

a cost of £5 10s.: no modification to the body of the lorry is necessary, and the equipment can be fitted by any carpenter or fitter in half an hour. The apparatus in no way interferes with the normal loading of the lorry.

In our opinion the equipment should be adopted as a standard fitting for the lorries of all medical units.

We wish to thank Colonel R. M. Dickson, O.B.E., Director of Training, Field Ambulance Training Camp, Swingate, Dover, for permission to forward this article for publication.

Echoes of the Past.

WAR EXPERIENCES OF A TERRITORIAL MEDICAL OFFICER.

BY MAJOR-GENERAL SIR RICHARD LUCE, K.C.M.G., C.B., M.B., F.R.C.S.

(Continued from p. 277.)

CHAPTER XIV.—EAST FORCE.

EAST Force Headquarters was at this time established in a group of small camps close to the village of Deir el Belah and only about five hundred yards from the sea. The Force though not formally recognized as an independent Army unit was practically run as such and the Commander flew the red and blue flag of an Army Commander. As the Commander-in-Chief, Sir Archibald Murray, had his Headquarters at Cairo, Sir Philip Chetwode was responsible for all the troops East of the Canal except those on the lines of communication.

Desert Column, consisting of the two Mounted Divisions and the Imperial Camel Corps with one of the Infantry Divisions attached, was practically an independent subordinate command with much the status of an Army Corps. The Commander flew the red and white flag of a Corps Commander. All correspondence between Desert Column and General Headquarters in Cairo passed through East Force Headquarters. The medical staff of the force consisted of a D.D.M.S. (Deputy Director of Medical Services) with an A.D.M.S. as his assistant and sanitary officer, a medical officer especially devoted to water supplies and a headquarters medical officer who had charge of all Headquarters personnel. The medical staff was not very comfortable as it was pitched on dusty ground close to a road on which there was much traffic and worse than anything it was within a few yards of the Headquarters motor garage. Cars were coming in or going out all day and all night long and we were so constantly subjected to the noises of engine testing that it was often difficult to carry on a conversation. It was, however, an agreeable change to live once more

in a roomy tent instead of in a bivouac tent and a great luxury to have electric light. The first few weeks were for me a strenuous time as there were many threads to be picked up and much new routine work to be learned.

The campaign had settled down very much to a condition of trench warfare.

The Turks held a line more or less unbroken from the sea at Gaza to Beersheba, nearly thirty miles inland. Our front line, about fourteen thousand yards long, was opposite the right part of theirs and extended from the sea to the slopes at Sheik Abbas and was strongly trenched and wired. Eastwards of Sheik Abbas our flank was thrown back across the Wadi Ghuzzeh and rested at its extremity on the old Turkish fortifications at Shellal referred to before.

Desert Column was responsible for the defence of the flank. Opposite Gaza the two lines were only about four hundred to a thousand yards apart, but our extreme flank, thrown back as it was, lay twelve miles from the nearest part of the Turkish lines and twenty from Beersheba. Both sides were fairly quiet and busily occupied in strengthening their defences.

The night of my arrival was, however, signalled by a serious bombing raid on our camps at Deir el Belah. It was a bright moonlight night and taking advantage of this, three or four planes dropped a number of bombs among our camps. The worst sufferers were the two casualty clearing stations near the railway station. Both units suffered severely. One medical officer and fourteen other ranks were killed; three dental surgeons and thirty-six other ranks wounded.

Two nights later a second raid took place and again the hospitals were the chief victims. Four other ranks were killed, three officers and fifteen other ranks wounded.

One of the bombs set fire to the dispensary tent of the 53rd Casualty Clearing Station which was burned to the ground.

The hospitals at the time were showing the regulation distinguishing lights, i.e. two white lights side by side. This distinguishing mark, though official, is not international and not an authorized Red Cross distinction. It was anxiously debated whether this attack on the hospitals was a deliberate breach of the Geneva Convention on the part of the Turks in imitation of their allies or a mistake due to their ignorance of our distinguishing signs for hospitals at night. This was an important matter to decide, as on it depended our future policy. In the moonlight the tents of the hospital even without lights are a good mark from the air but there is no doubt these lights showing would help the aim of the bomb dropper who had deliberate malice in his heart. We had to settle, therefore, whether it were better to show no lights at all or to show others which would be quite unmistakable. Taking into consideration their previous record both in Palestine and at Gallipoli for clean fighting and respect for the Geneva Convention, we decided on the latter policy and inaugurated

a system of marking the hospitals at night by a cross formed of red lamps suspended on wires a few feet from the ground.

Two days later there was another raid and this time the hospitals were spared, so we presumed that our charitable view of their conduct on the previous occasions was the correct one. The system was later extended to field ambulance units when they were filled with patients, and we never had any reason afterwards to regret our decision. Our Air Force reported that these red crosses were quite visible and distinctive at high altitudes. To be on the safe side, however, we constructed shallow trenches or "Funk Holes" all round the tents of the hospitals and organized a scheme for getting the patients moved into them whenever the alarm of air raid was sounded. Another precaution taken at the time was to forbid the use of headlights on the motor ambulances at night. It was doubtful whether it was more dangerous for those in the cars to run the risk of being bombed or to chance being turned over and buried under an ambulance.

A few days later the 53rd Casualty Clearing Station moved back to Rafa so as to reduce the tentage in the forward area and to be more directly available for cases from the Desert Column who now had their own direct route of evacuation to Rafa some distance from the coast.

My first duty as D.D.M.S. was to make a round of visits to the divisions and their medical units and to get into touch with their medical needs.

These visits to the front line were always full of interest, introducing one to new ground, new people and new problems. The ground held by East Force troops as distinct from that held by Desert Column, was divided into two front line sections and a reserve area. Each section was held by a division, while the reserve area was occupied by a third division.

The remaining infantry division was attached to Desert Column and out of the direct administrative control of East Force Headquarters.

The divisions moved round in rotation from one area to another. As it was impossible to see the whole area of a division in a day I used to visit representative sections.

Each division had its little points of difference in sanitary and medical methods. It was our policy at Headquarters, while insisting on uniformity in important principles, to allow as much freedom as possible in the carrying out of details and to hand on successful new methods initiated by any one division to the others for adoption. A great deal was done in this way to stimulate keenness and originality. Weekly conferences were held at Headquarters at which all the divisional A.Ds.M.S. or their representatives were present, and the discussions which took place at them were often most interesting and helpful.

As it was understood that there was no likelihood of active operations being undertaken for some months we were able to devote ourselves wholeheartedly to the medical well-being of the troops and in this we received every possible help and encouragement from our Commander, Sir Philip

Chetwode. With the experience of Gallipoli and Salonica before us the three main problems were the prevention of dysentery, malaria, and typhus. Experience had shown us that with properly inoculated troops enteric was not a serious danger. Dysentery depends on the fly and the disposal of excreta. Malaria on the mosquito. Typhus on the body louse. Fortunately we had at the disposal of the Force a first rate practical entomologist in Major Austen of the British Museum. His knowledge of the habits of our enemies and of the best methods of tracking them down was invaluable. He was entrusted with a roving commission to inspect and advise on all work undertaken to combat these pests. Sometimes he was attached to East Force and sometimes to Desert Column Headquarters.

As regards dysentery the details of the plan of campaign had been worked out during the previous year in Egypt by a special committee. The great object before one was to prevent flies from breeding and to deny access of those that existed to excreta infected with dysenteric germs and to food materials.

The first principles were therefore :—

- (1) To use bucket latrines with fly-proof seat covers, whenever these could be obtained.
- (2) To destroy the bucket contents by fire, or when this was impossible to bury them in deep pits and covered over so as to be inaccessible by flies.
- (3) To burn all food and other organic refuse in which flies could breed, or when this was not possible to bury it in pits which were to be sealed, as soon as full, with sheets of Hessian cloth or Hessian and paper in such a way that the adult fly emerging from the pupa which had wriggled to the surface of the pit, found itself shut down beneath an impermeable sheet which soon became its pall.
- (4) To bury dead animals well away from camps and trench quarters.
- (5) For all troops to carry on an active campaign against the adult fly itself.
- (6) To protect all food-stuff from access by the fly by the use of fly-proof larders and gauze wraps.
- (7) To burn horse manure or spread it in a layer not more than one inch deep over a wide smooth area, to dry in the sun.

Every effort was made to teach the troops and their officers, and by a system of regular inspections to ensure as far as possible that regulations were carried out and a proper sense of sanitary discipline developed throughout the Force. It is idle to maintain that fly-breeding ceased as the result of our efforts, but in Palestine the numbers of flies never approached the proportions reached at Gallipoli, and in fact, they rarely became a serious plague in areas controlled by well-disciplined units. The better divisions by constant work kept their lines wonderfully free. Dysentery and diarrhoea never assumed epidemic proportions.

As regards malaria we started with very little knowledge about the prevalence of the disease in this part of the country which had been little frequented by tourists and travellers. We knew, however, that parts of central and northern Palestine had a very evil reputation in the summer and autumn months.

As the female mosquito lays her eggs on the surface of still water and the larvæ when hatched live in it, breeding can only take place where water is present and the water supplies of southern Palestine in the summer and autumn are strictly limited; for there is no rainfall from May to October. It was not difficult, therefore, to discover if mosquitoes of the dangerous kinds were present in sufficient numbers to cause anxiety.

The only sources of water that we had to deal with in this area were: a lake at Deir el Belah, the water of which was distinctly brackish, and increasingly so as the water dried up during the summer; a series of wells in and around the villages; springs and pools in the Wadi Ghuzzeh and the shore water beneath the sand referred to above. The sea itself was thought at first to be above suspicion, and for practical purposes I believe it was free from danger, but breeding was found on a few occasions to be taking place in quiet pools of sea-water by the shore. The mosquito larva does not, however, like moving water and the constant breaking of the waves into the pools probably prevents the sea from being a serious source of breeding.

Anopheles larvæ were found in all the other surface water supplies, especially in the shallow stagnant pools of the Wadi.

Extensive schemes were put on foot to deal continuously with the breeding places, and so effective were the measures taken that by the late summer Major Austen found it quite difficult to find specimens in places where earlier they had been rampant. The result was that during the summer of 1917 there was little malaria among the troops.

It is now almost definitely established that typhus fever is conveyed to man by the bite of a body louse which has previously bitten a subject infected with the disease.

As regards typhus prevention, we had the benefit of the experience that had been gained in Serbia during the terrible epidemic of 1915. We adopted the great invention of the Serbian Force, the disinfecting train. This consisted of a locomotive engine and two or three closed trucks fitted with racks on which the entire kits of about six hundred men could be deposited at one time. Steam was conveyed in great force and volume from the engine into all the trucks simultaneously, and rapidly destroyed all the lice and their eggs exposed to its action. We had four trains of this kind with a permanent staff attached to each. A train could be moved up to any spot near the troops, and by this means a whole regiment could be disinfected in a single morning. One train was reserved entirely for men of the Egyptian Labour Corps. Endeavours were made to ensure that every unit was disinfected about once in six weeks, and in this way

the plague of lice was kept under control and the risk of a typhus epidemic reduced to a minimum.

Other diseases which gave anxiety were cholera, relapsing fever, diphtheria, scarlet fever, and sandfly fever. The small epidemic of cholera which occurred in August, 1916, after the capture of Katia has already been referred to. The infection undoubtedly came from the Turks, who had had a number of cases.

In June, 1917, we had an isolated case in an Egyptian of the Labour Corps in which the vibrio of cholera was definitely isolated. It caused us considerable anxiety and led to a temporary enforcement of strict regulations as to the movement of troops and civilians up and down the line and across the Canal into Egypt. Fortunately there was no spread at this time.

Relapsing fever occurred occasionally among the Egyptians, but in 1917 we had little or no trouble with this disease among the British troops. As in the case of typhus, for prevention of this disease we relied on regular disinfection of clothing.

Diphtheria and sore throat caused a good deal of trouble in the trenches, though they never became epidemic. Cases of diphtheria, though fairly common, were almost always confined to individuals and rarely spread to contacts.

An interesting piece of work was done by one of our bacteriologists at the laboratory attached to the 54th Casualty Clearing Station on the connexion between septic sores and diphtheria. In numerous cases he isolated from the discharge of the sores a bacillus which could not be differentiated from the Klebs-Löffler bacillus of diphtheria. I do not know if he ever had the opportunity of completing his investigations, but the extreme chronicity of these sores and their resistance to local treatment bears a distinct resemblance to some recognized forms of diphtheria infection, such as that of the eyelids. Almost my first recollection of General Allenby is the occasion when we tried to demonstrate to him, with a microscope, the Klebs-Löffler bacilli in a specimen from one of these cases. It was in the laboratory of the 54th Casualty Clearing Station during his first visit to the Palestine front on July 6, 1917.

Cases of scarlet fever cropped up in a curiously sporadic way during the summer, but this again was never epidemic.

In July and August we had a definite and extensive epidemic of sandfly fever. The disease runs a course clinically not very different from influenza, though fortunately without its sequelæ. The habits of the fly are not well known, but it is supposed to like dark and shady spots and has been thought by some to have a relation to lizards. We found, at any rate, that the troops attacked by it were those quartered near villages or in ground enclosed by hedges and palm trees. We found the way to stamp out an epidemic was to move the troops out into the open plain or desert.

This outbreak, though in no way serious, caused a certain amount of

trouble and anxiety because it occurred just at the time when the Force was being reorganized and undergoing special training for the new operations which were to take place in the autumn. An affected unit was temporarily placed *hors de combat* and could not be counted on to do any work until the epidemic was over. The majority of cases were treated in their lines, but the more serious had to be admitted to field ambulances, instructions being issued not to send them down the line if it could be helped.

To deal with the septic sore and other minor complaints not really requiring hospital treatment, a convalescent camp was established on the beach at Rafa. The exact military status of this camp caused a good deal of discussion. The point was, whether it was to be a medical unit under the protection of the Red Cross, or a military rest camp with a medical unit attached to carry out any special treatment that was needed. Eventually the latter principle was decided on. The camp was put under a military commandant but one of the immobile sections of the Field Ambulance of the 74th Division was attached to it and the Commanding Officer of this medical unit, though not responsible for discipline, was given special powers for regulating the administration of the camp and for dealing with the medical aspect of the cases sent there.

Under these conditions in which sea bathing formed a large part of the treatment, the septic sores made good progress and the camp fulfilled a very useful function.

Desert Column had a similar camp on the coast between Belah and Rafa for their cases.

The 53rd Division opened a special hospital on the beach, near the mouth of the Wadi Ghuzzeh, for scabies cases of which there were a great number in that division. They found it very difficult to eradicate this disease from the community, and by no means easy to cure it in the individual, even when the case was under complete medical control with every facility for bathing, washing, disinfection and regular treatment.

I have seen it stated by confident dermatologists that scabies can be cured in two to three days by careful treatment, but this certainly is not true of the cases we had to deal with. Even four to five weeks does not always suffice to make a definite cure in a bad case.

The organization of field ambulances into mobile and immobile sections has already been referred to, especially in relation to the mounted field ambulances. The Infantry Field Ambulances of the Infantry Divisions had two mobile sections and one immobile.

The three immobile sections of a division were about this time organized into a single unit without however in any way altering their official establishment. In accordance with the wish of the Force Commander the immobile sections of all the divisions were grouped together on a site near the 54th Casualty Clearing Station and were used for the reception of light cases from their own divisions so as to relieve the base hospitals.

The two casualty clearing stations, the 54th at Belah and the 53rd at Rafa, were unable from their establishment to do more than fulfil their function of clearing cases from the front. It was impossible for them to retain cases and send them back cured to their unit. Once men go down the line it is very difficult to get them back, even though their original disabilities may have been slight ones. Every effort, therefore, was made during this long period of quiescence to save the wastage which evacuation down the line involves.

The Immobile Section Divisional Hospitals fulfilled a very useful function in this way. It was necessary, of course, to obtain for them a special scale of equipment to ensure the satisfactory treatment of patients and the requisite standard of comfort.

The main dressing stations of the field ambulances stationed nearer the line were used to some extent in the same way.

One of the grouped immobile sections, that of the 52nd Division, was opened as a special hospital for the segregation and treatment of diphtheria and diphtheritic carriers, and did most useful work.

On June 4, East Force Headquarters moved into a new camp which had been prepared for it on the coast about a mile South of Belah. The sand dunes there are narrow and only about thirty feet high. Into this sand cliff facing the sea terraces were dug and out of these terraces quarters were constructed for all the messes and also for the officers of the staff. They were dug into the side of the cliff, revetted and fronted with sandbag walls and roofed with timber and corrugated iron.

For residence in the heat of summer, the position was ideal. Within a few yards of the sea, over which they looked out from a height of twenty to thirty feet, they received every bit of the breeze, which in normal times came off the sea every day. Bathing could be indulged in at one's very door, though it was hardly safe on this coast except in very calm weather. When there is anything of a swell the currents are very strong and there is an outlying reef of submerged rocks against which bathers are very apt to be dashed. During the summer there were several fatalities from bathing.

Attached to the Force, but at this time employed on the line of communications at Khan Yunus was a small French detachment of colonial troops. They were entirely self-supporting medically, having their own base hospital in Egypt and their own field hospital at Khan Yunus. All we had to do for them was to give them railway facilities for evacuation.

Our relations with the French medical officers were most cordial and a visit to their pleasant camp in an orchard at Khan Yunus, with its warm welcome and open hospitality, was a pleasure to be looked forward to and held in happy remembrance afterwards.

These French detachments were equipped for mountain warfare with mule litters for the carriage of the wounded. Each mule carried a pair of litters which when occupied must have weighed well over three hundred and

eighty pounds, too big a load for a mule, we should think, but the animals seemed to get along all right. Their hospital tents were of an excellent light pattern, lined with a cool blue colour which formed a refreshing relief from the glaring sun.

Though there were no active operations going on during the summer months, the autumn with the coming offensive was ever before us, and much care and thought was bestowed on the organization of our methods of evacuation of wounded in preparation for active operations, offensive or defensive.

Sites for dressing stations, advanced dressing stations and first-aid posts were carefully selected and protected, as far as possible, with head cover from shrapnel.

The routes up to the dressing stations were surveyed and made practicable for motor ambulances by laying down wire netting where necessary.

Regular inspection of these routes and seeing that they were kept in order formed an important part of my duty.

General Chetwode made a great point of saving the motor ambulances during periods of inactivity as they were limited in number and could not be replaced. They were, therefore, kept concentrated in the charge of a special R.A.S.C. officer, under direct control of the D.D.M.S., and only used for serious or urgent cases.

The ordinary routine evacuation of sick was carried out by means of camels and sand carts. By this means the cars were saved and the mules and transport drivers kept exercised.

For emergencies, one or two cars were always on duty at convenient points on each route.

Of the motor ambulances at our disposal, in the proportion of seven for each field ambulance, about half were Ford cars capable of taking two lying patients each or four sitting. The remainder were either Wolseleys, Studebakers or Sunbeams, each able to take four men lying, or twelve sitting. The Fords had their special uses as they could travel over rough and sandy ground which completely defeated the heavier cars.

About the middle of June we had a visit from Lieutenant-General Lawson, who had come out from England to deal with the question of man power. His plan was to take as many able-bodied men as he could from the R.A.M.C. and replace them with men of class B. We made an absolute stand against the men of field ambulances being replaced, as their work during active operations is no whit less arduous than that of the fighting ranks. This point was conceded but we had a number of our R.A.S.C. drivers replaced by Egyptians. It was arranged that to each team of four animals there should be one British and one Egyptian driver. This system worked well and we rarely had any trouble with our Egyptians. They were hard working and with the support of their British comrades they never showed any lack of courage.

CHAPTER XV.—ARRIVAL OF GENERAL ALLENBY.

General Allenby came out to relieve Sir Archibald Murray at the end of June. He paid his first visit to East Force on July 6. All the heads of departments went to meet him at the station at Deir el Belah and I for one did not fail to be impressed with the great personality that had come out to control our destinies.

The 60th Division, the first of our new divisions, began to arrive on the same day from Salonica, where they had only spent a few months without taking part in any active operations. They were a second line London Territorial Division commanded by Major-General Bulfin.

The 75th, a mixed British and Indian division which was being formed on the Canal, came up about a month later. Its British regiments were some Wessex territorial battalions from India and some regulars from East Africa. Most of the Indian troops had been serving in Mesopotamia. The troops from East Africa were terribly infected with malaria, in some cases so badly that they could not take the field when the division first came up.

During the summer a branch line was constructed from Rafa to the right part of our line. It made its way through the old Turkish defences to the crossing over the Wadi Ghuzzeh at Shellal and was carried across the bed of the Wadi, up the escarpment on the other side and about a mile out into the plain beyond. The working at this point, however, was shelled so heavily from the Turkish position at Hareira that it was decided to take up the piece that had been constructed beyond the Wadi. No doubt the taking up of the rails was done partly to deceive the Turks as to our future intentions. At the same time another branch was continued along the south side of the Wadi as far as Gamli, the extreme right of our line.

As soon as these branches were completed they were used for evacuation of casualties. In the meantime the Sinai part of the line from Kantara to El Arish was gradually being doubled. To get the troops into proper fettle for coming events after their long inactivity, a couple of raids were organized and carried out on the coastal section during the month of July. Both were directed against outlying positions held by the Turks near the coast in front of Gaza. Both were successful, and on each occasion prisoners were taken and only a small number of casualties incurred. These raids also served to test our scheme of medical evacuation which proved quite satisfactory.

With the arrival of General Allenby and the new divisions, came rumours of reorganizations at headquarters. These rumours gradually materialized into definite news. The Commander-in-Chief was coming to Palestine with his headquarters to take over command of the Army in person. East Force was to be abolished and the Army divided into three Army corps, two of infantry to be called the 20th and 21st, and one of mounted troops. General Chetwode was to command the 20th and General Bulfin the 21st. The mounted corps was to retain its old purpose

and to be called the Desert Corps instead of the Desert Column, General Chauvel retaining command. It was now, however, to consist of three divisions each of three brigades. The new divisions were to be known as the Anzac, the Australian, and the Yeomanry Divisions. In the change I remained with General Chetwode and became D.D.M.S. of the 20th Corps, and my A.D.M.S., Major Lelean, stayed with me as D.A.D.M.S. The Corps was to consist of the 53rd, 60th and 74th Divisions, and the 10th Division (Irish) when it should arrive from Salonica.

A large camp was prepared for General Headquarters at Kelab on some open ground near the railway between Rafa and Khan Yunus.

The D.M.S., General Maher, did not at first come up to Kelab with the rest of the G.H.Q. staff, but sent his A.D.M.S., Colonel Keble, to represent him.

East Force did not become extinct until August 12. At this time the 53rd Division was in the trenches on the coastal section and the 60th was attached to Desert Column, so that when the 21st Corps took over responsibility for the maintenance of the lines opposite Gaza the 74th Division was the only one of our divisions which for the moment was under our control, and as they were going through a special course of training our immediate responsibilities were very light.

Twenty-first Corps Headquarters moved into our terraced quarters on the beach and we formed a temporary camp in Deir el Belah near where we had been before, until a new camp which was being prepared for us at Fukhari, on the Rafa-Shellal railway, was ready. After the strenuous work of East Force our duties were very light, and the opportunity was seized by most of us for taking a short holiday. My own, the first since our landing in April, 1915, was spent in Cairo, where, after the manner of the traditional busman, I took the opportunity of seeing something of the work in the base hospitals.

(To be continued.)

Current Literature.

The Influence of Diet on Caries in Children's Teeth. Medical Research Council. Spec. Rep. Series, No. 211. H.M. Stationery Office, 1936. Pp. 137. Price 2s.

The results obtained during the first stages of the investigations described in this report were published in an interim report issued by the Medical Research Council in 1931 (Spec. Rep. Series, No. 159). The report under review gives a complete description of the investigations, the methods employed and the detailed results.

The object of the investigations being to determine to what extent it was possible to control the initiation and spread of caries by dietetic measures