

# The Battle of Keren – Medical support in a complex environment

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## Abstract

Rapid developments of capability seen in the contemporary operating environment are a constant during any period of conflict. The Second World War is littered with numerous examples of adapting systems developed following the First World War and making them more suitable for a more mobile, modern form of warfare. The East African campaign during 1941 saw a number of developments to an accepted field medical system. Established as a neat, linear structure from point of wounding through to hospital care, it was adapted to support a battle waged in a complex environment. The Battle of Keren, in Eritrea, was the decisive battle of the East African campaign, and is a remarkable example of rapidly exploiting success, with Commonwealth forces taking full advantage of Italian reluctance to become decisively engaged. To maximize success, support to the fighting echelon had to be, at least, as agile and able to adapt to circumstances presented resulting in the first significant land success of the war. It provided a vehicle for the Army Medical Services and Indian Army Medical Corps to develop a system of treatment and evacuation in an extremely challenging situation, a system that continues to have relevance today.

## Introduction

*'Success was due mainly to their boldness and skill in execution, the quality of their subordinate commanders and to the dash and endurance of the troops.'* [1]  
 General Sir Archibald Wavell GCB CMG MC  
 Commander in Chief in the Middle East

The Italian Empire in Africa was dispersed and with the exception of Cyrenaica (Libya), suffered from poor lines of communication, particularly into East Africa (Eritrea, Italian Somaliland and Abyssinia, now Ethiopia), each surrounded by British and French Empire possessions. Oil in the Middle East was the resource that had to be secured - Adolf Hitler needed it to sustain the German homeland and his Eastern ambitions, but Benito Mussolini, the Italian leader, dismissed the German approach, declining their material support in order to fight his own parallel war [2]. The British position in the Mediterranean was precarious as troops were small in number, poorly equipped and organised only for garrison duty rather than anything more challenging [3]. In contrast the Italian Army was well positioned throughout the region in large numbers but suffered from antiquated equipment. They made a number of early excursions in the region but failed to exploit success, going on to maintain a defensive posture through a perception that they would be invaded.

By the autumn of 1940, General Wavell, General Officer Commanding-in-Chief Middle East, had developed his plans in

North Africa and his scheme for East Africa. His broad intent was to foster relations with the Patriot movement, a resistance group fighting to regain Abyssinia and reinstate Emperor Haile Selassie, and at that time focused on disrupting Italian forces in the central highlands of Abyssinia. He intended to task a force of Indian Army, Sudanese and Free French, to recapture Kassala in Eastern Sudan, a town of importance that controlled the eastern loop of the Sudanese railway network and maintain pressure on the Gallabat region and finally in the South, to exert pressure in the Moyale area in order to encourage the Patriots with a mixed force of African and Dominion troops. Once the Italians were fully engaged, the force in Sudan was to move into Italian Somaliland and advance to Kismayu before the rains, as the low lying desert and poor roads were extremely susceptible to flooding which would prevent all movement later [4].

## Planning Factors

The Northern area of operations, centred on Eritrea, had limited infrastructure in the North-Eastern area - the Eritrean rail network linked Agordat, Keren, Asmara and Massawa, a distance of approximately 100 miles but there were very few roads. The climate was hot and dry along the coast, but much cooler and wetter in the central highlands. The region was characterized by mountainous areas, eroded to create either high plateaus or sheer mountain sides; the few rivers that flowed through the region became fast flowing and impassable during the rainy season between March and September.

There was little information for the medical staff to produce an accurate medical intelligence picture, but it was known that the Italians had done very little public health work for the indigenous population, concentrating only on preventing epidemic disease; leishmaniasis and malaria were also endemic throughout the region. Although malaria was a concern, 1940 had been particularly dry resulting in a much reduced mosquito population but it would still pose a threat as the force moved in areas below 1,000 metres. Keren had some recorded cases of malaria; other

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possible epidemics that could affect the force such as dysentery, although needing to be factored into medical planning, would be reduced by the planned mobility of the operation [5]. Other medical considerations included the prevalence of tuberculosis and sexually transmitted diseases amongst the local population, estimated to be approximately 80% [6]. As the troops arrived into the region they were briefed on local medical issues with particular emphasis on anti-malarial measures and sexually transmitted disease. Despite the process of briefing, prophylaxis and prophylactics, between November 1940 and March 1941; 1,271 cases of malaria, 957 cases of dysentery and 1004 cases of sexually transmitted disease were reported from a total strength of 26,800 [7].

## Order of Battle and Organization

From September 1940, forces began to build up in Sudan, reinforcing local battalions as a priority. The troops were, in the main, found from 5th Indian Division arriving into Sudan directly from India. The division included 9th, 10th and 29th Indian Infantry Brigades with supporting arms and services. An eclectic group of medical units accompanying the Division are listed in Box 1 [8].

10, 20 & 21 Indian Field Ambulances.  
7 & 12 Indian Field Hygiene Sections.  
11 & 12 Indian Staging Sections.  
11 British Staging Section.  
3 Indian Casualty Clearing Station.  
14 Combined General Hospital.  
7 Indian Depot Medical Stores.  
4 Indian Mobile X-ray Unit.  
2 Indian Field laboratory.  
1 & 2 Indian Anti-Malaria Units.

Box 1. Medical Units accompanying the Division in Keren

As soon as the medical units deployed they played a major role in preserving and protecting the force and by the end of October the reported incidence of malaria declined. Early operations along the Sudan-Eritrea border led to low numbers of battle casualties however, it presented an opportunity to develop the system of evacuation using river and rail. An early observation was the inefficient use of evacuation resources to constantly clear small numbers of minor casualties from forward medical treatment facilities in case of a sudden surge in battle casualties. It was a policy that saw a number of patients moved through the system who could have been treated in the forward units and returned to duty after a few days. This observation led to an immediate emphasis on improved nursing facilities within the forward areas.

The medical units that deployed into the region fell into three distinct groupings; those in the forward combat area, the line of communication and the rear area. Field Ambulances were the most forward mobile medical unit under the direct control of the Divisional Assistant Director Medical Services (ADMS). Indian Field Ambulances were organized into a headquarters and two companies, the headquarters could configure into a Main Dressing Station (MDS) whilst the two companies would form Advanced Dressing Stations (ADS), receiving the casualties from Regimental Aid Posts (RAP). Both of these structures were only concerned with early treatment and evacuation. The mode of evacuation would be appropriate to the circumstances and could include motor transport and animal transport. It was usual practice to allocate a Field Ambulance to each Brigade, although a number could be brought together for greater medical effect. Towards the rear of the Divisional area Casualty Clearing Stations would be established, less mobile than a Field Ambulance, offering early surgery to enable the patient to survive further evacuation. Staging

Sections were established on the Line of Communication in order to provide a node where patients dressings and general condition could be checked and refreshment offered. Finally the section had an area medical support role for troops operating in the vicinity. These sections were peculiar to the Indian Army, whereas the British Army used a Field Ambulance to provide this particular capability [9].

Following the success of Operation COMPASS, during which, the Commonwealth force recaptured Sidi Barrani and moved into Cyrenaica, Wavell could now divert resources to East Africa. 'Blooded' during the Battle of Sidi Barrani, 4<sup>th</sup> Indian Division redeployed to Sudan, arriving in early January 1941. The Division mirrored 5<sup>th</sup> Indian Division in organization, made up of three infantry brigades, each brigade consisted of one British battalion and two Indian battalions. The Division was also accompanied by its full complement of supporting arms and services. Divisional medical units included 14, 17 and 19 Indian Field Ambulances, 2 Indian Casualty Clearing Station and 15 Indian Field Hygiene Section. One further grouping worthy of mention for its specialized role was Gazelle Force; established as a formation reconnaissance organization, it would raise its own problems of intimate support. In order to provide the most appropriate level of medical support, 170 [British] Light Field Ambulance was tasked to directly support this light armoured battle-group.

## Entry into Eritrea

The force was now complete and as final preparations to move onto Kassala on 19<sup>th</sup> January 1941 were being made the Italians withdrew on 18<sup>th</sup> January. The British commander immediately changed his plans from attack to pursuit. The first engagement was at Keru Gorge resulting in the capture of an Italian brigade headquarters, its commander, 1200 men and a number of guns. Gazelle Force forged ahead of the main force and by 25<sup>th</sup> January was eight miles from the frontier occupying Sciglet wells and within five miles of Agordat. The force positioned itself to cut the Italian line of communication. Following behind, 10<sup>th</sup> Indian Brigade (commanded by Brigadier WJ Slim) made its way by foot. The rapid redeployment of 4<sup>th</sup> Indian Division and the greater emphasis on North Africa had required the Force to make do and lorries were a luxury that Slim would have to do without.

Despite Italian efforts to fortify, reinforce and an order to defend to the last man, Agordat fell. 5<sup>th</sup> and 11<sup>th</sup> Indian Brigade deployed and attacked an Italian force of four brigades supported by seventy-six guns and two companies of tanks [10]. The battle was characterized by attack, counterattack and manoeuvre, but within three days the garrison at Agordat fled followed a day later by the fall of Benentu. After two weeks the Italians were collapsing and only reinforcement from the South would stop the advance. The Italians rapidly reinforced Keren with their best regular army troops in Italian East Africa, positioning them into the mountains to the West and South of the town. The Italian commanding general and Governor of Eritrea, Lieutenant General Luigi Frusci, recognized that Keren was the key not only to Eritrea but to Italian East Africa; the town was at the crossroads between the Port of Massawa and the capital, Asmara. Keren was not a position that could be bypassed or outflanked; it would have to be assaulted. As the garrisons of Agordat and Benentu withdrew through a defensive line that was being established, the Italians blocked a tight pass to the south of Mount Sanchil by destroying 180 metres of cliff. The gate to Keren was closed.

## Keren

The topography of the Keren region is characterized by precipitous mountains, the route from Agordat to Keren runs along a narrow valley floor, a little under one kilometre wide at its widest point (Figure 1). The road climbs to the Keren plateau entering Dongolaas Gorge, guarded by Fort Dologorodoc to the East. This fort is overlooked by Mount Falestoh, Mount Zeban and Mount Sanchil with peaks in excess of 1750 metres. From Mount Sanchil,

a series of peaks running to the North-West that overlooked the road. These later would be named Brig's Peak, Hog's Back, Flat Top, Mole Hill, Cameron Ridge and Rajputana Ridge. A railway track ran above the road, a feature that would play a key part in resupply and evacuation. Below Fort Dologorodoc and to the East of the main road the ground opens into a wide, flat area known as Happy Valley, a scene of particularly ferocious fighting. Finally, to the North, there was a gap in the mountains allowing water to run off the Keren plain, Aqua Col.

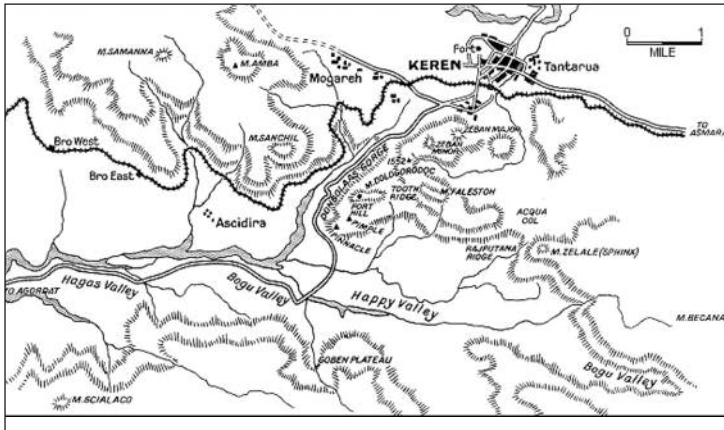


Figure 1 – The topography of Keren [11]

## Preliminary operations

By 2<sup>nd</sup> February, Gazelle force was five miles from Keren at the rock-fall road block in Dongolaas Gorge; it became clear that engineers would have to undertake a significant amount of work to make the route passable. 11<sup>th</sup> Brigade started to arrive into the Keren region, lorries shuttling back to Agordat to bring the brigade forward. During the initial stages of the battle, a MDS was established some 25 miles from Keren with 19 Indian Field Ambulance monitoring the patient evacuation west of Agordat. Those patients whose wounds demanded urgent surgical intervention could be regulated to a civilian hospital in Agordat where a surgical team had been positioned. In the forward areas 170 Light Field Ambulance deployed with two sections providing intimate support to Gazelle Force. 17 Indian Field Ambulance established an ADS with 11th Indian Brigade operating in the area to the South West of Mount Sanchil. 11th Brigade commenced an attack at 1400 hours on 3<sup>rd</sup> February, early successes were limited, terrain and a determined defending force would be persistent obstacles. Numerous attacks went into the Italian positions leading to well led, aggressive Italian counter attacks. An action involving Lance Naik Bhaira Ram, 1st Rajputana Rifles demonstrated the resolve of both the Commonwealth troops and the Italian defenders leading to the high number of casualties, 'He [Bharia Ram] was in command of a platoon reduced in strength to seven men... Bhaira Ram continued to defend his post with the utmost vigour... Not only did he repulse the attack, but with his remaining two men he chased the retiring Italians with the bayonet. When all was over 11 Italian soldiers lay dead just outside his post and many more on the hillside.' [12]. Bhaira Ram was awarded the Victoria Cross for his conduct during the battle.

To the South-East of the valley floor 19 Indian Field Ambulance opened an ADS in the vicinity of Aqua Col to support 5<sup>th</sup> Indian Brigade. Aqua Col was seen as an area that could be exploited, however stiff Italian resistance placed a significant demand on the medical evacuation system leading to the movement of 270 casualties during the first four days [13]. It became clear that Keren was going to be tough and 5<sup>th</sup> Indian Division was brought forward from Barentu. At the same time the logistic plan was considered and using all available transport, forward water, ammunition and ration dumps were established. Concurrently, in the North, 7<sup>th</sup> Brigade (from 4<sup>th</sup> Indian Division) were operating with the Free

<sup>1</sup>The railway line followed the 1250 meter contour line running east-west on the northern side of the valley

French moving South toward Keren, this posed another difficulty for Frusci who had to divide his troops to meet this additional threat.

ADMS 4<sup>th</sup> Indian Division looked at the medical problem and concluded that with such a narrow front, along the valley floor, that he would brigade the available medical resources in order to streamline evacuation. 14 Indian Field Ambulance opened a MDS at point known as km 100, receiving casualties from the ADS's established by 17 and 19 Indian Field Ambulances and 170 Light Field Ambulance. The MDS was then cleared by a Motor Ambulance Convoy for further treatment in Agordat or via 3 Indian CCS in Khashm el Girva, ultimately arriving into 16 Combined General Hospital for definitive treatment in Khartoum. Those staff not utilized in Dressing Stations would be employed as stretcher bearers to extract the casualties from the forward areas. They operated in relays from an advanced stretcher bearer post at the bottom of Mount Sanchil. 2nd Cameron's RAP was located near the bottom of Brig's Peak, 3/14<sup>th</sup> Punjab's RAP was established much closer to the fighting in a railway tunnel<sup>1</sup>. On 5<sup>th</sup> February the number of casualties that needed to be evacuated from Brigs Peak appeared to overwhelm the stretcher bearer parties, 3/14<sup>th</sup> Punjab's Regimental Medical Officer went to the top in order to influence evacuation and where necessary effect treatment. He found that the problem was not the number of casualties but the effectiveness of the Italian positions that dominated the ground. Evacuation became almost impossible during daylight and at night stretcher bearers were hampered by the steep terrain and difficult ground making the evacuation process slow and triage decisions more difficult [14]. The number of casualties was high with the MDS recording 340 admissions in one day (12<sup>th</sup> February). Amongst the casualties were a number of RMO's, one having severe appendicitis, another developing a septic leg and RMO 3/1st Punjab's wounded. Replacements were found from Field Ambulances but of course this created difficulties further in the evacuation chain. By 13<sup>th</sup> February it became clear that this process of attrition was becoming costly and a halt was called in order to consolidate the current position and gains.

This pause in proceedings allowed troops to rest, repair critical equipment and allowed the logistic services to establish larger forward dumps of stores and rations. The railway line was re-established and evacuation was improved and by 23<sup>rd</sup> February a system of railway 'flat' cars drawn by lorries brought up rations, water and ammunition and returned with casualties [15]. This break also allowed 5<sup>th</sup> Division to move forward. The medical plan was reviewed and by 17<sup>th</sup> February, 3 Indian CCS relieved 19 Indian Field Ambulance in Agordat which in turn allowed the Field Ambulance to move forward as a reserve. The staging sections also moved forward to relieve field ambulance detachments manning the line of communication. ADS's continued to remain under brigade control with extra stretcher bearers found from reserve Field Ambulances when required.

## The break in and exploitation

Utilizing all available combat power the aim was to conduct a coordinated attack with 4<sup>th</sup> Division operating to the North of the valley assaulting the line between Mount Sanchil and Mount Samanna and 5<sup>th</sup> Division concentrating on the road block, Fort Dologorodoc, Mount Zeban and to exploit beyond Keren. The attack would be coordinated using a combination of RAF medium bomber aircraft, concentrated fire from both Divisional artillery groups and finally assaulting troops advancing on a wide front. This tactic would serve to tie down and confuse Italian reinforcement, with any counterattack quickly broken up by rapid and effective artillery fire. The attack was launched by 4<sup>th</sup> Division on 15<sup>th</sup> March; the Italians continued to staunchly defend their line resulting in heavy casualties on both sides. The collection of casualties to a RAP was initially by regimental stretcher bearers, although they could be reinforced by stretcher bearers from field ambulances if casualty demand required additional support. Field

ambulance stretcher bearers would take the next leg down the sharp and difficult ground to the ADS. In order to make the journey manageable, a system of relay posts was adopted every hundred yards, as the bearers handed over their casualty they collected another stretcher and blankets and made their way back to their post further up the mountain (Figure 2). Once the casualty entered the ADS located above the railway line, they received sufficient aid to allow their further movement. At the railway line four collecting posts had been established, each manned by a field ambulance company, each collecting post was capable of holding patients until a favourable situation allowed their further movement back to the MDS at km.120. Pillai remarks in his account that: "At these collecting posts stretcher-carry ended...resources of all three field ambulances were pooled. All batmen were taken from the officers, most of the followers were requisitioned and even the personnel of the hygiene sections had to be called upon..." [17]. This measure, adopted by 4<sup>th</sup> Division, produced an additional 240 men for bearer duty. The work that they undertook was relentless, living on a reduced food and water ration; they made numerous journeys over difficult terrain whilst under hostile fire. It is worth noting that the average journey time from point of wounding to admission in the MDS was six to eight hours.

At km 120, ADMS had deployed both MDS from 17 and 19 Indian Field Ambulances along with an advanced operating centre to enable early surgery. The advanced operating centre deployed with a surgeon, anaesthetist, radiologist and an ophthalmologist. Although it is not clear from the admission details [18] of this facility it can only be deduced that the dust and rocky terrain as a secondary effect from explosions required the services of an ophthalmologist. The concept of early surgery for those patients unable to be evacuated further without intervention had first been suggested during Operation COMPASS but this was the first practical demonstration. Records detail 110 admissions over a 12 day period of which 86 patients survived following admission, although only 83 received surgery (Table 1). Forty-nine percent had received injuries to their limbs and of the 29 cases admitted with abdominal injuries only 55% survived [18]. The surgeon who had been deployed submitted a report of his activities and was quite clear about the requirement of forward surgery '...was the provision of very urgent surgery only, admission was strictly limited to (i) abdominal cases and (ii) head, chest and limb cases where immediate surgery was required or where any further movement by evacuation would jeopardise life.' [18].

The method of medical support deployed during the attack to the East on Fort Dologorodoc by 5<sup>th</sup> Indian Division was slightly easier when compared to the Northern attack however, the ADS, established by 21 Indian Field Ambulance, was in range of indirect fire. This factor also limited vehicle movement resulting in evacuation being conducted solely by bearers from the point of wounding via the RAP and ADS to an ambulance collecting post. This attack also diverted some attention from the road block, allowing sappers to work on removing the obstacle, which was covered by fire. Casualties from the road block would have to endure a two mile journey in the dark by stretcher bearer. Only once Fort Dologorodoc was captured did the situation ease to allow motor vehicles to move into the forward areas to enable a more economical and speedier evacuation. By 19<sup>th</sup> March, 5<sup>th</sup> Division consolidated their gains which allowed the medical facilities to clear, 21 Indian Field Ambulance conducted a relief in place with 10 and 20 Indian Field Ambulances.

Engineers finally dismantled the road block by 1430 hours, 26<sup>th</sup> March. A force of Infantry tanks and carriers with supporting infantry broke through and rapidly secured the Keren-Asmara Road. At the same time, 7<sup>th</sup> Brigade reached the Northern outskirts of the town. The Italians, having held their line for 53 days realized that all was lost and had started to thin their positions out. For the Commonwealth forces it had been at a significant cost; 536 killed and 3,229 wounded. At its peak, 15 – 27 March 1941, the Medical Services had treated a reported 1491 battle casualties and

590 disease & non battle injuries, approximately 6% of the initial force strength. For the Italians the losses were even higher, some estimates reporting 10,000 killed and wounded. Although very little is documented about the Italian medical services, it was reported that their equipment and stores were of good quality '...The dressings were of excellent quality, and the Italian first field dressing can certainly give points to our own.' [19]. Italian hospital sanitation was, however, appalling and there was no evidence of medical provision for their colonial troops. Moreover, a number of Italian casualties were discovered where abdominal wounds were left untreated save administration of analgesia as the casualty had arrived into an Italian medical facility '...out of hours and the [Italian] surgeon did not feel disposed to put himself to the inconvenience of operating after dinner.' [19].

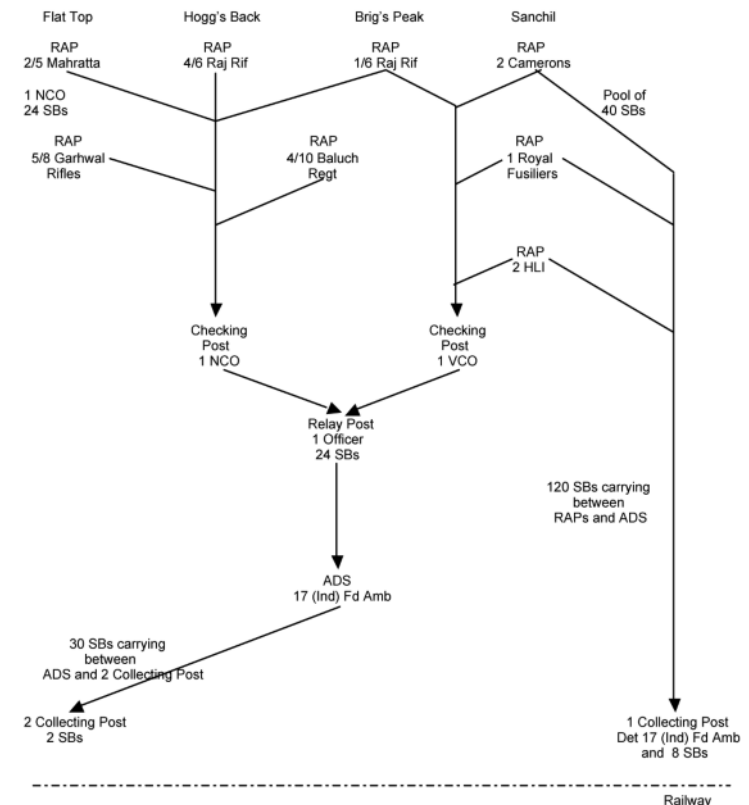


Figure 2 – Evacuation system – 11th Indian Infantry Brigade, Keren – 18 March 1941 [16]

Causes	Admissions	Deaths
Trunk	6	-
Limbs and joints	42	3
Abdomen	16	13
Skull (brain involved)	11	8
Chest (sucking pneumothorax)	5	-
Face	1	-
Spinal cord	1	-
Abdomen (extra peritoneal)	1	-
Unfit for surgical intervention	3*	-
<b>Total</b>	<b>86</b>	<b>24</b>

\* Two deeply unconscious cerebral cases, and one case of multiple injuries including cervical spine and abdomen.

Table 1. Actual number of admissions and deaths in the advanced operating team working with 19 Indian Field Ambulance in the forward area during 15 March 1941 to 27 March 1941. [18]

## Enduring lessons & observations

In reviewing this particular encounter that took place so early in the war, there are a number of lessons and observations that led to developments of the medical chain of evacuation and treatment. Several stand out, not least for their relevance on the contemporary battlefield. Firstly, the importance of preserving the deployed force: the medical staff worked hard to prevent sickness and disease debilitating the troops through a simple process of continuous education and advice. Secondly, it was quite clear that terrain was a significant challenge to casualty evacuation, not least on the robustness of individual bearers and forward evacuation but subsequent movement of casualties to deployed hospital care. The requirement for ADMS to coordinate this activity and exercise functional command was critical; this coordination brought economies of scale ensuring that casualties were evacuated with best speed. The medical staff were under no illusions about the demands for manpower required to extract and evacuate casualties and, as the battle progressed, developed and refined a number of tactical procedures to maximize the activity of a limited number of stretcher bearers. This demand for forward care continues today in Afghanistan, where we routinely see medics forward with Infantry Platoons. Whilst there has been technological development in methods of evacuation, such as the helicopter, a requirement for initial physical extraction of casualties to a place of safety to effect treatment remains – the stretcher bearer.

Finally, positioning a surgical resuscitation capability as near to the point of wounding as the tactical situation allowed in order to save life and limb. Observations made by ADMS 4th Division are clear ‘...It is our contention that the place for the experienced surgeon with clinical discriminative ability is not in the general hospital but in the forward area where he can see his patient within anything up to 6-8 hours of the onset of injury and where he can utilise his discriminative powers to differentiate between who must be operated upon immediately as an urgent life saving measure and who can safely travel back to the CCS as against the junior surgeon lacking in experience and discrimination and whose value would be more profitable in the backward area... The experiment in having operative personnel so very forward has proved an undoubted success in this instance, and although for tactical reasons instances may arise in which their presence would be definitely contraindicated, it seems that in selected theaters of war they undoubtedly fulfill an extremely useful function.’ [18]. This capability continues to develop today. The need for a light and manoeuvrable forward surgical capability remains, performing lifesaving procedures but only if it is appropriate with the aim of reaching hospital care within two hours. This practice has now been further enhanced by the deployment of key clinical staff to the point of wounding by either road vehicle or rotary wing aircraft to undertake advanced resuscitation techniques.

The Battle of Keren was only one part of a larger campaign that defeated Italian East Africa in less than four months; the Italian force of approximately 220,000 and its equipment had been completely destroyed and a little less than one million square miles had been occupied. Despite the swift success of what Wavell later described as plan that could be perceived as ‘...Teutonic in conception and execution’ [1] it was in reality a development of events through improvisation. The agility of the Army Medical

Services, Indian Army Medical Corps and the other supporting services enabled the force to focus on securing Keren and opening the door to Italian East Africa. Wavell in his closing remarks in the official report on the East African campaign states ‘...The capture of this natural stronghold which the Italians had defended with such determination was a fitting climax to the great work in Eritrea of the 4th and 5th Indian Divisions, ably commanded by Major-General N. M. de la P. Beresford-Peirse and Major-General L. M. Heath respectively. After the fall of Keren the Italians made little further effort to defend, Eritrea, their oldest colony.’ [1]. The success of this little known campaign cannot be underestimated, by securing East Africa, Wavell had completed one of his four tasks in detail, he had secured the Red Sea area. This security would open the sea lines of communication between not only India and Europe but from the West coast of America thus allowing American war material to be directed to Egypt.

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