effect of albumin is remembered. Thus, where a complete method of steam sterilization by downward displacement cannot be used, the method of first washing in hot water, and then leaving the utensils to stand in potassium permanganate 1 in 1000 solution is recommended. Ineffective methods of sterilization are dangerous, in that they give a false sense of security.

A considerable number of experiments were done in the Pathological Department of Trinity College, Dublin, and my thanks are due to Professor J. W. Bigger, who gave me the facilities for carrying them out, and for many helpful suggestions. I should also like to thank Dr. G. C. Dockery and Dr. L. L. Griffiths for their advice and help.

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Echoes of the Past.

THE SECOND AFGHAN WAR, 1878-1879.

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The immediate cause of the Afghan Wars of 1878-1880 was the reception of a Russian Mission at Kabul and the refusal of the Amir, Shere Ali, to admit a British one. War was declared in November, 1878, when three columns crossed into Afghanistan by way of the Khyber, the Kuram Valley, and the Khojak Pass respectively. The first column consisted of 10,000 British and Indian troops under Sir Samuel Browne, forming a division; the Kuram force, under Sir Frederick Roberts, was 5,500 strong; Sir Donald Stewart, operating through Quetta, had a division equal to the first. The Quetta garrison was reinforced to the strength of another division, and a second division of the Peshawar Valley Force was concentrated at Hasan Abdul.

The opening of the campaign was a time of much anxiety for the heads of the British Medical Service. Though the surgeons were technically no longer regimental, no steps had been taken to remove them from their corps, and there were no hospital establishments other than regimental.

In September, when the possibility of war was realized, Inspector-General Ker Innes had submitted an appreciation to the Commander-in-Chief in Bengal proposing the establishment of divisional field and base hospitals for British troops, the one to accommodate normally five, the other seven per cent of the force. While maintaining twelve per cent of beds as a whole, the proportion in each was capable of variation. Associated with this was a system of regular, if not daily, evacuation from front to base through rest stations where medical assistance and relays of transport would be provided. The hospitals were to be divisible into sections corresponding to brigades, and were to provide replenishment of medical stores.
The scheme, applying to British troops only, was accepted by the Commander-in-Chief, but final sanction was only accorded seven days before hostilities commenced. Surgeon-General Sir G. J. H. Evatt has described the confusion involved when the P.M.O., Deputy Surgeon-General J. Gibbons, arrived at Peshawar with a single copy of the Precis, as it was called, in the shape of a rough proof. "It became necessary in three days, and practically in the face of the enemy, to remove all the medical officers and subordinates from their regiments to the little understood new creation of field hospitals, to hand over every grain of medicines, instruments and technical equipment, books and documents, and give and receive receipts on both sides, and finally to draw from the Commissariat, Ordnance, and Transport Departments the various equipments needed, the very existence of which was unknown outside the Medical Department." 1

The P.M.O. was not allowed a staff officer. On one occasion he was seen leading his own camels, which he had drawn in person from the transport lines. It is not surprising that at the end of the second phase of the war he was sent home ruined in health and speedily died.

On November 20 a field hospital made up from regimental medical

equipment was encamped with the division at Jamrud. The stores were packed in camel trunks, and the size of the tents precluded mule transport. As a result, when, on the following day, the force advanced on Ali Musjid, the hospital was left with the heavy baggage on the camping ground. The P.M.O. remained with it. That any effort was made to afford assistance to the attacking troops seems to have been due to the initiative of Surgeon-Major Evatt, who, later in the day, obtained leave from his Field Hospital Commander to follow them up with some reserve dressings and medical comforts carried in doolies. Arriving unescorted, and at no small risk, about nightfall, the party found that, though the main attack had been postponed, two Indian regiments had delivered a premature assault. Halting on the river bank, they received their casualties, numbering about fifty, and here they remained isolated through the night.

The main assault was never delivered, as the Afghans retired under cover of darkness. At dawn the Inspector-General, who had accompanied Army Headquarters, visited the dressing station, and arranged for the removal of the wounded to the Shirgai heights, whence they were transferred in doolies to Jamrud and afterwards by wheeled transport to the 300-bedded base hospital established under Surgeon-Major Fred Moore at Peshawar. In the evening the field hospital arrived and was pitched at Ali Musjid. On the 24th the division reached Daka, where it remained three weeks. The hospital was again left behind, but on December 7 a section of fifty beds, under Evatt, with Surgeon Shaw and an apothecary (assistant surgeon) was moved up. In the meantime the only hospital accommodation on the spot was a hospital improvised by Surgeon-Major Creagh in the fort with his battery equipment. At the same time the evacuation scheme was put into practice. Elephants, camels and a reinforcement of doolies had come up from Peshawar, rest stations had been formed, and there was a daily evacuation through Landi Kotal and Ali Musjid to the base. Eventually the remainder of the field hospital arrived at Daka and leaving a section behind in the fort, marched with the bulk of the division to a concentration area round Jalalabad.

By this time the cold of the Frontier had begun to affect the battalions who had come from warmer stations, especially those with a previous malarial history. A bad outbreak of pneumonia occurred in the 14th Sikhs who were sent back to India. Various small operations against the neighbouring tribes were undertaken both from Daka and Jalalabad. Returning from one of these the 17th (Leicesters) had thirty-one cases of pneumonia and eleven deaths. The daily evacuation of weakly men continued, but the general health of the troops was described as good.1 Towards the end of March the Second Division moved up and took over the line from Jamrud to Daka. Surgeon-Major J. A. Hanbury was P.M.O. of

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1 The average sick of British troops was given as 3·6 per cent and of Indian troops as 4·27 per cent.
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this division, and Surgeon-Major J. H. Wright commanded the field hospital. At Peshawar a second base hospital was established under Surgeon-Major Ramsbotham. An Indian general hospital and an officers' hospital were also opened.

On April 2 occurred the disaster when an officer and forty-six men of the 10th Hussars were drowned in fording the Kabul river. Surgeon Cornish their medical officer narrowly escaped, only to meet his death two years later on Majuba Hill. On April 14 the division encamped at Safed Sang near Gandamak. On May 30, the Amir having died, the treaty of Gandamak was signed.

The operations on the Central and Southern routes now need consideration. General Roberts had a striking force of two infantry brigades, a cavalry brigade, two field batteries, two mountain batteries, and a company of Sappers and Miners with a squadron of the 10th Hussars. Two battalions and a field battery remained at Kohat. The P.M.O. was Deputy Surgeon-General F. P. Allen, C.B. A base hospital, described as "rough, but clean, comfortable, and orderly," was established under Surgeon-Major Curtiss Martin at Kohat.

Having opened a depot and a section of a field hospital at Thal, where the Miranzai and Kuram valleys meet, Roberts crossed the Kuram river on November 21. Going was easy, and all operations were facilitated by the friendliness of the Touri inhabitants. Marching on the right bank of the river by Khapianga, Ahmad-i-Shama and the Darwazai Pass, the Kuram Fort, near the present village of Ahmadzai, was occupied on the 25th, the Amir's forces retiring to a position on the Paiwar Kotal. The position was turned by a difficult and dangerous night march up the Spingawai Ravine and a somewhat critical fight at dawn, in which the 72nd and the 5th Gurkhas were particularly distinguished. The guns were carried on elephants. The troops engaged numbered 3,000, of whom 20 were killed and 72 wounded. The latter were removed to Kuram. The medical problem presented no serious difficulties. There was an efficiently organized transport service consisting of hired mules for the most part. In January, 1879, a column visited Khost, and was withdrawn after defeating the tribesmen at Matun. No further military operations were undertaken. The present road along the left bank of the river was made, butments were built for the garrisons at Kuram, where there was a very complete hospital for British and Indians at the Peiwar Kotal, where there was another hospital, and at Ali Khel. The fort at Thal was strengthened and a new cantonment near Shalozan, the modern Parachinar, was commenced. Except for a few cholera cases at Thal, health remained good.

The railhead of the troops on the Southern line was at Sukkur on the Indus, and by no means the least arduous part of the undertaking was the long dreary march to Quetta through the desert and up the Bolan Pass, in which the heat by day and the cold at night tried the troops severely. As in the first Afghan War, the mortality among the camels was enormous.
G. A. Kempthorne

Early in December the 2nd (Quetta) Division, having concentrated at Pishin, the 1st (Multan) Division began to reach Quetta, where they found the hospitals crowded. Partly owing to the scarcity of sweepers, and partly owing to the fatal omission to deal with the question early, the camping ground was in a deplorable condition, and the stench of dead camels filled the air. It was never really cleaned up, and remained a menace to health throughout.

The Multan Division, under the personal command of Lieutenant-General Sir Donald Stewart (P.M.O. Deputy Surgeon-General A. Smith), and the 2nd (Quetta) Division under Major-General Biddulph (P.M.O. Deputy Surgeon-General J. Hendley) advanced through the Khojak and Gwajha Passes. Each division had its British field hospital, and a base hospital under Surgeon-Major J. McCarthy was left at Quetta. In crossing the Khojak, the guns and wagons were lowered with ropes down a specially constructed ramp. Kandahar was reached almost without opposition on January 8. In the course of a reconnaissance made by the 2nd Division towards the Helmand River some cases of scurvy occurred, and a curious epidemic of giddiness, followed in some cases by insensibility, affected a number of the troops. Inquiry showed that among the crops the datura plant constantly grew, and was garnered with the wheat. To this the local inhabitants were immune, but the flour affected the Army with symptoms of poisoning by Cannabis indica.

When the treaty was signed at the end of May, the weather was already hot. The daily evacuation of sick to Quetta had for this reason ceased, and in March the base hospital was closed. A base hospital under Surgeon-Major J. B. C. Reade and a native hospital were operating in the citadel at Kandahar. Here the British troops remained healthy, but there was much pneumonia among the followers. As in the First Afghan War, jaundice was prevalent. It was decided in view of the season that the march back to India must be postponed until the autumn. The troops in the Kuram also remained. The problem of the withdrawal from Gandamak was one which required the most serious thought. A conference at which Inspector-General Ker Innes and Dr. Cunningham, the Sanitary Commissioner, were present, was held by the Governor General at Simla. An outbreak of cholera had occurred at Peshawar. In spite of the precautions, such as examining posts and cholera hospitals, adopted by the P.M.O. of the 2nd Division, it had spread to Ali Musjid, and on May 15 had reached Jalalabad. There was reason from past experience to believe that the division, if it remained at Gandamak through the summer, would suffer severely from dysentery and enteric fever, cases had indeed already occurred. Moreover they had no shelter other than tents. Under the circumstances it was decided to move in. Every possible precaution was taken, excepting only those comparatively simple and vital ones, which later knowledge has taught us might reasonably have been expected to preserve at any rate the disciplined portion of the force from infection. Surgeon-Major J. H.
Porter, a most experienced and popular officer, was attached to the Quartermaster-General's Department to advise on camping sites, preservation of water supplies and sanitation of camps and rest depots. Recommendations were made as to troops marching in the evening, the provision of double-fly E.P. tents, avoidance of old camping grounds, easy marches and the issue of refreshments. The British field hospital was split into its four sections and distributed among the marching detachments.

No doubt the measures taken were of considerable value, but the death roll was heavy. The Rifle Brigade had forty-seven deaths from cholera before reaching Peshawar, the 10th Hussars thirty-four, the 51st thirteen, and the 17th nine. Of the Indian regiments, the writer has found no record. The stores from Jalalabad were floated down the river on rafts, and with them a number of Indian cholera patients. The troops commenced their march in poor condition. The temperature rose to between 110° F. and 115° F. "On reaching Jamrud," Inspector-General Innes wrote, "their distress was very apparent. Their clothes were stiff and dirty from the profuse perspiration and dust; their condition betokened great nervous exhaustion combined with a wild expression difficult to describe, the eyes injected and even sunken, a burning skin, a dry tongue, a weak voice, and a thirst no amount of fluids seemed to relieve. . . . If there was one class worse than another it was certainly the medical officers and subordinates." Surgeon-Major Porter states that on their arrival at Hari-Singh-Ka-Burj most of them were in a painfully helpless and prostrate condition both mentally and bodily. This was attributable to the strain to which they had been subjected, almost incessant work day and night coupled with the anxiety and depression, which even the most indifferent or callous must share in the presence of so much disease, fatigue, and responsibility. Some had almost literally no relief from toil, as from so many of their number becoming ill the duties became doubled and trebled for those who remained at their posts. The M.O. i/c Section Hospital broke down early, next the surgeon of the 4th Rifle Brigade, and a third Medical Officer arrived at Hari-Singh who was simply capable of handing over his sick before being placed himself on the sick list. The medical officers had been thrown entirely on their own resources in regard to pitching and striking of tents, receiving no European assistance for this purpose. They had also to muster the doolie-bearers before marching and drive them like so many cattle along the march. Others not entitled to draw forage allowance were obliged to march on foot, and at the end of it to perform their professional duties when worn out by fatigue and excessive heat. While the troops were passing through Peshawar there were twelve medical officers on the sick list at one time.

Up to the end of June, 317 cases of cholera and 199 deaths were reported. There were four deaths among the medical staff during June and July, of which two were from cholera. The officers who took part in this march were, besides Gibbons the P.M.O., Surgeon-Majors J. H. Porter,

The war was now assumed to be over, though it proved to be no more than the termination of the first phase. The Commander-in-Chief bore handsome testimony to the conduct of the medical officers in the cholera epidemic. The divisional P.M.O.'s. were mentioned in Dispatches as well as seventeen others of the A.M.D. and six regimental medical officers of the Indian Army.

As usual, many valuable lessons had been learnt or relearnt. A certain proportion of the British battalions were composed mainly of long service men. These were found to have borne the strain of active service well. A large number of the younger soldiers enlisted under the recent conditions of six years with the Colours and six with the Reserve had broken down. After the war, the term was altered to seven and five. The disastrous wastage resulting from the despatch of troops to the frontier from unhealthy, especially malarious, stations was brought to notice by the Inspector-General. The mortality among followers from pneumonia owing to their being inadequately clothed was appreciated, and, for a time, taken to heart. The need for a disciplined Army Hospital Corps, a properly organized cadre of native bearers, and the attachment of British nursing orderlies to the field hospitals, was strongly represented. The new system of field hospitals for British troops and continuous evacuation through relay posts were accepted as having justified its trial. The divided system under which the Indian regiments took their regimental hospitals into the field had caused some confusion, but less than was expected. The supply of portable field medical equipment was taken in hand and satisfactorily dealt with. After some difficulties, the proposal that sick transport should
be earmarked as such and remain under the orders of the P.M.O. of the force was accepted in principle.

On July 24, in accordance with the terms of the treaty, Sir Louis Cavagnari arrived at Kabul as the British representative. His staff consisted of his secretary Mr. Jenkins, Dr. A. H. Kelly of the Indian Medical Service and Lieutenant W. H. P. Hamilton in command of a carefully picked escort of twenty-five Guides Cavalry and fifty Infantry of the same Corps. On the morning of September 3, the Residency, which was within 250 yards of the Amir's palace in the Bala Hissar, was attacked by three Afghan regiments. The escort held out with the utmost gallantry until evening, when they were overwhelmed, the survivors either perishing in the burning building or being put to the sword.

Immediate action was decided on; the evacuation of Kandahar, which had already commenced, was arrested. The Shutargardan Pass on the Central Line was occupied by British troops, and Sir Frederick Roberts hastened down from Simla to resume command of the Kuram Field Force, the strength of which was now about 7,500, including in its ranks the 9th Lancers, 2nd battalion 8th (Kings Liverpool), 72nd (Seaforth) Highlanders, 85th (2/K.S.L.I.), and 92nd (2/Gordon) Highlanders. The transport consisted mainly of mules. Profiting by past experience, a suitable scale of warm clothing had been supplied; for British, a jersey, warm socks, mittens, putties (on payment), Balaklava caps, and posheteens. Indian troops had the same, but a blanket in place of a jersey. For followers, a country blanket and warm pyjamas were allowed, and either a posheteen or a warm coat.¹ The uselessness of the Indian shoe was pointed out by the General on reaching Kabul. He suggested the substitution of a Kabali pattern one, but stated that the only effective footgear for Indian troops on the frontier was the ammunition boot. The Government price of a pair was 4 Rs. A serious effort was made to organize the Kahars, who were put under the charge of a medical officer, Surgeon-Major Isidore Burke. The field medical equipment was now all in mule panniers.

On September 27th Headquarters moved from Ali Khel to Shutargardan. In a skirmish with some tribesmen, en route, Deputy Surgeon-General Townshend, I.M.S., the P.M.O., who was riding with General Roberts, was severely wounded, receiving a bullet in the jaw. At Kushi the Amir Yakub came into the British camp, professedly to place himself under British protection. He was under the gravest suspicion in connection with the murder of the Envoy and was detained. On October 5 Chaharasia was reached, where the column bivouacked at a point eleven miles from Kabul. On the following day a force of 10,000 of the enemy was engaged with decisive success, and on October 9 Kabul was occupied.

¹ The so-called "warm coat," by the year 1918, had degenerated into the miserable "coat, warm, followers" which was supplied for some time to the newly formed Army Hospital Corps.
G. A. Kemphorne

Roberts's troops in this engagement numbered 3,800, the action lasted eight and a half hours, and his losses were eighteen killed and sixty-seven wounded. Among the latter was Surgeon A. Duncan of the 23rd Pioneers. Surgeon J. J. Morris, attached to the 92nd, received a mention in Dispatches. On reaching Kabul the Amir abdicated, and was later despatched to India. Meanwhile the posts at Shutargardan and Ali Khel were attacked by 10,000 Ghilzais. The garrisons were relieved, but, as the winter was closing in, this line of communication was abandoned and the Khyber line re-opened by the 2nd Khyber Division from Peshawar under Major-General Bright. The P.M.O. with this force was Deputy Surgeon-General H. B. Hassard.

Roberts with his small force maintained a continuous and energetic offensive, but just before Christmas he was compelled to withdraw into his fortified cantonment of Sherpur while the city of Kabul was occupied by 20,000 Afghans. A strong attack delivered on December 23 was handsomely repulsed, after which the Afghans dispersed. Our casualties from the enemy during the fortnight's fighting did not exceed 280. Pneumonia was now very prevalent. During the first week of the New Year Surgeon A. C. Keith died of the disease, and three days later Deputy Surgeon-General J. H. Porter, who had succeeded as P.M.O., also succumbed. This officer, to whom the General paid a fine tribute in column orders, had served in the Crimea and the Mutiny and held the German "Steel Medal" for his work in the British Ambulance at the siege of Paris.

In March, Sir Donald Stewart moved towards Ghazni with two divisions, Kandahar being taken over by Major-General Primrose with a division of Bombay troops. On April 19, Stewart, with 4,651 men, engaged and defeated 15,000 Ghilzais and Duranis at Ahmad Khel, inflicting a loss on the enemy of 3,000. It was one of those comparatively rare events, a hand-to-hand fight. Successive waves of swordsmen on foot charged our infantry and up to within thirty yards of the muzzles of the guns. The British reserves were all thrown in, the situation, at one time critical, being saved by repeated charges of the Punjab Cavalry. Our casualties, seventeen killed and 125 wounded, were all caused by knife and sword cuts. Sir Donald Stewart now assumed command of the three divisions of what became officially the Northern Afghanistan Field Force. The medical staff was as follows: P.M.O., Deputy Surgeon-General A. Smith, C.B.; 1st Division (Roberts), Deputy Surgeon-General H. B. Hassard; 2nd Division (Ross) Deputy Surgeon-General J. A. Hanbury; 3rd Division (Hills), Brigade Surgeon R. W. Meadows.

In March pneumonia disappeared. The field hospitals of the 1st and 2nd Divisions were amalgamated into one large field general hospital with

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1 Squadron 9th Lancers, three regiments Indian Cavalry, two batteries R.A. and a Mountain Battery, wing of 67th, 72nd and 92nd Highlanders, 5th Gurkhas, 5th Punjabis, and 23rd Pioneers.
Surgeon-Major S. B. Roe in charge of the British, and Surgeon-Major G. Farrell, 5th Gurkhas, of the Indian Section. On the restoration of the Khyber line, daily evacuation of sick through relay posts had been established. This system, which was economical in transport and saving of Kabars, was in March replaced by one of large weekly convoys, from which the bearers returned sick and exhausted. In April the heat rendered movement of any serious cases undesirable. During the next two months the troops on the Khyber Line were kept in constant activity by Mohmand, Khugiani and Shinwari raids. Kuram was, on the whole, quiet. Here the lower valley was becoming malarious.

In July the Kandahar Province was threatened by the advance of Ayub Khan, the ex-Amir's younger brother, from Herat, and the tribes rose in sympathy. The Wali of Kandahar with an Afghan force was sent to oppose him, and a force of all arms, under Brigadier-General Burrows, moved out in support.¹

The force was accompanied by a field hospital in charge of Surgeon-Major J. D. Edge, Surgeon-Major A. F. Preston was in medical charge of the 66th (2/Royal Berkshire) Regiment, C. H. Harvey of the Artillery, and Surgeons Burroughs, Dane, and Eaton of the I.M.S. accompanied their respective corps. Burrows advanced to Girisk, when the Wali's troops all went over to the enemy. He then fell back, encumbered with a good deal of baggage and eighty-four sick, to a point forty-six miles from Kandahar. On the morning of July 27, having received information that the enemy were occupying the village of Maiwand in force, though in unknown strength, he decided to attack. The artillery came into action and the infantry came up in line with the guns, but here they were halted and remained. The field hospital and transport were three-quarters of a mile in rear with a baggage guard. The Afghans, emboldened by seeing the British halted, commenced to attack. The infantry stood their ground for three hours, the small force of Indian cavalry being employed in constant demonstrations against the Afghans, who threatened to envelop our flanks. The baggage guard was in action from the first. The troops had been out since 7 a.m., they had no cover, the temperature was 110°F. in the shade. At about 3 o'clock the Ghazis got close in, the Indian infantry on the left suddenly broke, and rolled up on the 66th, forming a helpless crowd of panic-stricken men. A cavalry charge was ordered, but the men had had as much as they could stand, and, after one effort, went about without orders and retired off the field. The main body of the Berkshires retired in good order, continuing to inflict great loss on the enemy. A halt was made in an enclosed garden, where the entire Afghan army surrounded them. Here, rallying round their colours, and fighting to the last,

¹ 66th (2/Royal Berks), 80th Bombay Infantry, 1st Bombay Grenadiers, Company Bombay Sappers and Miners, 3rd Bombay Light Cavalry, 3rd Sind Horse, E-B., R.H.A., and a captured smooth-bore battery.
Lieutenant-Colonel Galbraith with nine of his officers and more than half his men died.

The baggage and hospital guard, consisting of a company of each of the three infantry battalions under Major Ready of the 66th, had put up a fine defence throughout. A little time before the débâcle occurred, an attempt was made to withdraw the baggage. This failed, but the majority of the sick, and those of the wounded who had reached the hospital, seem to have been got away on transport animals. When the Bombay Infantry broke, a general panic occurred among the followers in rear. Surgeon-Major Preston, who had just been brought in wounded, was carried off by his doolie-bearers at a run, amid a stream of men, camels, bullocks and horses stampeding in confusion. He was soon dropped, but was fortunately taken up by an artillery wagon, and so escaped. The other medical officers were equally fortunate, but fourteen of the Kahars were killed. In spite of the gallantry of the Royal Artillery, eight guns had to be left; their limbers went out of action crowded with wounded. The pursuit was not pressed, as the bulk of the Afghans were engaged in looting the baggage. The remnant of the force, a straggling column upwards of six miles long, had to cross sixteen miles of desert before water was found. The number engaged was 2,476. Of these 21 officers and 296 British other ranks were killed and 8 officers and 42 other ranks wounded. Of the Indian troops, 653 were killed, and 118 wounded were brought in; of the followers, 331 were killed or missing. Surgeon-Major Edge received a mention in Dispatches. Whether or not the attack against vastly superior numbers might have succeeded if properly pressed, depends no doubt on various purely military considerations, but one may conjecture that General Roberts, who appreciated the Afghan temperament, would have carried it through. The Indian regiments present were, at the lowest estimate, of good average quality, but the strain of the long passive resistance when hungry and exhausted by heat was too much for them.

When the news of the disaster reached Kandahar the cantonment was hurriedly abandoned, and the troops were withdrawn into the city, which was soon closely invested. General Primrose had about 5,000 men, of whom 438 were on the sick list. The British force consisted of the 7th Royal Fusiliers, the remains of the 66th, and three batteries. A hospital was established by Deputy Surgeon-General J. O’Nial in the citadel. A sortie made on August 16, in which a loss of 106 killed and 117 wounded was incurred, did nothing to improve the morale of the garrison. There was much sickness, ascribed to want of fresh vegetables, the confined quarters and the difficulties of conservancy with the enemy close under the walls. The siege continued until the 23rd, when the Afghans withdrew on the approach of the relieving force.

On August 8, 2,562 British and 7,151 Indian troops, with 18 mountain guns and mule transport, left Kabul on their 300 mile march to relieve Kandahar. Sir Frederick Roberts's advance through hostile country without
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a base or communications towards a point presumably in possession of a recently victorious enemy was, until justified by its success, condemned by military critics as in complete disregard of all accepted principles. The distance was covered in twenty-three days.

The force was most carefully selected, all weakly men being discarded. Deputy Surgeon-General J. A. Hanbury was P.M.O. of the column, with J. Ekin P.M.O. of the infantry division. A section of a field hospital was allotted to each brigade for British troops, to which was attached a subsection for followers. The Indian troops, as usual, had their regimental hospitals. For sick transport there were 2,192 Kahars, 115 doolies, 321 dandies, 286 ponies, 43 donkeys, 3 bullocks, and 6 camels, calculated in the proportion of 5 per cent for Europeans, 3 for Indian troops and $\frac{1}{2}$ for followers. This scale was, however, inadequate. The Kahars started in bad condition, many of them having recently returned from heavy duty with convoys.

The country to be traversed consisted of valleys cut by deep nalis or plains mapped out in little patches, signs of former cultivation, bounded by ridges and irrigation channels. This made very bad going. The daily variation of temperature was as much as $80^\circ F.$; sandstorms and the dust of the column caused much discomfort. As regards rations, good mutton was usually secured by the supply officers, flour was baked in a field bakery. The difficulty of fuel was overcome by digging up the roots of the southern wood (abrotanum) or by purchasing the houses of the villagers and burning the roofs. Water, though good, was scarce, and halts had to be regulated accordingly.

Ghazni (97½ miles) was reached in seven marches, in the course of which the Zamburak and Sher-Daban Passes were crossed. Blistered feet, dyspepsia with bilious vomiting, and diarrhoea caused some trouble. Three sepoys died from intestinal obstruction, having consumed large quantities of water after a meal of raw Indian corn. Many of the marching boots were coming to pieces, and it was found necessary to augment the sick transport by the purchase of a large number of donkeys. The next 136 miles to Khelat-i-Ghilzai were completed between August 16 and 23, the average constantly sick for the first seven days being 550 troops and 200 followers. Half this inefficiency was due to sore feet. On the 23rd the first halt was made; 232 miles had been accomplished in 14 marches. From Khelat to Khel-i-Khun (50 miles) took three days, when another halt was made, the sick and weakly men being sent on to Robat, the next halt, in two stages. Kandahar was reached without opposition on August 31, when about 1,000 men suffering almost entirely from minor ailments were admitted to hospital. The last 20 miles of the journey had been done in 2 short marches after a halt. The official history of the campaign estimates that 280 miles were covered in twenty days or 19 marches.

Sir Frederick Roberts was not favourably impressed by the bearing of the greater part of the garrison, which he described as demoralized and despondent. The force which he now had at his disposal actually out-
numbered that of Ayub Khan, who had taken up a position among the hills on the Baba Wali Kotal. On September 1 an attack was delivered with 8,392 men when the Afghans were thoroughly defeated and their army broken up. During the fight the field hospital remained in camp, dressing stations and ambulance transport accompanying the brigades under the brigade surgeons. Our losses were 35 killed and 213 wounded. A few days later the advanced troops of a fresh division from Quetta under Major-General Phayre arrived.


General Roberts's victory had the immediate effect of quieting the country. Abdur Rahman had already been recognized by the Indian Government as Amir. By the end of February, 1881, the Kuram Valley was evacuated; in March the last troops left the Khyber, and in April the troops in Southern Afghanistan had returned to the Quetta district. The final withdrawal from Kandahar was admirably conducted; rest camps, water supplies, and shelter were carefully arranged, and in spite of the heat the health of the troops was excellent.

The maximum strength attained by the British armies in Afghanistan during this war was in August, 1880, when there were 18,801 Europeans and 46,151 Indians engaged. The average strength of British troops of the Bengal Army during the seven hundred and ten days has been given officially as 10,246. Of these 1,122 died, including 161 killed in action or died as the result of wounds, making an annual death-rate of 56.2 per 1,000. The admissions to hospital are given as 1,443 per 1,000 per annum, which compares favourably with that of 1,911 for all India during 1879. These figures do not apparently include some 2,000 odd Europeans of the Bombay Division in General Primrose's force. These suffered much from sickness during their stay in Kandahar; lost 317 at Maiwand and 32 more in the sortie of August 16.

The following medical officers lost their lives: Deputy Surgeon-General J. A. Porter; Surgeon-Majors: R. H. Bolton, G. Atkinson, J. H. Wright, H. Kelsall; Surgeon A. C. Keith, of the British Service; Surgeon-Major J. Wallace; Surgeons: H. A. C. Gray, G. Watson, J. E. Walsh, A. H.