries of the different organs and soft structures, as well as specimens of disease incident to warfare, the effects of gassing, trench nephritis, gas gangrene, etc. The entire collection is systematically arranged, and each preparation is furnished with a brief description and history. So far, three demonstrations have been arranged. Each will occupy about one hour, and will be given from 3.30 till 4.30.

Wednesday.—Sir George Makins: Injuries of Arteries.
Thursday.—Professor Arthur Keith, F.R.S.: Fractures of the Skull.
Friday.—Mr. C. S. Wallace, C.B.: Abdominal Injuries.

CURRENT NOTES.

Medical Resettlement.

A correspondent has drawn our attention to a letter which appeared in the *Times* of January 17th, 1919, headed "A Hospital Appointment." The letter began thus: "An open appointment as Medical Officer to the Corporation of Birmingham Pensioners Hospital was advertised, preference being given to 'senior men having recent hospital experience.' A lieutenant-colonel, a major, and three captains, Royal Army Medical Corps, all with war service, were candidates. The appointment was given to a young recently qualified man who has never served his country." From such inquiries as we have been able to make, it appears that the facts given are approximately correct, but we are not in a position to state the reasons which influenced the Birmingham Public Health Committee when making the appointment in question. The policy of the Central Medical War Committee in this matter is defined in the following resolution adopted on February 5th, 1919, by the General Purposes Subcommittee of that Committee:

That the Committee adhere to the principle already adopted by it that where it is by any means possible appointments falling vacant in institutions, etc., should be given to medical officers who have served in the forces; that exceptional circumstances should be the only reason for departure from this principle; and that in cases where it is not possible to appoint a demobilized officer a temporary appointment only should be made pending general demobilization.

Meetings of Branches and Divisions.

Edenburgh Branch: South-Eastern Counties Division.

A special meeting of the Division was held at Newtown St. Boswells on February 6th, when Dr. A. J. Campbell presided. The annual report and financial statement for 1918 were submitted and approved.

Ministry of Health.

Dr. M. J. Oliver, Honorary Secretary, read a letter from the Branch Council asking for an expression of opinion on the proposal for a Ministry of Health.

Dr. W. Blair explained the composition and origin of the Representative Committee for Scotland. After full discussion, Dr. Oliver moved that "the meeting approves of a committee being appointed to represent the interests of the medical profession in Scotland." Dr. W. L. Cullen seconded, and the motion was carried.

A resolution was adopted, on the proposal of Dr. P. C. MacRobert, seconded by Dr. Somerville, giving approval to the formation of a Scottish Representative Committee consisting of representatives of the following bodies:

College of Physicians (2).
College of Surgeons (2).
Faculty in Glasgow (2).
Faculty of each of the Universities (1).
Society of Medical Officers of Health (2).
Scottish Association of Medical Women (1).
Nine members other than members of the British Medical Association and non-collegiate, to be co-opted by the other representatives and all the members of the Scottish Committee of the British Medical Association.

After a lengthy discussion the meeting did not desire to express any opinion as to the lines on which a Ministry of Health should be formed. Dr. Campbell moved that the meeting should express approval of a State medical service; Dr. I. K. Hermon seconded. Dr. MacRobert moved the direct negative, Dr. J. J. McMillan seconded, and the amendment was carried by six votes to two.

INSURANCE.

MEDICAL BENEFIT OF DEMOBILIZED MEN.

The following memorandum, dated February, 1919 (253, I.C.), has been issued to Insurance Committees by the National Insurance Commission (England).

1. In view of inquiries which have been received on the subject of the re-entry to medical benefit of insured members of His Majesty's Forces on demobilization, the Commissioners think it advisable to communicate with Insurance Committees generally in the matter.

2. Each insured soldier or airman is furnished, on demobilization, with a postcard containing a certificate as to his insurance during his service which he is directed to forward at once to his society or, if not a member of a society, to the Commission.* The society (or Commission) is thus placed in a position to notify the appropriate Committee—by means of an Index Slip—of a demobilized man's resumption of medical benefit, and on receipt of the notification a new medical card is issued by the Committee to the man in order that he may select a doctor.

3. Every demobilized man is supplied with a leaflet explaining his position in insurance which, *inter alia*, informs him that if delay should arise in the receipt by him of a medical card, he should apply direct to his Insurance Committee by means of Form Med. 30, which is available at every post office.

4. In many cases, however, a demobilized man applies to a doctor with his old medical card. In such cases it will be necessary for special steps to be taken in order that the man may be duly included in the doctor's list and in the Committee's Register. The following procedure should be adopted:

5. The medical card should be completed in Part B, signed by the doctor in token of his acceptance, endorsed by him on page 1 "Demobilized on (date)," and forwarded to the Committee. The Committee, on receipt of a card so completed and endorsed, should issue a new card, prepare a suspense slip, and apply to the society (or Commission) for the Index Slip by means of a Form Med. 80, endorsed in the top left corner "Demobilized on (date)."

6. The Commissioners have recently had before them suggestions that the regulations should be amended so as to provide for the automatic reinstatement of demobilized men on the lists of their former doctors. These suggestions have, it is understood, been based on the belief that the proposed arrangements would be beneficial alike in the interests of the men and of the profession, especially those members of the latter who have been absent from their practice on war work. After an exhaustive examination of the matter the Commissioners have arrived at the conclusion that this belief is not well founded, mainly because of the selections of doctors made during the war period itself, and of the large movements of population which have been and are taking place. In these circumstances, the Commissioners do not propose to amend the Regulations, and therefore, certain administrative difficulties which would arise in giving effect to the suggestions need not be examined. Every demobilized man should have an unrestricted free choice of doctor as in the case of a new entrant into medical benefit. Where, however, as in a few cases, any men have in the past been replaced on the lists of their former doctors without any application on their part, the lists need not be disturbed unless the men concerned themselves make application to select a new doctor.

Position of Demobilized Men during their Period of Furlough.

7. As committees are aware, each demobilized man is granted twenty-eight days' furlough commencing from the date on which he leaves his dispersal station. During this period the man ranks as a soldier, sailor or airman, as the case may be, and is entitled to treatment at the cost of the service authorities under the ordinary furlough arrangements.

8. In the case of soldiers and airmen, the man should apply at the nearest military hospital whenever practicable. Should he live more than two miles from a military hospital, or his condition be such that he is unable to travel to the hospital, the Commissioners understand that he may call in a civilian doctor, and that to obtain payment, the doctor must fill in Army Form O1667 and send it to the Deputy Director of Medical Services of the district.

9. In the case of sailors or marines, the man, if at a naval port, should be referred to the local naval authorities, or, failing that, to the naval surgeon and agent if there is one in the district. At a place where there are no naval authorities, the man should be directed to make his own arrangements with a civilian practitioner for treatment. The Commissioners understand that the surgeon and agent will receive his fees for the case from the Admiralty, and if a civil practitioner be employed, the latter should apply to the Accountant General of the Navy, Admiralty, S.W.1., for remuneration on the same scale as is provided in the army form quoted above. It should be observed that the regulation printed on the back of the Protection and Identity Certificate (Form S. 1306) to the effect that sailors or marines are themselves responsible for settling a civil practitioner's fees is obsolete.

** In the case of insured seamen or marines, the certificate of insurance is sent direct to the society or Commission) by the Admiralty.*

LOCAL MEDICAL AND PANEL COMMITTEES.

West Riding of Yorkshire.

At a meeting of the Local Medical and Panel Committee on December 13th it was decided to send a resolution to the West Riding Insurance Committee expressing to the strongest possible terms the surprise and regret of the Panel Committee that when the question of the return of military doctors was being discussed no medical men were placed upon the subcommittee appointed to deal with the matter.

A subcommittee was appointed to deal with the question of the establishment of maternity centres and school clinics in many prosperous parts of the West Riding area.

County of Forfar.

At the inaugural meeting of the Local Medical Committee on January 22nd it was resolved to impose a levy of 1d. per five insured persons on the panel of each practitioner in the area for each of the four quarterly payments to be made during the year.

It was agreed that any operation or other treatment necessary in a spontaneous interruption of pregnancy during the early months should be carried out by the panel practitioner under the agreement with the Insurance Commissioners.

At a meeting of the Panel Committee on the same day a letter was read from the National Insurance Commission (Scotland), stating that an insured person is entitled to drugs and prescribed appliances as part of his medical benefit only when he is receiving treatment from the practitioner on whose list he may be under the arrangement made by the Insurance Committee, and that it is not competent for another practitioner attending him, even if a doctor on the panel, to order drugs and appliances on the official prescription form.

Naval and Military Appointments.

ROYAL NAVAL MEDICAL SERVICE.

THE following notifications are announced by the Admiralty:—Surgeon Commander C. M. Beadnell promoted to rank of Surgeon Captain. Surgeon Lieutenant Commanders: L. C. Hunt to the *Carlisle*, A. E. P. Cheesman to the *Ceres*, M. H. Ormsby to the *Coventry*, H. St. C. Colson to the *Yarmouth*, J. M. Gordon to the *Calypso*, J. G. Danson to Dartmouth College, F. H. Stephens, O.B.E., to the *Dauntless*, F. G. H. B. Black to the *Southampton*, W. Bradbury, D.S.O., to the *Ganges*. Surgeon Lieutenant J. G. Stevens to Haslar Hospital. Surgeon Lieutenants (temporary): J. B. Crawford to the *Severn*, J. F. Haynes to Plymouth Hospital, J. F. O'Grady to the *Lancaster*, W. F. Tew to Chatham Hospital, B. H. Pidcock to Haslar Hospital.

ROYAL NAVAL VOLUNTEER RESERVE.

Surgeon Lieutenant C. F. A. Hereford promoted to Surgeon Lieutenant Commander.

ARMY MEDICAL SERVICE.

ROYAL ARMY MEDICAL CORPS.

C. J. Bond, C.M.G., to be temporary honorary Colonel whilst specially employed.

To be acting Colonels whilst specially employed: Lieut.-Colonel and Brevet Colonel R. R. H. Moore, Lieut.-Colonel J. C. Connor, C.M.G.

To be acting Lieut.-Colonels whilst in command of a medical unit: Majors A. N. Fraser, D.S.O., W. J. Weston, D.S.O., O. Ievers, D.S.O., Captain G. O. Chambers.

To be Majors:—Captains (acting Lieut.-Colonels) W. K. Beaman, M. P. Leahy, D. F. Mackenzie, D.S.O., W. W. Boyce, J. de F. Langrishe, D.S.O., T. H. Scott, M.C., G. F. Rudkin, A. C. Elliott, W. B. Purdon, D.S.O., M.C., F. Casement, D.S.O., E. M. Middleton. Captain (Brevet Major) H. G. Gibson. Captains (acting Majors) A. D. Fraser, D.S.O., M.C., J. L. Wood, O. R. McEwen, M. O. Wilson, L. A. A. Andrews, H. W. Farebrother. Captains: C. Cassidy, M.C., A. Irvine-Fortescue, F. H. M. Chapman, H. M. J. Perry, F. T. Turner, M.C., J. E. M. Boyd, M.C., J. H. Gurley, V. T. Carruthers.

To be acting Majors:—Captains: A. Hendry, H. G. Robertson, J. H. M. Frobisher. Temporary Captains: H. C. Elliot, M.C., A. E. Hallinan, M.C., D. B. I. Hallett, A. C. Palmer, A. V. Poyser, C. C. Chance, M.C., R. W. P. Jackson, H. G. Peel, M.C., C. O. Bodman, H. B. Shepherd, H. H. Hepburn, M.C., J. P. Mathie, G. Muir, W. Warnock (from August 14th to October 28th, 1918), H. H. Raw, R. L. Dobson, H. R. Evans, W. S. Martin, M.C. Whilst specially employed: Captains H. Y. Stanley, V.C., James Vallance, temporary Captains J. R. Easter, J. Greene, D.S.O., M.C., J. H. Peek.

The following relinquish their commissions on ceasing to serve with No. 6 British Red Cross (Liverpool Merchants' Mobile) Hospital and retain their honorary rank:—Temporary honorary Lieut.-Colonel Nathan Raw, C.M.G. Temporary honorary Major F. A. G. Jeans. Temporary honorary Captains J. Hayward, S. Raw, H. W. Jones, F. C. Wilkinson.

The following relinquish their acting rank on reposting:—Temporary Major (acting Lieut.-Colonel) J. C. Davies. Captain (acting Major) W. F. Christie. Temporary Captains (acting Lieut.-Colonels): H. K. Wallace, A. Jones, D.S.O., M.C. Temporary Captains (acting Majors): D. M. Hunter, M.C., J. G. Murray.

Temporary Major E. K. Martin to draw the pay and allowance of his temporary rank from January 4th to December 18th, 1918.

Major D. P. Johnstone to be seconded for service on the staff of the Governor of Bombay.

C. F. Curtis, late temporary Captain, is granted the rank of Captain.

Temporary Lieutenants to be temporary Captains: J. Cullen, G. V. Allen, P. C. Leslie.

Temporary honorary Lieutenant D. E. Carter to be temporary honorary Captain.

O. K. Lang to be temporary Lieutenant.

The notifications in the *London Gazette* of the dates indicated regarding the officers mentioned are cancelled: Major W. J. Watson, D.S.O. (January 20th, 1919); temporary Major A. Stewart (June 21st, 1918); Captain C. W. Milner (December 20th, 1918); temporary Lieutenants C. E. Elliston (January 14th, 1919), A. Ashkenny (January 28th, 1919).

Officers relinquish their commissions: Temporary Captains (acting Majors) and retain the rank of Major: H. B. Atlee, R. F. Bartlett, M.C. Temporary Captain J. H. Hebb, November 27th, 1918, and is granted the rank of Major (substituted for notification in the *London Gazette*, January 11th, 1919). Temporary Captains, on account of ill health contracted on active service and retain the rank of Captain: F. Thompson, T. Stansfield, T. J. Little, G. Heathcote. Temporary Captains, on account of ill health and retain the rank of Captain: W. R. Meredith, F. W. Emery. Temporary Captains and retain the rank of Captain: G. O. Hutchinson, A. C. Boswell, A. Ball, R. W. L. Fernandez, L. G. Cobb, R. Dane, F. H. Dodd, L. W. Kergin, C. J. McN. Willoughby, W. Garton, D. Duff, L. W. Forsyth, W. G. Harnett, R. M. Bennett, A. R. J. Douglas, F. A. Anderson, M.C., J. J. Clarke, D. J. Clark, M. M. Roger. Temporary Captain A. S. Glynn (on transfer to the R.A.F.). Temporary honorary Captains and retain the honorary rank of Captain: D. A. Bartley; J. S. Burn (on ceasing to be employed with the St. John Ambulance Brigade Hospital); J. Boyd, on ceasing to be employed with the Welsh Hospital, Netley, November 26th, 1918 (substituted for notification in the *London Gazette*, December 7th, 1918). Temporary Lieutenant and retains the rank of Lieutenant: W. Wright. Temporary honorary Lieutenant and retains the honorary rank of Lieutenant: B. M. Gibson (on ceasing to serve with No. 12 Stationary Hospital).

ROYAL AIR FORCE.

MEDICAL BRANCH.

Captain A. E. McCulloch is transferred to the unemployed list.

Captain L. G. Davies relinquishes his commission on account of ill health, and is permitted to retain his rank.

Granted temporary commissions:—As Captain: A. S. Glynn (Captain R.A.M.C., seniority April 1st, 1918). As Lieutenant: G. McK. Thomas.

INDIAN MEDICAL SERVICE.

The commissions of the following officers are antedated to the dates shown: Lieutenants B. C. Ashton, R. Hay, G. Shanks, and G. A. S. Ramsay (July 17th, 1918), H. M. Kharegat (September 11th, 1918), J. M. Shah (December 13th, 1918), W. M. Crombie (May 22nd, 1918).

To be temporary Lieutenant: Narbheram Parbhudas Bhansali.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Captains to be acting Majors: W. S. Haydock, H. T. Chatfield, W. B. Wood, M. J. B. F. Burke-Kennedy.

Captain K. Talbot, M.C., relinquishes his commission on account of ill health contracted on active service and retains the rank of Captain.

To be Lieutenant: W. A. Freedman.

OVERSEAS CONTINGENTS.

CANADIAN ARMY MEDICAL CORPS.

Hon. Captain J. W. White to be acting honorary Major while employed as Officer in Charge C.D.M. Stores.

SOUTH AFRICAN MEDICAL CORPS.

The following relinquish their commissions on ceasing to be employed with the Union Imperial Service, and retain their rank: Temporary Lieut.-Colonel G. K. Moberley, temporary Major G. D. Maynard, O.B.E. Temporary Captains: I. Harlam, W. D. Akers, J. A. Martin, A. J. Milne, A. McW. Green, J. J. Commerell, E. L. Galgut.

The name of Major W. H. Maxwell is as now described, and not as in the *London Gazette* of December 3rd, 1918.

To be temporary Captains: T. J. Howell, C. C. Murray, T. G. Burnett, A. J. Milne.

TERRITORIAL FORCE.

ROYAL ARMY MEDICAL CORPS.

Major G. A. Troup to be Lieutenant-Colonel, May 3rd, 1918.

Captain (acting Major) J. W. Cairns relinquishes his commission on account of ill health contracted on active service, and retains the rank of Major.

To be acting Majors whilst specially employed: Captains J. C. Denvir, J. C. S. Dunn, T. G. Buchanan.

The following relinquish their acting rank: Majors (acting Lieut.-Colonels) H. T. Samuel, on ceasing to command a field ambulance; J. Evans, D.S.O., and W. D. Watson, on ceasing to be specially employed; Captain (acting Major) A. E. Barnes, on ceasing to be specially employed.

Captains J. Angus and M. H. B. Stratford relinquish their commissions on account of ill health contracted on active service, and retain the rank of Captain.

Captain J. F. W. Wyer relinquishes his commission on account of ill health, and retains the rank of Captain.

2nd Eastern General Hospital.—Captain W. B. Prowse relinquishes his commission on account of ill health, and retains the rank of Captain. Captain H. N. Fletcher is restored to the establishment.

BIRTHS, MARRIAGES, AND DEATHS.

The charge for inserting announcements of Births, Marriages, and Deaths is 6s., which sum should be forwarded with the notice not later than the first post on Wednesday morning in order to ensure insertion in the current issue.

BIRTHS.

BODMAN.—On February 7th, at Private Nursing Home, 7, Berkeley Square, Clifton, to Alan and Clare Bodman, a son.

ENGLISH.—On February 9th, at "Earnscliffe," Crewe, Cheshire, to Dr. and Mrs. Howard English, a son.

DEATHS.

BRAMWELL.—At 10, Heriot Row, Edinburgh, on February 12th, Martha, beloved wife of Byrom Bramwell, M.D., F.R.C.P.E., LL.D.

MORRIS.—On February 14th, at Halesworth, Suffolk, Pryce Jones Langford Morris, M.R.C.S., L.R.C.P., aged 78 years.

REID.—At Devon House, Portobello, Edinburgh, on February 15th, Lily, the beloved wife of Captain A. E. H. Reid, R.A.M.C., aged 27 years.

DIARY FOR THE WEEK.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1.—Monday, 8.30 p.m. Mr. Robert Anstruther Ramsay, M.C.: Treatment of Congenital Hypertrophy of the Pylorus.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.—Monday, 5 p.m., Arris and Gale Lecture by Dr. Charlton Briscoe: The Mechanism of Post-operative Massive Collapse of the Lungs.

ROYAL SOCIETY OF MEDICINE.—General meeting of Fellows, Tuesday, 5.30 p.m.: Sir Almroth Wright: On Lessons of the War in the Field of Immunisation. Social evening, Wednesday, 8.30 p.m.: Sir William Osler: Sir Thomas Browne and his *Religio Medici*—a Bio-bibliographical Demonstration. *Section of Odontology*: Monday, 7.30 p.m., Mr. J. F. Colyer: Irregularities of the Teeth in Monkeys. *Section of Medicine*: Tuesday, 5.30 p.m., Dr. Otto Leyton: Transfusion in Diseases of the Blood. *Section of Study of Disease in Children*: Friday, 4.30 p.m., Continued discussion: The Etiology, Prevention, and Non-operative Treatment of Adenoids.

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RAMC 365 | 10/1

WAR DIARY
or
INTELLIGENCE SUMMARY
(Erase heading not required.)

Arm

Instructions regarding War Diaries and Intelligence Summaries are contained in F. S. Regs., Part II. and the Staff Manual respectively. Title Pages will be prepared in manuscript.

Place	Date	Hour	Summary of Events and Information
CITADEL WEST	25/9/16.		Divisional Collecting officer, and officer in charge of A… A.D.M.S. was at Headquarters at the CITADEL. Capt O'SULLIVAN. RAMC 16th F.A. sent up to A.D.S. to report on the progress of Evacuation.
	26/9/16.		Fine hot day. Casualties admitted to Corps Main Dressing Station up to 6 a m this morning were 10 officers 120 O.R. Walking wounded numbered about 163. With A.D.M.S. visited Advanced Headquarters and DUBLIN POST. Reported here that the front last night was almost entirely cleared of wounded, although word was sent down that 50 stretcher cases had still to be brought in from the front line. CAPT. ADAMSON (18 F.A.) wounded in right knee by shrapnel while collecting wounded. ADMS. then visited 7/11th Bde Headquarters at the BRIQUETER[IE] then the 16 & 18 Inf Bde HQ. in the QUARRIES at GUILLEMO[NT]. Then proceeded to the A.D.S. at GINCHY. Here progress had been made in constructing shelters for Bear[ers] &c. Stretcher Cases came stead[ily]

1875 Wt. W593/826 1,000,000 4/15 J.B.C. & A. A.D.S.S./Forms/C. 2118.

Shotola
Swanage
17. 9. 99

My dear Netter,

I have read it over the letter as you suggest, but still think it would gain somewhat by the introduction of the corrections I proposed. However I have as you see signed it as it stands.

I think the case would gain if Neri's address which I sent you were incorporated as an appendix. If this is done I think the last page of the letter ought to run as it does in my revised version.

I shall return from this on Wednesday afternoon & if you are coming at Thursday morning would come down to the Ldn. early that day to meet you. Let me have a line either here or at Netley.

yours ever
A. E. Wright

No 56139
1.

War Office,
22nd August 1892.

Sir,

The gentleman named in the margin having been appointed Professor of Pathology at the Army Medical School, in succession to the late Sir Wm Aitken, M.D., I have the honour, by desire of H.R.H. The Commander in Chief to request that, on his arrival, you will be so good as to cause him to be recognised accordingly.

The appointment will bear date the 1st September, and will appear in the Gazette in due course.

I have the honour to be,
Sir,
Your obedient Servant
(signed) W. A. Mackinnon
D. G.

Dr Almroth Edward Wright.

The General
Officer Commanding,
Portsmouth

INDIA OFFICE,
WHITEHALL, S.W.

Shotola
Swanage
15.9.99

My dear Notter,

Herewith the letter with the revisions which have occurred to me. Will you have it recopied and will you reserve the original for me. Of course you will introduce whatever modification seem good to you. But do not delete mine without due consideration. I think Travis's address will tell, so have introduced a reference to it in the text and have sent you a reprint to serve as appendix No II.

I cannot get at appendix No III (i.e. list of papers till I get back to Netley). I propose to return for the purpose on Monday or Tuesday next. But I want very much either to go over the final draft of the letter with you and to append my signature.

If you receive this letter on Sat. aft. or at midday and I think you will and if you can get either to have fair copy made by Monday and if you will wire to me to that effect I will come up on Monday. I will look in on you in the evening or meet you at 9.20 on Tuesday at Netley and get the thing off.

I will however guide myself in the matter by you, and will stay here (unexpected circumstances excepted) until I hear from you as to when I am wanted for signature and revisal.

Yours sincerely

A. E. Wright

Wounded from the Aisne & Marne

A Note on the Wounded at ROUEN on July 24th & 25th, 1918. (1918)

I visited the ROUEN Base Hospitals with the Consulting Surgeons on July 24th and 25th and ascertained the condition of the wounded from the 51st and 62nd Divisions who had passed through the 50th Casualty Clearing Station after the fighting of July 20th, 21st, 22nd and 23rd. The following had arrived in the Hospitals I visited. The Train journeys had occupied from 24 to 26 hours.

1st	Australian	328
10	General.	360
12	"	303
6	"	451
11	"	223
5	"	427
9	"	824
TOTAL.		2916

Of these six had died.
Twelve had undergone amputations.
Eleven had had serious Gas gangrene.

A very large proportion of the wounds had been caused by rifle and machine gun bullets, and very few by shrapnel bullets.

With some exceptions, the wounds had not been excised at the front, and very few were in a condition for early suture in consequence of the lapse of Two or more days after injury before arrival at the Base.

Most of these patients with abdominal and thoracic wounds had been retained at the front.

Fractures of the femur had generally been well splinted after operation but fractures of the leg and of the upper extremity, with few exceptions, were either not splinted at all or else were imperfectly splinted with straw or small pieces of wood.

Some of the patients arrived with the first field dressing still unchanged.

It was evident that No. 50 C.C.S., had had more work than could be thoroughly done, but the general condition of the patients was good, and deaths had been few. Very few patients required immediate amputation on arrival, and it might therefore be concluded that patients requiring primary amputation had all been operated upon at the front.

A good many amputated cases had already arrived.

The most unsatisfactory thing was the absence of splints for fractures, and I have never seen during the last three years so many unsplinted limbs.

It is, I think, evident that neither the Field Ambulances nor the Casualty Clearing Stations had been supplied with nearly enough splints considering that they were leaving our own Army Area, and were at a distance from supplies.

I would suggest that in the future, if Casualty Clearing Stations and Field Ambulances are detached from the British Zone --

(1) They should take with them not less than three "Teams" as reinforcements.

(2) That splints sufficient for the treatment of the fractures found in 2000 or 3000 wounded should be taken with their equipment. The actual numbers required can be easily estimated.

Anthony Bowlby
Major

2-8-18.

RAMC 365/5

23 CCS.

	Wounded	Operations	Percentage	
July.				
23.	583	17	2·9	
24	388	18	4·5	
25	179	18	10.	2 teams
26	115	18	15	
27	128	25	20	
28	288	29	10	
29	627	35	5·5	
30	587	31	·5	Hughes.
31	173	54	32	
Aug 1	422	44	10	
2	602	64	·10	
3	183	23	11	
Total	4175	376	9	

P.T.O.

No 63 CCS

orders arrived at 7 pm 20th
Train of 50 Trucks arrived 2 pm on 21st
ENTRained by midnight
Moved off 4 am from Watten
arrived Senlis 10.30 p.m. on 22nd
Received Wounded 6.30 am 23rd
~~Sta~~ Two teams & 6 Sisters wired for by DDG. noon of 23rd.
Two teams & 6 sisters arrived during afternoon of 25th.
Further Sisters & a team wired for by DDMS on 27th.
one Surgeon arrived on 30th

A Report on the Treatment of Wounds at the Base Hospitals between March 21st, 1918, and March 31st, 1918.

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1. The wounded who arrived at the L. of C. Hospitals between March 22nd and March 29th had, with few exceptions, not been operated upon at the front.

2. Owing to the difficulties in which the Casualty Clearing Stations did their work it was not generally possible after the 21st to do more than apply dressings and splints, arrest bleeding, and remove badly smashed limbs.

3. During the first two days of the fight - March 21st and 22nd - most of the wounds were caused by shells. Later on, at least one half were due to bullets - mostly machine gun - and a few were caused by shrapnel bullets.

4. A certain number of patients died in transit, either in trains or in motor cars, for many were evacuated from the front who, in ordinary circumstances, would have been retained and would have died at the Casualty Clearing Stations.

5. Some patients who had been long in reaching the base died soon after arrival from Gas Gangrene. But these were few in proportion to the whole, and the number of cases of gas gangrene which subsequently developed in hospital was small and much less than might have been expected. I attribute this slight incidence of gas gangrene partly to the large numbers of clean bullet wounds. But I also think that the condition of the ground itself may have had an effect. The battle was fought over old battlefields which had not been cropped, grazed, or manured for two or three years. The soil had been broken by shells and traffic, and had been exposed to the sun, the wind, and the rain till it no longer resembled arable land, and was much more like "prairie" land. It is certain that in such conditions the ordinary virulent anaerobic bacteria would die out. But, whether this is the right explanation or not, it is clear that wounds which were left unoperated on and treated under similar difficulties and in similar ways at the earlier battles of the war, such as those of the Aisne or of Ypres etc. developed the

Worst form

worst forms of gas gangrene, and that there was no such prevalence after the recent fighting.

6. As regards the nature of the wounds, there were the usual very large numbers of superficial injuries always met with where bullet wounds are of frequent occurrence. On the other hand, it is satisfactory to find that a very large number of severely wounded men also arrived safely at the base, and it is evident that the great majority of the badly wounded must have been rescued. Proof of this may be found in the fact that about 800 patients with fractures of the femur arrived in the fort--night following March 21st, and there are no more difficult cases to bring away from the battlefield than these.

7. The opinions previously formed by the experience of the last three years as to the cases which can or cannot be safely moved to the base very soon after injury were confirmed on this occasion.

(a) Head cases travelled well.

(b) Chest cases travelled badly.

(c) Abdominal wounds not treated by operation at the front were generally fatal.

(d) Patients suffering from shock, haemorrhage, or multiple wounds, travelled badly.

(e) Fractures of the limbs travelled well, because they were generally very well splinted, and in this respect there has been the greatest possible advance during the last year or eighteen months. The splints now in use are infinitely superior to those of former years, and the results obtained are correspondingly better.

(f) The treatment of fractures of the femur in hospitals where they are collected in special wards and under special surgeons, has been completely successful. The results obtained so far have been very good.

8. The Base Hospitals were, as a rule, able to deal satisfactorily with all the cases they received. They were provided with larger staffs than usual, and their operating theatre accommodation has been greatly increased during the past few months. The newly-trained "Nurse Anaesthetists" did very good work, both at the Casualty Clearing Stations to which they went and also at the base hospitals. I think more nurses should be trained.

9. I have visited all the hospitals at the various bases (except those at Havre and Etretat) on several occasions during the past three weeks, and am satisfied that the surgical work has been excellent and that difficulties have been thoroughly well met and mastered. Many thousand operations have been performed, and in some hospitals an

average of over 100 operations a day has been maintained for the whole ten days following March 21st.

The following table of the work done at the Etaples-Camiers area in a week is, I believe, a fair sample of the whole. I am indebted for it to Colonel Ballance and Colonel Richards, the Consulting Surgeons.

The death rate of one per cent for one week amongst nearly 20,000 patients is low, and the percentage of patients on whom operations were performed is very high. The variation in the proportion of cases operated upon in different hospitals is largely the result of the various strengths of their surgical staffs, but is to some extent also due to the different capabilities of the operators, to the arrangements of the theatres and the supply of good anaesthetists.

In conclusion I should like to suggest that it would be an advantage if each hospital had one responsible anaesthetist who should be regarded as holding a permanent appointment. Similar appointments were recently made at the Casualty Clearing Stations, and have proved very satisfactory.

Anthony A. Bowlby
Maj. Gen.

Ap. 14 - 1918

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(Over)

Anthony Bowlby
Maj-Gen

1 Apr. 1918

RAMC 365/5

Return of Admissions, Operations, and total Deaths of wounded in 13 Hospitals at Etaples and Camiers (March 23rd to 29th, inclusive.).

Hospital.	Admissions.	Operations	Per-centage.	Total Deaths in all patients.	Per-centage.
"A" (General.)	1439	285	19	14	1.
"B" (General.)	1510	208	14	11	.7
"C" (General.)	1470	193	13	16	1.1
"D" (General.)	2701	699	26	6	.2
"E" (General.)	2095	452	22	37	1.8
"F" (General.)	2087	277	13	14	.7
"G" (General.)	1992	262	13	7	.35
"H" (Stationary.)	126	--	--	-	--
"I" (General.)	1996	626	31	34	1.7
"K" (General.)	2612	394	15	19	.7
"L"	656	121	19	21	3.
"M"	310	131	42	2	.7
"N".	296	50	17	9	3.
TOTALS&	19,292	3,698	19%	190	1.%