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Medical Aspects of the Campaign in Italy – 1943 – 44 – 1945.

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THE CAMPAIGN IN ITALY

1943 - 44 - 45

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The campaign which began with the landings at Reggio on 3rd September, 1943 ended with the total capitulation of the enemy's forces on 2nd May, 1945. During the intervening months Eighth Army, in Mr. Churchill's admirable phrase, "dragged the hot rake of war" up the Italian peninsula, and their final triumph completed the enormous task which they had shouldered at El Alamein. Since that far off day their composition had greatly changed - at one period no fewer than nine languages could be heard in their ranks - but they had remained an entity, and pride in their past and resolution for their future had kept their spirit high.

In a military sense the campaign, compared with others in which the Allies engaged, was unspectacular and in certain of its phases unsatisfactory. From a medical standpoint its chief interest lies in three major innovations, of which a full account may be found in the appropriate sections of this History. In Italy a new organisation of forward medical units was tested and largely perfected; the use of penicillin was introduced and gradually made universal; an organisation was set up which revolutionised the methods of malaria control previously in use. These three innovations were to have far reaching effects on surgical and medical practice in the field of war.

In certain other respects, on the other hand, - notably in methods of evacuation and of hygiene - existence in a country possessing the amenities of modern civilisation meant a return to orthodox routine. Improvisations, such as had been necessary in Norway, in Abyssinia and in North Africa, were no longer required. There is therefore little of especial interest to be found in the accounts of those activities with which the following narratives are chiefly concerned.

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THE CAMPAIGN IN ITALY

THE ROAD TO ROME - I

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EIGHTH ARMY

PHASE I - Period 3.9.43 - 30.11.43

REGGIO - R. SANGRO

1. Composition of the Army

The period which saw the advance of Eighth Army from Reggio to the River Sangro opened with the landing in Italy on 3rd September. The following Formations were under command at that time:

231st Bde 5th Div. 1st Cdn. Div.	Under Command H.Q. 13 Corps
50th Div. 51st Div.	In Sicily
78th Div. 4 Armd. Bde. 86 Area	

with the following Medical Units under command Army:

56 Gen. Hosp.	29 F.S.U.
83 Gen. Hosp.	35 F.S.U.
6 Fd. Hosp.	1 Cdn. F.S.U.
3 C.C.S.	2 Cdn. F.S.U.
4 C.C.S.	3 F.T.U.
5 C.C.S.	4 F.T.U.
7 C.C.S.	7 F.T.U.
15 C.C.S.	11 F.T.U.
14 Fd. Amb.	35 F.T.U.
132 Fd. Amb.	1 Cdn. F.T.U.
151 Lt. Fd. Amb.	5 Base Transfusion Unit
159 Fd. Amb. (less 1 Coy)	8 Malaria Fd. Lab.
11 Fd. Hyg. Sec.	2 Mob. Ophthalmic Unit
1 Mob. Bact. Lab.	7 Adv. Dep. Med. Stores
5 Mob. Bact. Lab.	138 Mob. Dental Unit
1 F.S.U.	139 Mob. Dental Unit
2 F.S.U.	150 Mob. Dental Unit
4 F.S.U.	151 Mob. Dental Unit
5 F.S.U.	146 M.A.C.
21 F.S.U.	60 M.A.C.
22 F.S.U.	

21 C.C.S. 150 Lt. Fd. Amb. 3 F.S.U. 6 F.S.U. 1 F.T.U.	In Sicily awaiting call forward by Fifth Army.

Administration of Eastern Sicily was given to H.Q. 2 District (Fortbase) on 6th September. 6 Base Sub Area was established in Taranto and came under command Eighth Army on 19th September as a base for 1st Airborne Div. which had landed there. H.Q. 5 Corps arrived in Italy on 17th September to take command of 78th Div. which was then arriving, and of 1st Airborne Div. and came under command Eighth Army on 19th September. At the same time 8th Ind. Div. joined Eighth Army under command 5 Corps.

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At this time No. 567 (A.F.S.) Ambulance Corps Company arrived from Tripoli.

On 30th September H.Q. 2 District assumed command of the "heel" of Italy, and at this time all General Hospitals were taken off Eighth Army Order of Battle.

No. 3 Mob. Hyg. Lab. and the vehicles of No. 5 Mob. Bact. Lab. arrived during the first week of October, and soon afterwards No. 14 Combined Gen. Hosp. arrived. No. 34 Fd. Hyg. Sec. arrived on 18th October, and on 23rd October Nos. 18 and 19 C.C.S.s and 8 Fd. Hyg. Sec. (5 Corps Hyg. Sec.) arrived, all from North Africa. On 24th October H.Q. Fortbase became Adv. Adm. Echelon A.F.H.Q. (Flambo) and moved to Naples, and H.Q. 2 District was established in rear of Eighth Army Area.

There were no further additions to the Medical Order of Battle during the quarter.

2. Physical Geography of the Country.

Between Reggio in the extreme south, where 13 Corps landed on 4th September, and the line held at the end of the period by 5 and 13 Corps (Ortona line) every conceivable variety of country was encountered and traversed.

The central high tableland in the south is surrounded by a narrow coastal strip which is intersected at more or less frequent intervals by the main rivers and torrents running radially towards the coast. Further north the tableland becomes a narrow strip, separating east and west, which widens as far as Crotone and then narrows as the country again becomes more hilly and, inland, mountainous. Further north still the plain of Taranto merges with that of Foggia and extends up to San Severo, beyond which the country becomes undulating, and so continues until the valley of the Sangro is reached.

5th Div. on the west coast were confronted with the problem of advancing on a single axis running along the precipitous edge of rocky, mountainous country which did not open until Vibo Valentia was reached on 13th September. Thereafter narrow plains with deep ravines and water courses were encountered until Sapri was reached and the Division turned eastward on its axis towards Potenza and the wide plain of Taranto.

1st Cdn. Div. advanced along the eastern coast road and the central mountainous axis over Aspromonte ridge, where conditions of mountain warfare prevailed. These two Divisions (13 Corps) joined with 5 Corps at Foggia, and then swung inland towards Campobasso and the central road through the Apennines.

78th Div. (5 Corps) landed at Reggio on 25th September and was complete at Bari by the end of the month. It then moved forward behind 2nd Para. Bde. and 4th Armd. Bde. through Foggia and San Severo to Campomarino.

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3. Climatic Conditions

All four seasons are distinct in Southern Italy, i.e., the country south of the Rome line and the Apennine slopes.

Summer extends from May until September, during which time temperatures are relatively high. A typical day is very warm with a clear sky and occasional cumulus clouds in the afternoons and mornings. Temperatures rise rapidly towards the end of May, and the mean weekly maximum in September '43 and 91.0° F. By night the sky is usually clear, but from time to time thundery conditions prevail and occasional localised thunderstorms occur.

Autumn begins towards the end of September and merges into winter late in November. It is mild, frequently overcast, and rainstorms are common. In October rain falls heavily for brief periods, skies are overcast and temperatures fall rapidly, so that the nights are frequently cold and damp. Temperatures continue to fall during November, and conditions become more and more wintry. Fog is not unusual at night in the west, while east winds are frequent and strong on the Adriatic coast. Rivers rise rapidly in late autumn and spates are not unusual, washing away all but high-water-level bridges.

Winter lasts from December until February. On the west coast it is usually mild with light winds and damp air; fog may be widespread at night and frost is not unusual. There is little rain, but dull foggy weather occurs at times. Snow is rarely seen at sea level, but hail storms are not infrequent. On the east coast cold, dry, N.E. winds predominate, with clear skies, good visibility and low temperatures. Spells of overcast sky and rain and snow occur, especially in the mountains of the Apennines.

Spring develops slowly out of winter at the end of February. It is generally wet and stormy. Rain falls in heavy but brief spells, and thunderstorms become common towards the end of April. Later, rainy days alternate with quiet sunny weather and the afternoons become warm.

4. Diseases prevalent among the civilian population

Apart from malaria, venereal disease, enteric, scabies and pediculosis capitis the population was remarkably healthy in spite of the hardships and privations of war and the low standard of living.

Malaria. Although evidence of the effects of malaria on the people generally and the children in particular can be seen in almost any town or village in Southern Italy it is not striking except in highly malarious areas such as Catanzaro and Foggia.

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Spleen rates were low even in those areas, and this is attributed to the use of Italikin and other anti-malaria drugs.

Information from local sources indicated that in recent years mortality and morbidity rates had fallen steadily but that, since the war began, control measures had lapsed almost entirely, while drugs for prophylactic and therapeutic purposes had been increasingly difficult to obtain. It was not surprising therefore that during the previous four years the death rate had risen again and the number of cases had increased greatly.

Figures for mortality and morbidity rates are not available and spleen rates are unreliable.

Venereal Disease. Gonorrhoea and syphilis are prevalent not only in the large towns but in villages of a few hundred inhabitants. The former is not looked upon as V.D. by the majority of practitioners and consequently receives little attention or treatment in most districts. There are well recognised V.D. clinics and hospitals in most of the larger towns and in peacetime these function to advantage. Brothels are recognised and licensed, but accosting is a punishable offence and it was possible in some towns - Reggio, Vibo Valentia, Taranto and Bari - to arrest offenders and place them in protective custody.

Examination of prostitutes in brothels, as carried out by Italian M.O.s, was entirely unreliable, but with the assistance of A.M.G. thus was made less so under the supervision of D.A.D.s H.

The difficulty in dealing with the prostitute situation will be appreciated when it is realised that in Bari alone there were, shortly after the town was occupied, some 2,000 clandestine prostitutes in addition to those in licensed houses. Almost every hotel and lodging house was used by these women, while pimps and touts abounded. It was found also that when brothels were placed out of bounds to troops the women left their licensed houses to ply their trade on the streets, where more money or its equivalent (bully and biscuits) was to be picked up.

Strenuous efforts were made by all concerned to deal with the situation. Many of the worst houses were closed and others under new and better management opened. A drive against pimps and touts was instituted and efforts made to prevent accosting in the streets. A number of prostitutes were placed in protective custody and those found suffering from V.D. were given treatment. It was also necessary to restrict the sale of M. & B 693 and other drugs of the sulphonamide group, as resistant

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strains of G.C. were being encountered in increasing numbers. Women were using these drugs as a prophylactic and many patients were attempting to treat themselves.

Generally speaking, Italian military, police and municipal services co-operated well, but they were more often than not ineffective and recommendations were not carried out. Much however was done by close co-operation and by supervision of brothels and prostitutes generally.

Scabies and Pediculosis. These are very prevalent and the former is closely associated with venereal disease. Almost every child and adult suffered from pediculosis capitis and there was a high incidence of pediculosis corporis among the working classes. Drugs for the treatment of these conditions were in short supply locally, and in some towns sulphur was made available from Army Medical Services. A.M.G. took the matter in hand, but owing to shortage of water and fuel and the lack of public baths and disinfestors these diseases were likely to become even more prevalent.

Enteric. Typhoid fever is endemic throughout Southern Italy. Incidence varies in town and village according to economic and sanitary conditions. In some of the badly bombed towns. such as Foggia, the threat of an epedemic was very real. In most cases facilities for dealing with sporadic cases did not exist, and often the sick were not even seen by a doctor. Statistics from civilian sources are not available but at the end of the period almost every village had its case of typhoid, while in the larger towns there might be as many as a dozen at any one time. When a town was occupied an O.C. Field Hygiene Section carried out a survey and collected information regarding the sick, prevalence of infectious diseases, etc. At the same time drains and water supply were examined. In most cases extensive damage had resulted from bombing or demolitions; only at Bari were these found intact. At Taranto arrangements were made for sewers to be flushed with sea water, utilising fire-engine and other apparatus. Special water points were arranged for civilian and military use, and scavenging services began to work at an early date.

Typhus and Anti-typhus measures. The principal steps taken to guard against typhus were:

(a) Typhus inoculation of all ranks - this approached the 100% mark.

(b) Training of Malaria Control Units as anti-typhus teams. All teams received adequate training and were employed as disinfestation and bathing teams.

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(c) Full instructions regarding the measures to be adopted in units by special terms and by Hygiene Sections were published in A.R.O.s and circulated to Administrative Medical Officers.

(d) Propaganda in the form of posters, notice board and articles in "Eighth Army News".

At the end of the period typhus was prevalent in Naples where as many as twenty fresh cases were reported daily during the last week. The town was placed out of bounds to all ranks except those on duty or recognized leave parties.

Hygiene Sections and Anti-typhus Teams had not yet received complete anti-typhus equipment. O.S. were doing all they could to procure this equipment including additional disinfestors. In the meantime field hygiene section workshops were making as many M.E.S.H. type disinfestors as possible, and these were being distributed to Transit Camps, P.O.W. Camps, Refugee Camps and Units.

Typhus of the louse-borne variety was not reported in Eighth Army, and the incidence of pediculosis was low.

General. In many of the larger towns and in almost every village the poorer people showed evidence of privation. Food (particularly flour) and clothing were scarce and living conditions primitive. Families of six, seven and eight lived huddled together in one or two rooms with pigs, hens and goats wandering in and out. All the household refuse and frequently human excreta were deposited in the street drain - if there was one.

Italian bread, which is the staple diet, contains 100% wholemeal flour.

Meat was scarce and very expensive, but vegetables were fairly plentiful in season. Large quantities of tomatoes were eaten and preserved in the form of puree. Olive oil, which is normally plentiful, was becoming scarce, while other forms of fat including butter and margarine were practically unobtainable. Dairy produce also was in short supply, though eggs, chickens, turkeys and geese were to be seen in country districts.

Distribution of food was particularly difficult owing to lack of road transport and the disruption of railways, so that even when fat was available it was frequently not possible to bring it to the consumer.

There was as yet little frank evidence of deficiency disease, but septic skin conditions were prevalent and many young children showed signs of under nourishment.

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OPERATIONS AFFECTING THE MEDICAL SERVICES

At the beginning of the period Eighth Army was in Sicily preparing for the invasion of the Italian mainland, which took place on the 3rd September, when 5th Div. and 1st Cdn. Div. under H.Q. 13 Corps landed at Reggio. The rate of progress was such that the nucleus of 86 Area was established in Reggio on 4th September, and H.Q. Eighth Army set up there on the 7th.

No. 15 C.C.S. under 13 Corps was established as a Light Section on the 5th, and by the 11th was built up to full strength at Reggio. Evacuation from the beaches was by L.C.T. to Santa Teresa and thence by road to Giarre and Catania. Evacuation by Hospital Ship from Reggio was begun on 9th September, and the uncertainty of arrival and sailing of these ships, which had prevailed in Sicily, still persisted.

In the meantime 231st Bde. had made a landing at Pizzo (Vibo Valentia) on 8th September, and the advance elements of 13 Corps made contact with them on the next day. Light Section No. 7 C.C.S. was opened at Palmi on 8th September and went to Vibo Valentia on the 11th. The surrender of Italy on 8th September had little effect except to minimise the difficulty of taking over accommodation and medical equipment for Army requirements. The advance along both sides of the "toe" proceeded and forward troops reached Crotone on the 12th and Belvedere on the 14th.

Army Medical responsibility on the mainland was up to this time confined to evacuation from Reggio to Sicily, and responsibility for local arrangements of General Hospitals etc. in Sicily was delegated to D.D.M.S. Fortbase. Evacuation by Air Ambulance Unit was arranged by 9th September and was of great assistance, and the fullest possible number of cases was evacuated to Catania by this means. An Army C.C.S. (No. 4) was set up in Reggio on 15th September, and No. 15 C.C.S. (u/c 13 Corps) could therefore be moved forward, but it did not open.

On the arrival of No. 60 M.A.C. on the mainland on 17th September the responsibility for evacuation by road from Vibo Valentia (No. 7 C.C.S.) was undertaken by Army, and on this date No. 15 C.C.S. (u/c 13 Corps) opened at Sapri. Hospital Carriers were being worked from Pizzo by the 14th.

At this time 78th Div. and 8th Indian Div. arrived on the mainland and came under command 5th Corps, and H.Q. 86 Area moved to Bari to establish the base there. By the end of September our forward troops had reached the Foggia line.

The transfer of effort from the west to the east coast naturally caused some difficulty in view of the numbers of sick to be cared for and the long distances and bad roads encountered on the journey. However, No. 70 Gen. Hosp. and No. 9 Ind. C.C.S.,

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which were established in Taranto under 6 Base Sub-Area, were utilised to capacity until No. 7 C.C.S. was moved by 13 Corps at the end of September to Bari, and No. 15 C.C.S. was opened at Barletta.

At this time No. 83 Gen. Hosp. after some delay relieved No. 4 C.C.S. at Reggio to look after the troops remaining in that region and to hold the short term sick until fit for return to their units, so releasing No. 4 C.C.S. to relieved No. 7 C.C.S. at Bari.

On 8th October No. 3 C.C.S., which had just arrived on the mainland, was given to D.D.M.S. 5 Corps as Corps C.C.S., and at the same time 84 ambulance cars of No. 567 (A.F.S.) Amb. Car Coy. arrived and were used as Army M.A.C. to evacuate cases from Bari to Taranto, whence Hospital Ships were plying with monotonous irregularity and uncertainty.

On the 9th, 5 Corps moved into the forward area on the coastal sector with 78th Div., 8th Indian Div. and 4th Armd. Bde. under command.

On 11/12th October No. 7 C.C.S. opened at Foggia under 13 Corps, and No. 3 C.C.S. was located at San Severo. An Ambulance Train service, improvised from ordinary stock, from Bari to Taranto was started on 10th October. (See ~~Appendix II~~ MAP I).

At this time a re-distribution of M.A.C. ambulance cars took place, and 5 Corps was given two platoons of No. 567 A.C.C., as was 13 Corps, while No. 146 M.A.C. became Army M.A.C.; a detachment of No. 60 M.A.C. at the same time returned to 2 District. Evacuation by road from Foggia became an Army commitment.

Meanwhile there had been heavy fighting for Termoli, which resulted in its fall on 11th October, and the enemy now appeared to be fortifying the Trigno line. 5 Corps was therefore fighting on a line N.W. of Termoli southwards to include Larino, along the line of the River Fortore, and 13 Corps was fighting in the region of Campobasso and Casacalenda, the former falling on 14th October and the latter on the 15th.

No. 5 C.C.S., which had recently arrived, relieved No. 15 C.C.S. at Barletta on the 15th and was under command Army. No. 15 C.C.S. was then sent forward to Campobasso, where it opened on the 19th. On the same date responsibility for road evacuation behind Barletta passed to 2 District.

Nos. 18 and 19 C.C.S.s arrived from North Africa in time to go to Termoli and Foggia under 5 Corps and Army respectively, No. 19 relieving No. 7 C.C.S. On 25th October 2 District accepted responsibility for evacuation from Foggia, and about the same time No. 1 C.C.S. arrived and was located at Torremaggiore u/c Army to ease the

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strain on No. 3 C.C.S. at San Severo. Rail evacuation by Ambulance Train from San Severo was established on the 24th.

On the same date the large scale re-organisation of the chain of administrative responsibility took effect, when H.Q. 2 District became Adv. Adm. Ech. A.F.H.Q. (Flambo) and all administrative matters requiring reference to a higher authority were to be referred through this Echelon. A new 2 District was formed with H.Q. at Bari, which controlled the General Hospitals on the eastern side of Italy, i.e., those receiving cases from Eighth Army.

No. 9 Indian C.C.S., which had been located at Andria, was moved up behind 8th Indian Div. at Larino. The relief of No. 4 C.C.S. by a 200-bed hospital enabled this Unit to move to Foggia on 27th October. All C.C.S.s were now in position for the new offensive against the Trigno line, but bad weather caused postponement of the attack.

The weather improved at the beginning of November, and 8th Indian Div. attacked across the River Trigno in the coastal sector on the 2nd. Bitter fighting took place for Vasto, which fell on the 5th; meanwhile 5th Div. in the central sector had taken Isernia on the 4th. By the 7th we were overlooking the River Sangro on the coastal sector, and on the same day 13th Corps Rest Camp at Manfredonia, which had been run by No. 132 Fd. Amb., was taken over by Army and staffed by No. 151 Lt. Fd. Amb. It was used for the short term sick and those requiring a few days' convalescence before returning to duty. (See ~~Appendix III~~ MAP 2).

The chief difficulty in evacuation at this time was caused by mud. Cars with a 2-wheel drive were quite useless, and even the 4-wheel drive cars of No. 567 A.C.C. were severely handicapped by lack of chains. A number of jeeps with stretcher carrying gear was obtained from 1st Airborne Div. and sent forward. Evacuation in forward areas was dependent chiefly upon these and on mule transport; even so, around Isernia a four mile carry by hand was necessary for about a week. Ambulance Train evacuation from San Severo was very satisfactory during this period, but in order to save ambulance transport on a troublesome road stretch a Hospital Carrier was called to Termoli on 6th November. This was subjected to a bombing attack on leaving, but no damage was done.

Our patrols crossed the River Sangro in the central sector on the 10th, and then the weather broke once more just as 2nd N.Z. Div., which was placed u/c Army, was being moved into the line. Agnone was taken by the 1st Cdn. Div. on the 12th, and

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Atessa by 8th Indian Div. on the 13th. The weather then became so bad that until the the 18th no further operations, apart from patrols, were possible.

On the 14th No. 112 M.A.C. arrived from North Africa and was used as Army M.A.C. clearing from Termoli to San Severo, and No. 146 M.A.C. was switched to the Campobasso - San Severo line of evacuation. No. 19 C.C.S. moved from Foggia to Termoli, where it opened on the 18th. A large influx of civilian casualties caused by mines and booby traps caused some embarrassment to Medical Units in Campobasso, and mass evacuation of these cases to Bari had to be arranged; the 13 Corps field ambulance was put in to run the Campobasso civil hospitals.

In view of the policy of handing over Foggia and San Severo to U.S.A.A.F. some difficulty was experienced in locating C.C.S.s, as this entailed moving No. 4 C.C.S. from Foggia and No. 3 from San Severo. The railway had been expected to reach Termoli by 25th November, in which case little difficulty would have been experienced in closing San Severo by the 30th as required, but the railway could not be provided until that day, with a possibility of even further delay, so that it was arranged for the No. 3 C.C.S. building to be held till 7th December. No. 4 C.C.S. was moved (closed) to Larino to the site previously occupied by No. 9 Indian C.C.S., which had moved to Vasto on 15th November.

On the arrival of 2nd N.Z. Div. in the line the Heavy Section of No. 1 N.Z. C.C.S. opened in Vasto, leaving the Light Section in San Severo, in which region was the Ambulance Railhead.

No. 88 M.A.C. arrived from North Africa and on 25th November became Army M.A.C., evacuating from C.C.S.s at Termoli, and No. 112 M.A.C. became 5 Corps M.A.C., No. 146 M.A.C. being handed over to 13 Corps.

The prevailing bad weather further complicated evacuation of casualties from the forward areas, and three more jeeps, fitted with stretcher-carrying gear, were obtained for 13 Corps.

At the end of November all was ready for the launching of the next attack, i.e. on the Sangro positions. The attack was preceded by a tremendous air bombardment and was launched on the 28th by 8th Indian Div. and 2nd N.Z. Div. On the coast were 78th Div. next to 8th Indian Div. under 5 Corps; 2nd N.Z. Div. u/c Army, and on the inland sector 1st Cdn. Div. and 5th Div. u/c 13 Corps.

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THE HEALTH OF THE TROOPS

Principal Diseases Affecting the Troops

During the period malaria and infective hepatitis were the two chief causes of wastage.

Malaria. Between 4th September and 27th November, 1943, 9263 cases of malaria (5,410 clinical; 3,556 diagnosed microscopically; 297 relapses) were admitted to medical units of Eighth Army, while during the same time 6,454 NYD Fever cases were treated in field ambulances and C.C.S.s. It is estimated that the great majority of NYD cases were malarious, so that the grand total of cases for this disease probably amounts to some 15,000 (Sicily 10,395), giving an average of over 1,200 admissions per week for the period.

The peak incidence was reached during the last week in September when a total of 1,477 cases were admitted. The peak incidence during the Sicilian campaign was reached during the second week in August with a total of 1,819 cases.

It is difficult to say at what period fresh infections occurred in Italy, but the vast majority of admissions during the first three weeks were probably infected in Sicily. The marked fall in incidence after the third week in September, when the troops were in the Foggia region, bears this out, more particularly as incidence in the Canadian Division rose to 268 during the week ending 25th September, and they were practically the only Eighth Army troops in highly malarious areas during this period, having passed through Catanzaro and the Taranto plain.

The sudden fall in incidence between 25th September and 2nd October is interesting and indicates that the infection rate in Italy was relatively low. Nevertheless large numbers of 5th Div. and 13 Corps troops did become infected in the advance from Reggio to Foggia and in the valleys drained by the Fiume Petraco, Messina and Angitola.

Fresh infections in 1st Cdn. Div. began to manifest themselves towards the end of the third week of the invasion. On 18th September this Division had reached Crotone and had traversed the highly malarious areas of Dellanuova, Loiri and Catanzaro. Later the Division passed through Potenza and Treblacre and were operating in and forward of the Foggia plain by 1st October.

The relative weekly incidence in 5th Div. and 1st Cdn. Div. for the period 4th September to 2nd October is 195 to 154. The fact that 5th Div. had over 200 more cases during this period may be due to a relatively higher number of relapses in this Division which was heavily infected in Sicily. On the other hand the fact that 422

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cases were admitted during the week ending 25th September would point to a high infection rate in Italy when fighting was taking place between Vibo Valentia, Sapri and Potenza.

Malaria in 5 Corps showed itself first in 1st Airborne Div. These troops were infected in the Taranto area and later in the Foggia plain from which they were withdrawn about 9th October.

A total of some 1,790 Fevers NYD and malaria cases were admitted between 24th September and 30th October, the great majority being 78th Div., 4th Armd. Bde. and Corps troops.

As was expected, the incidence of M.T. to B.T. malaria rose relatively during September and October, and towards the end of November was approximately 50 - 50. Thirteen deaths were reported during the period, nine B.T. and three M.T. Four deaths were due to cerebral malaria and it is possible that mixed infections were present.

Generally speaking, the standard of malaria precautions taken was higher in Italy than in Sicily, owing no doubt to the experience gained in the latter campaign and to the fact that troops were more malaria conscious. It is considered also that mepacrine was taken more regularly by a higher percentage of troops towards the end of the campaign. The remarkably low death rate must be noted and can only be attributed to the effect of mepacrine which may have a more selective action on the M.T. than on the B.T. parasite.

Invaluable work was carried out by No. 8 Malaria Fd. Lab. during the malaria season. A detachment landed on D+1 at Reggio with 13 Corps, and the remainder of the unit followed on D+7. Surveys were carried out immediately behind advancing troops, and information passed back by means of sketch maps and reports so that up to date information regarding the malarious nature of the country in which troops were operating was available at the earliest possible moment. Close contact was kept with Hygiene and Special Malaria Officers in Divisions and Corps, and Malaria Survey Maps were supplied.

As regards control measures, emphasis was laid on adult destruction, experience in Sicily having shown that larval control and other control measures are of little value during a rapid advance.

The unit eventually reached Foggia where it remained to the end of the malaria season and until it moved to Bari to set up a Teaching Centre for the winter months.

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At the end of the period Classes of Instruction were being held in Bari for R.M.O.s, to be followed by classes for Special Malaria, Hygiene and Malaria Control Unit Officers.

Infective Hepatitis. A few jaundice cases were reported before the invasion of Italy. After the landing on 4th September the incidence rose steadily until the figure 412 was reached on 9th October. Weekly admissions averaged 253, and a total of 3,298 cases were admitted to hospital during the period under review.

The relatively high incidence in officers was again apparent, approximately four to one. All medical officers were asked to pay particular attention to possible etiological factors, and investigations were continued. One medical officer reported that actively mobile spirochaetes had been discovered on serological examination with dark ground within three hours of blood being taken. Otherwise there is nothing of particular interest to bring to notice regarding this disease.

Diseases of the Alimentary System. There is nothing unusual to report in connection with these diseases, incidence of which was not unduly high.

Inflammation of Areolar Tissue. In Sicily sick rates from these conditions were much higher than in the Desert and were almost doubled since the beginning of the campaign. The average at the end of the period was 250 cases per week.

Enteric. The entire absence of enteric must be noted, and this in spite of the prevalence of this disease in the civilian population.

Venereal Disease. On 18th September it became apparent that V.D. incidence was rising in Eighth Army. Many men in 5th Div. became infected in Francovilla, and 161 cases were reported during the week ending 9th October. Later, when 1st Cdn. Div. and 5 Corps troops had passed through Taranto and Bari, the weekly figure reached its peak of 226 cases on 23rd October.

A total of 953 cases were admitted during the period under review, an average of 73 per week. The incidence of syphilis was relatively high, being approximately one case in every ten.

Until the arrival of No. 5 V.D.T.C. in Italy at the end of September treatment of V.D. and particularly syphilis was unsatisfactory, chiefly because facilities for diagnosis did not exist in the forward area.

H.Q., V.D.T.C. was set up in Bari, and a section consisting of one Graded Specialist, one Serjeant S.T.O. and four other ranks opened an Advanced Treatment Centre at Foggia. On the arrival of the remainder of V.D.T.C. from Sicily accommodation at Foggia was increased to 150 stretchers, and a learner officer of No. 14

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Fd. Amb. was attached. Additional equipment and microscopes were added and eventually the Centre at Foggia was capable of dealing with up to 200 cases. The average stay in the Centre for fresh gonorrhoea cases was gradually reduced to a period of from six to eight days. The short concentrated treatment was giving good results, but it could not yet be said what the effect on the relapse rate would be, At one time considerable numbers of sulpha-resistant cases were encountered owing to previous incomplete treatment in the forward area. Difficulties experienced by M.O.s in carrying out treatment in units, or even in field ambulances, were sometimes great owing to constant movement of units and formations, and to the necessity for keeping medical units empty for the reception of battle casualties. Instructions were therefore issued that cases would not be held and treated in forward areas unless there was a reasonable hope of retaining the patient until the treatment was completed.

Syphilis cases were evacuated direct to the V.D.T.C. where they were retained until no longer infectious. The average stay in the Centre for syphilis cases was twenty days.

Poliomyelitis. Nine cases of this disease occurred during the period with two deaths. An iron lung was obtained by air from Malta, and arrangements were subsequently made to have six lungs made locally by R.E.M.E.

Immersion Foot or Trench Foot. The first cases occurred in 5th Div. (13 Corps) towards the end of November - one officer and four other ranks. All were on patrol during very bad weather and did not have their boots off for 48 hours. The sufferers did not complain until they took off their boots when their feet were found to be blistered and swollen. The swelling was slight at first but increased rapidly when the boots were removed and circulation restored. All were typical cases and moderately severe.

An A.R.O. was published drawing attention to this condition and the preventive measures to be adopted. In addition supplies of Foot Soap and Foot Powder were obtained and issued through supply services down to C.R.A.S.O. A.Ds.M.S. Divisions controlled issues to units, authority having been delegated by D.D.M.S. Army.

Instructions were issued that each man would carry a clean pair of socks so that exchanges might be made more frequently. In exceptional circumstances a fourth pair of sock might be issued to individuals on the recommendation of A.Ds.M.S.

Wounds. As will be seen from Appendix IV Battle Casualties for the period under review were 4,616, giving an approximate rate per thousand per day of 0.31.

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The figures are remarkably low considering the battles fought and the nature of the terrain encountered. Altogether there were three major actions: Pizzo, Termoli and Trigno, and in one only (Termoli) did the figures exceed a thousand, i.e. 1,192. A table showing the percentage of wounds in various parts of the body and according to type is included in the Appendix.

Gas Gangrene. A total of 24 cases was reported with 12 deaths. Of the latter six were from the N.Z. Division and three were German Ps.O.W. 5th Mob. Bact. Lab. were responsible for supervising the special treatment of these cases with massive doses of anti-gas gangrene serum and sulphathiazole. This treatment was considered to be the most effective yet carried out, and was probably responsible for reducing mortality to 50% in this series of cases.

A Penicillin Research Team carried out trials on selected cases during September with excellent results.

Medical Equipment. Inexpendible Medical Equipment was sufficient to meet all demands. Some expendible Medical Stores, especially sodium pentothal; were in very short supply. Great delay was experienced in the provision of anti-typhus vaccine and anti-diphtheria serum, but in the end all demands were met in full. The inadequate provision of Lighting Sets (not a medical supply) caused great anxiety for some time. Eventually enough Sets were provided to meet requirements.

No provision appeared to have been made for replacement of X-Ray Van and Trailer Sterilizers lost by enemy action.

Rations and Medical Comforts. Compo rations and 48-hour mess tin rations were adequate and much appreciated by the troops.

Troops joining Eighth Army from U.K. and North Africa complained that M.E. rations were monotonous. This was chiefly due to the fact that no fresh meat was available until 15th November.

The ration scale (N.A.) at the end of the period was adequate and well balanced. All through the period ample quantities of fresh fruit were available, grapes, apples, pears, nuts and oranges. Vegetables were fairly plentiful in country districts, but dairy produce - eggs, butter and cheese - were scarce, and in most places unobtainable. Fair supplies of poultry, including turkeys, were available in some places; also pigs and sheep.

Troops operating at heights over 2,000 feet received additional rations according to scale.

Medical comforts were in good supply and adequate.

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Clothing Scales. Apart from the fact that there was some delay in issuing battle-dress, which did not arrive in Italy until October, there were no criticisms to offer. All troops had two pairs of boots and three pairs of socks, four blankets and a ground sheet.

Special winter clothing was demanded for troops likely to operate at heights over 2,000 feet during the winter months.

Sanitary Conditions in Camps. On the whole the standard of sanitation was good, and excellent work was done by Hygiene Sections in dealing with the appalling conditions encountered in bombed towns and villages.

Wherever possible, deep trench latrines were employed, but some static units preferred buckets and the Otway pit disposal system.

Refuse in Camps was disposed of by burning and burial, but there was still a tendency to leave tins lying about uncovered.

Washing up arrangements in Camps were not always satisfactory.

Conservancy arrangements. Except in bombed towns little difficulty was experienced. Hygiene Section personnel were well trained, and a complete drill was laid down for dealing with drainage and scavenging problems as they arose.

Supplies of latrine tops, urinals, disinfectants, etc., were carried by Hygiene Sections and were put into use immediately around docks, billets, etc. Water points were tested and marked, and refuse disposal arranged. Street cleaning was organised with civilian labour and supervised by Field Hygiene Section personnel.

Bars, cafes, and barbers' shops were inspected, and notices erected placing them either in or out of bounds.

Contact was made with Municipal officials, and civilian hospitals were inspected in conjunction with an A.M.G. representative.

Water Supply. No difficulties were experienced with water supplies except for a temporary shortage in bombed towns, due to damaged reservoirs and water mains.

Every effort was made to restore Municipal supplies at the earliest possible moment, and this was always a priority R.E. service. The policy was to super-chlorinate in the early stages whether or not the water was considered safe for drinking purposes.

This was done because in most cases the supply was intermittent to start with, and there was always the danger of local contamination from fractured drains. Subsequently normal amounts of chlorine were added according to the quality of water to be treated. An Eighth Army improvised chlorinator was installed if no Paterson or

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similar type of apparatus was available. These chlorinators are made by Field Hygiene Sections from 40-gallon drums and worked on a flow and drip principle. They give very good service when properly looked after, but large quantities of water-sterilizing powder were required to deal with the water supply of large towns such as Taranto and Bari. They did, however, prove their worth, and it is a remarkable fact that not one case of typhoid fever was reported in Eighth Army.

Local supplies were usually from springs or wells, which were tested in the ordinary way before use, and afterwards chlorinated. Organised water points were the rule, and there was consequently a tendency to use water carts as water tanks, the filtering apparatus being neglected. It was not, therefore, unusual to find water carts unserviceable after they had been on the road for a few months.

Laundry. Owing to the lack of laundry facilities in the forward areas and the necessity for providing clean underwear, it was decided to set up Cleansing Centres on a basis of one per Division, Corps and Army.

These Centres, which were tented or in buildings, consisted of:-

(a) two Sections of a Mobile Bath Unit with 1 Hot Air Disinfestor,

(b) two No. 5 Disinfestors from Field Hygiene Sections,

(c) An improvised laundry with from 20 to 50 Italian washerwomen, supervised by a detachment of Mobile Laundry, R.A.O.C.

Each Centre was laid out as a Disinfestation Centre with laundry attached. A float of 2,000 suits of underclothing, 500 towels and 100 blankets was carried.

Work was co-ordinated by O.C., A.M.C.U., who was responsible for carrying out skin inspections.

These Centres could deal with from 500 to 600 men daily.

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APPENDIX I

CIVILIAN REFUGEES

During October and November increasing numbers of civilian refugees presented major problems of medical treatment, evacuation and disinfestation.

From the outset of the campaign the Army Medical Services were called upon to deal with a constant trickle of civilian casualties, a trickle which rapidly increased as the bombed and burned villages of the Foggia plain were approached. It was not, however, until the Trigno was reached that the problem became really serious. Here the situation was that, while Campobasso had a small, well equipped and relatively undamaged civil hospital which could deal with the normal local sick and some casualties, the influx of many civilian wounded, chiefly women and children, from forward areas was so great that admission to Military Medical Units was inevitable. In addition, the hospital theatre was out of action, and the Italian medical and nursing staff disorganised. The existing A.M.G. Organization, including supplies of Medical Stores, was insufficiently developed to cope with the situation, despite the efforts of individual A.M.G. Medical Officers. Rapidly improvised arrangements to evacuate in returning empty trucks did not much ease the situation, as some ten major surgical cases were being brought in each day. Fortunately at that time owing to the impossibility of deployment from the roads and to lack of accommodation, two Field Ambulances and a C.C.S. in the neighbourhood were closed. It was decided, therefore, to put a Section of a Field Ambulance H.Q. Company into the civil hospital to get it running again and keep up a regular discharge rate. This plan was carried through with very satisfactory results. A regular turn-over of admissions and discharges was maintained, and Military Medical Units in the area freed from civilian patients, other than acute surgical cases. After the fall of Isernia, a big hospital centre, on 5th November, it was necessary, owing to the complete destruction of the hospital building, to assist A.M.G. in establishing fresh accommodation in Carpinone. The new establishment began to function on 27th November.

On the 5 Corps axis similar but less serious problems were being faced. The civil hospital at Vasto was completely filled and was unable to receive cases which were being evacuated from the small civil hospital at Altino, where it had been necessary to accommodate the overflow of casualties in the adjacent church. Further confusion was caused at Altino in that the Vasto authorities not only failed to receive their cases but actually returned more than were sent back. Immediate

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arrangements were made, in conjunction with A.M.G., to evacuate all minor cases back to Bari in military transport.

As well as the problem of dealing with and evacuating casualties, there was the difficult problem of medical supervision and disinfestation of large numbers of infested personnel and their belongings. Inspection of refugees at rearward Collecting Centres revealed that many were louse infested, and a number suffering from scabies. As the military situation demanded that refugees should be removed from the forward areas as quickly as possible, it was clear that any system of inspection and disinfestation would have to be established well behind the battle zone. A civilian M.I. Room was opened in the Isernia reception area in two rooms of a M.D.S. This was staffed by a local Italian doctor, supplied with drugs from A.M.G. sources. Similar arrangements were made at an Indian P.O.W. Camp at Carovilli, an I.A.M.C. Medical Officer being in attendance, assisted by Italian nurses. On the eastern coastal axis there was no organised system of collection in forward areas. Refugees arrived in Vasto in lorries and on foot from across the Sangro and from various villages. Here a small collecting Post had been established in a part of a local cinema. It was frequently overcrowded at night, and complete segregation of the sexes was rarely possible. Supper and breakfast were provided from Army sources, assistance being given by the local voluntary helpers. All blankets were disinfested by No. 8 Fd. Hyg. Sec. daily after use, and subsequently by No. 13 Fd. Hyg. Sec., who also maintained hygiene supervision of the premises. Separate latrines - squat type - were provided in the adjoining grounds; considerable supervision was necessary to ensure their proper use. A local Italian M.O. visited each day to attend to the sick, but his value was seriously limited by the almost complete absence of medical supplies. The average stay in the Centre was about 24 hours, when evacuation to Guglionesi was carried out in any available transport.

It was clearly evident that a large, self-supporting Refugee Camp was required. At the end of the period a tented camp was being set up at San Salvo. All refugees were seen by an Indian M.O. assisted by two Italian nurses, and Medical Stores were supplied by A.M.G. A.M.E.S.H. Disinfestor was delivered to the site pending the carrying out of repairs to an Italian steam disinfestor which had been found in Casalbordino. The accommodation at Vasto was made to serve as a Stragglers Post.

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APPENDIX IV

NUMBERS AND RATIO OF BATTLE CASUALTIES BY FORMATIONS

FORMATION	9 Oct.	16 Oct.	23 Oct.	30 Oct.	6 Nov.	13 Nov.	20 Nov.	27 Nov.
78 Div.	770 5.24	50 0.34	65 0.43	156 1.11	245 1.67	43 0.29	33 0.22	106 1.37
1 Cdn. Div.	107 0.79	98 0.73	68 0.50	120 0.84	21 0.17	4 0.03	1 0.008	70 0.56
1 Cd.. A/T Bde.	1 0.05	- -	- -	1 0.04	- -	- -	- -	- -
4 Armd. Bde.	- -	4 0.12	- -	- -	25 1.38	- -	3 0.16	7 0.39
5 Div.	2 0.01	70 0.53	22 0.17	3 0.02	114 0.83	15 1.11	4 0.03	60 0.43
8 Ind. Div.	- -	- -	6 0.04	18 0.13	339 2.43	52 0.37	24 0.18	10 0.07
2 NZ Div.	- -	- -	- -	- -	- -	- -	- -	201 1.36
5 Corps Tps.	- -	- -	5 0.21	1 0.02	52 0.86	28 0.36	6 0.08	27 0.34
13 Corps Tps.	30 0.45	1 0.01	3 0.04	7 0.09	5 0.06	- -	3 0.04	13 0.17

BATTLE CASUALTIES

Sep.	4th	= 148
"	11th	= 493
"	18th	= 142
"	25th	= 125
Oct.	2nd	= 64
"	9th	= 1192
"	16th	= 312
"	23rd	+ 187
"	30th	= 372
Nov.	6th	= 816
"	13th	= 149
"	20th	= 83
"	27th	= 533
		4616

ANALYSIS OF B.C.

Head & Neck	= 14.3%
Shoulders & Arms	= 25.5%
Legs	= 35.5%
Back - Buttocks	= 8.25%
Thorax	= 3.52%
Abdomen	= 1.63%
Thoraco-Abdomen	= 6.20%
Multiple	= 3.28%
Spine incl. Spinal Cord	= 0.02%
Burns	= 1.80%

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PHASE II - Period 1.12.43 - 31.3.44

R. SANGRO - ORTONA

COMPOSITION OF THE ARMY

At the beginning of December, 1943, the Order of Battle, EIGHTH ARMY, was re-arranged as follows:

5 Corps

8 Indian Division
1 Canadian Division
4 Armoured Brigade

13 Corps

5 Division
78 Division
1 Canadian Army Tank Brigade

Under Command ARMY

2 NZ Division
86 Area (FOGGIA)

ARMY MEDICAL UNITS WERE:

1 C.C.S.
3 C.C.S.
4 C.C.S.
5 C.C.S.
7 C.C.S.
15 C.C.S.
18 C.C.S.
19 C.C.S.
9 Indian C.C.S.
1 NZ C.C.S.
4 Cdn. C.C.S.
14 Field Ambulance
151 Light Field Amb.
132 Field Ambulance
216 Field Ambulance
1 F.S.U.
2 F.S.U.
4 F.S.U.
5 F.S.U.
7 F.S.U.
8 F.S.U.
19 F.S.U.
21 F.S.U.
22 F.S.U.
26 F.S.U.
28 F.S.U.
31 F.S.U.
32 F.S.U.
35 F.S.U.
1 Cdn. F.S.U.
2 Cdn. F.S.U.
1 Indian F.S.U.
1 NZ F.S.U.
3 F.T.U.
4 F.T.U.
7 F.T.U.
9 F.T.U.
11 F.T.U.
26 F.T.U.
34 F.T.U.
35 F.T.U.
1 Cdn. F.T.U.
2 Cdn. F.T.U.
NZ F.T.U.

3 Adv. Depot of Medical Stores
7 Adv. Depot of Medical Stores
1 Mob. Bact. Lab.
5 Mob. Bact. Lab.
3 Mob. Hygiene Lab.
8 Malaria Field Lab.
11 Indian Field Lab.

5 V.D.T.C.
8 Field Hygiene Section
11 Field Hygiene Section
13 Field Hygiene Section
19 Field Hygiene Section
34 Beach Brick Medical Section
30 Indian Staging Section

130 Mob. Dental Unit
131 Mob. Dental Unit
138 Mob. Dental Unit
139 Mob. Dental Unit
150 Mob. Dental Unit
151 Mob. Dental Unit
15 Indian Dental Surgical Unit
2 British Dental Surgical Unit
3 Indian Dental Mechanical Unit

Det. 1 Maxillo-Facial Unit
Det. 4 Neuro-Surgical Unit
2 Mob. Opthalmic Unit
24 Indian ENT Surgical Unit
24 Indian Opthalmic Surgical Unit

S.T. UNITS 88 M.A.C.
112 M.A.C.
146 M.A.C.
6 M.A.S.
NZ M.A.C. (25 Cars)
567 (A.F.S.) A.C.C.

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On 4th December 86 Area moved from Foggia to Guglionesi to supervise the new Railhead Area at Termoli, but on the 5th H.Q. 60 Sub-Area moved into Termoli to be responsible for that Area under command 86 Area which was to move to Vasto. On the 9th Rear H.Q. moved to Vasto Marina.

On the 11th 78th Div. was placed under direct command Army, and 103 Sub-Area moved to command Eighth Army to Campobasso, so that the Order of Battle Eighth Army was now as follows:

5 Corps	Army	13 Corps
8th Indian Div.	78th Div.	5th Div.
1st Cdn. Div.	86 Area	2nd N.Z. Div.
	103 Sub-Area	

On the 13th Nos. 3 C.C.S., 7 F.T.U., and 35 F.T.U., left Eighth Army to return to U.K., and No. 9 F.T.U. was placed under command Eighth Army to act as the Army Blood Bank in place of No. 7 F.T.U.

At this time also 1st Div. and 4th Ind. Div. were placed on Eighth Army Order of Battle, but remained for administration under 2 District.

On the 17th No. 4 Cdn. C.C.S. came under command Eighth Army and arrived at Torremaggiore to take over equipment left by No. 3 C.C.S. 78th Div. was placed under command 13 Corps with effect from 30th December.

5th Division passed from command Eighth Army between 9th and 15th January to Fifth U.S. Army; with it went the following non-Divisional Medical Units: Nos. 15 C.C.S., 1 and 5 F.S.U.s, 4 F.T.U., 138 M.D.U. and 74 and 75 M.C.U.s.

2nd N.Z. Div. passed from command Eighth Army between 16th and 21st January. With it the following Medical Units passed from command Eighth Army: Nos. 1 N.Z. C.C.S., 2 N.Z. F.T.U., 1 N.Z. F.S.U. and 8 F.S.U. 2nd N.Z. Div. was relieved by 4th Indian Div. who moved forward between 16th and 20th January.

On 30th January 5th Cdn. Armd. Div. passed from command 13 Corps to 1 Cdn. Corps, who on that date took over from H.Q. 5 Corps. Pending the arrival of Canadian Corps Medical Units they also took over command of 5 Corps Medical Units.

On 1st February Adv. Ech. A.F.H.Q. asked for the release of two platoons of No. 567 (A.F.S.) A.C.C. and a F.S.U., and this was agreed to, No. 28 F.S.U. being nominated.

As Polish F.S.U.s and F.T.U.s had not yet been formed, Nos. 29 and 31 F.S.U.s and 23 F.T.U. were earmarked for work with 3rd Carpathian Div., and a platoon of No. 567 (A.F.S.) A.C.C. was allotted pending the arrival of Polish M.A.C.

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Action was taken through Staff channels resulting in the formation of four F.S.U.s and two F.T.U.s. Two F.S.U.s and one F.T.U. were to be formed in Italy, and the remaining units in the Middle East.

On 8th February information was received that 78th Div. was being withdrawn to rest, and would move into the Larino-Casacalenda area. This move caused a re-shuffle of troops in the line, 78th Div. reverting from command 13 Corps to command Army with effect from 8th February. 3rd Carpathian Div. passed from command 13 Corps to command Polish Corps whose advance troops moved into the line on the 6th.

8th Indian Div. and 1st Cdn. Armd. Bde. passed from command 1 Canadian Corps to 13 Corps, and Canadian corps retained under command 1st Cdn. Inf. Div. and 5th Cdn. Armd. Div. On the 9th 103 Sub-Area moved from Campobasso to command Fifth Army, and 60 Sub-Area took over command Campobasso in addition to Termoli.

No. 5 Cdn. C.C.S. was moved into Army Area and located at Lanciano on 16th February. At the same time No. 1 Cdn. M.A.C. relieved No. 112 M.A.C., which had been acting as Canadian Corps M.A.C. No. 112 M.A.C. came under command Army and relieved No. 88 M.A.C. which went into Army reserve. At the same time No. 1 C.C.S. reverted to command Army and was left in reserve.

With the above-mentioned move of 78th Div., Adm. Ech. A.F.H.Q. asked for a further C.C.S. and two F.S.U.s. The opening of No. 3 Polish C.C.S. in Campobasso enabled No. 7 C.C.S. to be nominated, and Nos. 4 and 25 F.S.U.s. were also nominated. They passed from command Eighth Army on 22nd February.

On 28th February Adv. Adm. Ech. A.F.H.Q. became H.Q. A.C.M.F. (Adm. Ech.) but there was no change in the chain of command.

At the beginning of March the re-organisation of Eighth Army Order of Battle began; details are given in the section relating to operations affecting the Medical Services.

2. Physical Geography of the Country

No considerable change in the topography of the country from that previously described was encountered during this period, the line having advanced only to include Ortona and the country immediately beyond. Apart from the narrow coastal strip, which is intersected at frequent intervals by the main rivers and torrents running towards the sea, the country is undulating and mountainous in character.

3. Climatic Conditions

During the winter season, December to February, the weather on the eastern side of the Apennines was fairly mild. Occasionally cold winds, reaching gale force on

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two occasions, and falls of snow at the higher altitudes were experienced. Rainy periods were frequent and fairly heavy, alternating with periods of dull inclement weather and short intervals of sunshine.

Spring developed very slowly out of winter, being generally wet and stormy. Rainfalls were very heavy with occasional hailstorms and thunderstorms. Long periods of sunshine with warm, sunny afternoons became more frequent towards the middle of March.

4. Diseases prevalent among the civilian population

In spite of hardships and privations of war, the low standard of living and the primitive sanitary conditions prevailing, the health of the adult civil population remained remarkably good. Judging by naked eye examinations the child population was not so fortunate; some were emaciated almost to the point of marasmus. No accurate figures of the Infant Mortality Rate are available, but it was evidently higher even than in peacetime.

Malaria. The incidence of malaria infection in the civil population was evidently high. There is however nothing special to report in this connection.

Venereal Disease. This continued to be a serious problem, particularly in so far as the protection of the troops was concerned. Syphilis and especially gonorrhoea were very prevalent not only in large towns but also in the villages and scattered farmsteads. Opportunities for infecting the troops were numerous. Accosting and touting could be seen almost anywhere in spite of the so-called suppressive efforts of the Carabinieri. In fact, it was said that some of the Carabinieri were in league with the prostitutes.

Even more strenuous efforts to deal with the situation were made during this period. Four P.A.C.s, Class "B", were equipped and put into operation in 78th Div. area, 86 Area, 60 Sub-Area, and at Eighth Army Rest Camp. All G.1098 equipment was not available, but with improvisation the Centres were able to function. I.1248 equipment was available to scale; supplies of E.T. packets and condoms were readily available. The American V.D. film entitled "Sex Hygiene" was shown to many officers and O.R.s. Three articles upon V.D. were published in Eighth Army News. Propaganda notices were displayed in certain places.

The Adviser in Venereology toured the forward Area and lectured Regimental officers on the general subject of V.D. The inadequate arrangements existing for the disposal of women found to be infected were strengthened, though still far from

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satisfactory. The weakest link in any such arrangement was the complete unreliability of the average Italian M.O.'s capabilities of diagnosis. Unless a frank discharge or obvious sore was evident, most Italian Medical Officers would render a certificate certifying a woman as free from infection with venereal disease on a single naked-eye examination, and without any bacteriological confirmation.

The arrangements were such that women evacuated out of Army area to Bari on the recommendation of a Military M.O. frequently returned to the Area after a short absence with a certificate signed by an Italian M.O. to the effect that they were not suffering from venereal disease. Strong representation was in consequence made to A.M.G. to prevent their return to Army Area and, under instructions issued by the Provost Branch, all women evacuated were given a direct Military Order forbidding them to return to Army Area. This Order was not fully emplemented, since the large number of cases involved necessitated admitting many to the V.D. Wing of the civil hospital at Vasto situated in Army Area.

Facilities at the Vasto hospital were extremely limited. O.C. No. 5 V.D.T.C., Adviser to Eighth Army in Venereology, visited the hospital and studied the methods of examination, diagnosis and treatment practised by this particular civilian Italian doctor, and was satisfied with the standard attained. The limitations of this hospital were lack of sufficient accommodation, shortage of beds and particularly blankets, inadequate nursing staff, shortage of therapeutic agents and dressings, and the barest minimum of essential medical equipment.

An identification pro-forma approved by Provost Branch was taken into universal use, and M.O.s received strict instructions in its completion.

Scabies and Pediculosis. The incidence of these among the civil population remained high. Practically all the child population, and most of the poorer adults, suffered from pediculosis capitis. Personal delousing by hand could be seen in almost any village. Efforts were made by A.M.G. to provide bathing and disinfestation facilities but without much success. In consequence reliance was placed almost entirely upon Army facilities.

Enteric Fevers. Enteric fever is endemic throughout southern Italy, but its extent cannot be accurately gauged. Judging by the diagnostic capabilities of the average Italian doctor, it is highly probable that many cases go undetected. In most areas Isolation Hospital facilities do not exist. Many cases are not even seen by a doctor. The larger towns have a piped water supply in addition to a varying

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number of scattered wells. Villages and isolated farmsteads depend entirely on wells. On occupation of a town it was invariably found that the aqueducts had been damaged. In addition, owing to the customary method of construction, at the junction of the pipes leaks frequently occur, which in the absence of inspection chambers sometimes necessitated many deep excavations. The result was that the town supplies tended to be at low pressure, frequently interrupted and unreliable. Water points put out of bounds when the town supply became available had to be re-opened when the town supply failed. Superchlorination of the whole town supply was the practice when possible, especially when, as was usually the case, the sewers had been damaged. The procedure was to instal an improvised oil-drum float-type automatic chlorinator to feed the main supply at a convenient point outside the town. A "Control House" usually exists on the outskirts of a town and is well situated for this purpose. The method worked well under the supervision of a Sanitary Assisant, but required large supplies of water-sterilizing powder. The heavy demands for W.S.P. were met.

All well-water supplies were examined and Horrocks tested by field hygiene sections, and either put out of bounds or the number of scoops of W.S.P. required indicated.

A difficult problem was the disposal of civilian refuse. On occupation of a town the forward Hygiene Section would select a suitable site capable of being used over a long period, with a roadway access and within half to one mile of the town, so as to be within easy reach of horse-drawn vehicles. Control tipping was instituted, the vehicles passing over ramps to the exposed tip face. Brick-built incinerators were erected on the site and were operated by civilian labour gangs. Prevention of haphazard tipping of the rubbish in streets and alleyways was maintained by Carabinieri patrols, by the display of public notices and, in Vasto, by house to house visits of trained welfare workers. The result was a big improvement in the general state of Italian towns, though they were still far from satisfactory.

The civilian sewage disposal systems seen in southern Italy are essentially primitive and limited. The average southern Italian is either ignorant of, or indifferent to, elementary sanitary principles. In consequence it was necessary to construct deep trench latrines for public use, and efforts were made to persuade the inhabitants to use them.

Typhus and Anti-typhus Precautions. No confirmed case of typhus fever among either the civilian population or military personnel was reported in Army Area during this period.

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Almost all troops were inoculated against typhus and many had a "booster" dose. Owing to the constant changing of units and personnel it is not possible to give an accurate figure for the inoculation state; it was, however, over 85%. Bathing facilities were ample, Mobile Bath Units being supplemented by Anti-Malaria Control Units working as Bath Units. Each A.M.C.U. was trained and equipped to scale for anti-typhus measures, and each was supplied with a S.J. Bath Set specially constructed and provided by the R.E.s. In addition, most Units improvised their own showers, assisted by the nearest field hygiene section.

Five captured Italian Bath Sets were called forward from North Africa but had not been delivered by the end of the period.

Medical Units were issued with Field Portable Disinfestors, and in addition improvised Serbian Barrels and M.E.S.H. Disinfestors were provided by Units and Field Hygiene Sections.

Sets of anti-typhus clothing were issued to the following scale:

C.C.S.	12 Sets
Field Ambulance	6 Sets
Field Hygiene Section	12 Sets
A.M.C.U.	9 Sets
M.B.U.	20 Sets

As the control of typhus is essentially dependent upon preventive measures being put into effect before the occurrence of an outbreak, the following general measures were taken or intensified as far as possible:

(i) Avoidance of overcrowding, the aim being to accommodate each soldier with 45 square feet of floor space. This was possible in a few cases only, owing to the extreme shortage of suitable accommodation.

(ii) Adequate ventilation of quarters and tents. This was universally satisfactory, thanks to broken windows and other damage.

(iii) Weekly skin and clothing inspections under Unit arrangements.

(iv) Medical inspection monthly and on individial moves.

(v) A hot bath weekly. Bath Register kept.

(vi) Underclothes changed and washed at least once a week.

(vii) Hygiene supervision of laundries and barber's shops.

(viii) Non-communal use of blankets, towels, etc.

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(ix) Education of the troops by posters, lectures, films and Eighth Army News Publications on:-

(a) The louse and its habits.

(b) Methods of combatting lousiness.

(c) Individual methods of delousing.

(x) General use of A.L.63.

(xi) Disinfestation of refugees, their clothing and blankets at Refugee Camps.

(xii) Inoculation of P.s. O.W. and civilian labour gangs with Durand and Giraud vaccine.

(xiii) Issue of Pamphlet "Control of Epidemic Typhus 1942" to M.O.s.

(xiv) Liaison with A.M.G. Health authorities, who were:

(a) educating the civilian population by means of pssters, etc.

(b) providing public baths.

(c) circulating Italian M.O.s with instructions to be on the alert for signs of infestation and typhus cases.

(d) arranging inoculation of Italian medical and nursing personnel with anti-typhus vaccine.

General

Evidence of the hardships and privations of war superimposed on an already impoverished people was manifest in every town and village. Undamaged and partially damaged housing was scarce, and families large. In consequence there was gross civilian overcrowding, sometimes two or more families living in one or two rooms, together with such farmyard live stock as remained to them. Clothing was obviously in very short supply and obtainable only by the well-to-do. The vast majority were dressed in rags, many going barefoot through the muddy streets.

Food was limited and simple. Wholemeal bread of varying degrees of milling formed the staple diet, supplemented by fruit and vegetables, which were plentiful. Olive oil and other forms of fat became increasingly scarce, margarine and butter being practically unobtainable. Eggs, chickens and a few geese were on sale in increasing numbers. The whole food situation was aggravated by the difficulty of distribution, resulting from the lack of transport.

The methods of refuse and sewage disposal have already been described.

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It will be seen that at this time the stage was set for the outbreak of an infectious disease, such as enteric or typhus. No such epidemic occurred in the Army Area. The only real, visible evidence of the unhygienic conditions prevailing was general undernourishment and septic skin conditions. Battle casualties (mine injuries, burns, splinter wounds and fractures) formed the commonest civilian disability in the Army Area. The proportion of children amongst these cases was remarkably high.

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OPERATIONS AFFECTING THE MEDICAL SERVICES

December

The period opened with the Battle of the Sangro in full swing (See ~~Appendix I~~ MAP 3). Fierce fighting was in progress for the Fossacessia - Romagnoli ridge, which by nightfall on 1st December had been captured. During the Sangro battle over 1,000 prisoners were taken. Castelfrentano fell on the 2nd in spite of fierce enemy resistance, and on the 3rd Treglio and Lanaiano fell and our troops advanced to the outskirts of San Vito.

For operational reasons it was decided to change over 78th Div. who were fighting on the coastal sector, under 5 Corps, with 1st Cdn. Inf. Div., who were fighting on the Campobasso front under 13 Corps. This change-over was completed by the 4th.

The opening of the Ambulance Railhead at Termoli was again delayed. This caused great complications because No. 3 C.C.S. at San Severo was closing on the 3rd (the site was required by U.S.A.A.F.), and D.D.M.S. 5 Corps was already feeling the need for the release of No. 1 C.C.S. from Torremaggiore. The Railhead was eventually opened on the 4th.

On the same day San Vito fell, and our troops pressed on to the River Moro. On the morning of the 5th the line-up of our forward troops was as follows: 5 Corps on the coastal sector had 1st Cdn. Inf. Div. and 8th Italian Div. under command; next was the N.Z. Division directly under command Army in the central sector; 13 Corps with 5th Div. in the line, and 78th Div. in reserve.

No. 1 C.C.S. closed at Torremaggiore and moved on the 6th to Pollutri, where it remained closed in 5 Corps reserve.

On the 6th heavy rain caused the River Sangro to overflow its banks, and all bridges across that river were completely swept away. This situation temporarily put and end to our advance. Casualties from the battle-front had to be brought across the river in D.U.K.W.S. The road transport of casualties was difficult owing to the mud and to the state of the roads. The A.F.S. cars were very useful with their 4-wheel drive. By the 10th the bridge had been rebuilt, and the position regarding supplies and evacuation of casualties became normal.

On the 10th Medical H.Q. moved from Lucera to Vasto.

The Army Commander announced the new plan of attack. To carry out this plan, both 5 Corps and 13 Corps were employed on the costal sector. 78th Div. reverted

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from command 13 Corps to direct command Army, and took over responsibility for the central sector. The N.Z. Division passed from Command Army to command 13 Corps, so that the lay-out on the 12th was as follows: 5 Corps in the coastal area had 1st Cdn. Inf. Div. and 8th Indian Div. under command. 13 Corps had N.Z. Division and 5th Div. under command. The two-Corps front stretched from the coast to a depth of 18 miles inland. 1st Div. and 4th Indian Div. came under operational command of Eighth Army, but were to remain in 2 District. The Army Medical lay-out at this point was as follows:

Vasto: Nos. 9 Indian C.C.S., 5 C.C.S. and N.Z. C.C.S. accepted all sick and wounded from the Corps Area. Cases were evacuated from Vasto to Termoli to No. 18 or No. 19 C.C.S., and thence to 2 District by Ambulance Train.

Campobasso: Nos. 7 and 15 C.C.S.s were located in Campobasso. Casualties were evacuated to Termoli by ambulance cars and thence to 2 District by Ambulance Train. No. 4 C.C.S. was located at Larino and accepted short term sick.

On the 13th bad weather again interfered with all activities, but next day the N.Z. Division launched a local attack which gained some ground and brought in another 200 prisoners.

At this time the civilian hospital in Lanciano and Vasto became full to capacity with civilian wounded from the forward areas, so special evacuation to 2 District was arranged. Cars of No. 88 M.A.C. brought cases to Termoli, whence they entrained for Bari. Evacuation of civilian casualties had to be accepted as an extra commitment, since A.M.G. possessed no means of carrying out their own evacuation.

On the 14th two of the four Ambulance Trains that were on the Termoli - Bari run were withdrawn. One was called for the Naples L. of C., and the other had a crash. This meant, instead of two Ambulance Trains daily for Termoli, a reduction to one daily or, more often, to two in three days. This situation led temporarily to gross over-crowding of Nos. 18 and 19 C.C.S. at Termoli.

On the 15th No. 34 F.T.U. was moved up from No. 19 C.C.S. to No. 9 Indian C.C.S., and the "Specialist Trinity" (No. 2 Mob. Ophth. Unit, Det. No.1 Maxillo-Facial Unit and Det. No. 4 Mob. Neuro-Surg. Unit) were moved from No. 19 C.C.S. at Termoli to No. 5 C.C.S. at Vasto.

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On the 16th N.Z. Division resumed its attack, and heavy fighting continued. The enemy counter-attacked next day, but made no advance.

The train service at Termoli remained inadequate, but the C.C.S.s continued to cope with the situation satisfactorily. Great difficulty arose from trains not bringing back sufficient blankets and pyjamas. This was a point which needed constant watching, as a reserve store can be depleted extremely quickly if Ambulance Trains do not carry sufficient blankets and pyjamas for exchange on a one for one basis plus 5% increase. On the 17th only one Ambulance Train arrived at Termoli. The C.C.S.s had already 860 cases remaining and as this train was taking only 150 cases the situation was a little difficult. "Movements" were requested to produce a second Ambulance Train; this they promised, but it did not arrive. A Hospital Carrier was also demanded. At the same time road evacuation was arranged from Termoli ao Barletta, and the forward C.C.S.s were instructed to hold all cases until the situation at Termoli returned to normal. On the 18th all was quiet in the forward areas, and the situation at Termoli had greatly improved. 520 cases were awaiting evacuation, but two trains were expected. These trains arrived to time, and by nightfall the situation had been restored. The Hospital Carrier demanded on the 17th arrived at Termoli on the 21st, and two Ambulance Trains also arrived about the same time. As the dire need for the Carrier had passed only 190 cases were evacuated by sea. The remainder (N.Z. and Canadian casualties) were evacuated by rail.

On the 18th No. 3 Adv. Dep. Med. Stores moved from 2 District to Campobasso. Nos. 18 and 48 Indian Staging Sections arrived at Vasto. D.D.M.S. 5 Corps opened the Light Section of No. 1 C.C.S. at Rocca.

The next day fighting was again resumed on the coastal sector, the Canadians making a slight advance. On the 20th the battle for Ortona began in earnest, and the Canadian Division reached the outskirts of the town. This battle continued with ever increasing ferocity until the Canadians finally took the town on the 28th. (See ~~Appendix II~~ MAP 4).

At this time Eighth Army were given No. 50 General Hospital, which was earmarked to replace Nos. 18 and 19 C.C.S.s at Termoli.

On the 24th the road between Vasto and Termoli became completely unusable owing to bad weather, and no evacuation could take place. Next day the road was better and arrangements were made for a convoy of ambulance cars from Vasto to Termoli.

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On the 25th H.Q. 5 Corps moved to San Vito. On the same day a new plan for Eighth Army was announced - that it was to stand on its existing winter line. With this in view 1st Div. and 5th Div. were to pass from Eighth Army to Fifth Army, 1st. Div. on the 29th December and 5th Div. on the 4th January. The Medical lay-out for the static period following the capture of Ortona is shown at ~~Appendix III.~~ MAP 5

With the change in plan great activity on the welfare side was instigated. A.D.H. Army visited Bari to advise on the construction of an Eighth Army Rest Camp and to make necessary Medical arrangements. This Camp was to hold 5,000 when completed.

On the 28th Rear H.Q. 13 Corps moved from Campobasso to Paglieta, and, on the 30th, 78th Div. reverted to command 13 Corps.

On the 31st Vasto opened as the Ambulance Railhead.

January

The new year opened with the worst storm yet experienced in Italy. The River Sangro rose and all bridges across it became unserviceable. Fortunately all was quiet and although no evacuation from the forward units could take place these units were not overtaxed. The Ambulance Train scheduled to arrive in Vasto was cancelled as sufficient cases were not to hand to fill it to capacity.

On the 2nd information was received that the railway bridge across the River Fortore had become unserviceable owing to heavy rain. It was estimated that the damage would take three weeks to put right. The wrecking of this bridge meant that no Ambulance Trains could go further than San Severo. Arrangements were immediately made to increase the number of ambulance cars at Termoli, so that rapid evacuation of cases from Termoli to San Severo could take place. Arrangements were also made for one Ambulance Train daily from San Severo with a second train standing by in case of necessity. Medical Units in Campobasso were asked to hold as many cases as possible until the situation at Termoli became clear. To make matters more complicated, heavy snow blocked the Campobasso-Termoli road so that the line of evacuation from Campobasso had to be transferred to Foggia via Lucera. A staging post was placed at Vinciature. This arrangement worked very satisfactorily, and although rail evacuation from Termoli was not re-commenced until 16th January and from Vasto until the 26th there was no cause for anxiety as during the whole of this period little fighting took place.

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On 3rd January the 1st Brigade of 5th Div. moved from the forward area to command Fifth Army; the move was completed on the 5th. Nos. 15 C.C.S., 1 F.S.U., 5 F.S.U., 4 F.T.U., 1 38 B.M.U., 74 and 75 A.M.C.U.s proceeded to Fifth Army with 5th Div. 5th Div. were replaced in the line by one brigade of 4th Indian Div. and one brigade of 5th Cdn. Armd. Div.

On the 7th heavy snow isolated many units of 78th Div. in the Caprocotta area. These units had to have supplies dropped by air. Fortunately, since evacuation was impossible, battle casualties were few.

Final arrangements were made for the move of No. 50 Gen. Hosp. from 2 District to Termoli. The advance party (100 beds) of this hospital replaced No. 18 C.C.S. at Termoli on the 16th. The remainder moved some days later and spread into the site occupied by No. 19 C.C.S. on the 29th. No. 18 C.C.S. on relief moved to Larino and did not open; No. 19 C.C.S. on relief moved to Campobasso on the 29th, occupying the building vacated by No. 15 C.C.S. On the 8th No. 1 Mob. Mil. Hosp. was placed temporarily under command 2 District and moved from Manfredonia on the 10th.

Information was received that the N.Z. Div. was moving from under command Eighth Army to command Fifth Army. This move took place between the 16th and 21st. No. 4 Cdn. C.C.S. moved from Torremaggiore to Vasto to replace No. 1 - N.Z. C.C.S. on the 21st. On the 10th No. 26 F.S.U. had moved from No. 4 Cdn. C.C.S. to No. 5 C.C.S. at Vasto and No. 29 F.S.U. moved thence to 78th Div. The latter move was made necessary because heavy snow was preventing the evacuation of casualties from some parts of the 78th Div. front and a F.S.U. in the advanced A.D.S. was essential.

11th Inf. Bde. moved into the line on the 11th and came under command 13 Corps. Next day 2nd Para. Bde. passed from command 13 Corps to command 5 Corps. During all this period only patrol activity was taking place. On the 13th the remainder of 4th Indian Div. moved up into the line. They released N.Z. Div. who started to move to Fifth Army on the 16th.

Rail evacuation from Termoli reopened on the 17th, one train daily easily coping with the casualties. Next day No. 50 Gen. Hosp. opened for the reception of cases. On the 19th another C.C.S. was demanded for Fifth Army; No. 18 C.C.S. was nominated and it moved from Eigth Army Area on the 24th.

The first definite news that 1 Canadian Corps was coming under command Eighth Army arrived on the 19th. On that date 1st Carpathian Div. came under command

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Eighth Army though they remained in 2 District area for the time being.

During the last week in January 5th Cdn. Armd. Div. moved into the line and came under command 13 Corps, and 1 Canadian Corps started to move into the line to relieve 5 Corps on the 25th. On the 26th information was received that 3rd Carpathian Div. was moving into the line to relieve 78th Div. in the central sector. The take-over was completed by 4th Feb.

On 26th January Ambulance Railhead re-opened at Vasto, A detachment of No. 3 Polish C.C.S. was attached to No. 7 C.C.S. at Campobasso to deal with Polish casualties; No. 3 Polish C.C.S. was to take over from No. 7 C.C.S. completely at a later date. Evacuation of Polish cases was arranged as follows:- from No. 7 C.C.S. to No. 50 Gen. Hosp. at Termoli by road and then by Ambulance Train to No. 3 Polish Gen. Hosp. at Taranto.

On 30th January 1 Canadian Corps took over from 5 Corps who moved into reserve. Information was received that 4th Indian Div. would move from Eighth Army Area in the near future and 1st Carpathian Div. pass to command 13 Corps.

February

During the whole of February the general situation remained unchanged; the forward line for the complete month was static, only patrol clashes taking place and even those being limited by very bad weather.

D.D.M.S. and A.D.H. Polish Corps spent the night of 2/3 Feb. at Medical H.Q. The complete Polish Medical lay-out was discussed at a conference and the following provisional arrangements made. Casualties from 3rd Carpathian Div., which by the 2nd was completely in the line, were to be evacuated by Divisional Field Ambulances to Campobasso, where there was a detachment of No. 3 Polish C.C.S. From No. 7 C.C.S. here Polish cases were to be evacuated to No. 50 Gen. Hosp. at Termoli, where they were to be staged for the night and then evacuated by rail to No. 3 Polish Gen. Hosp. at Taranto.

A detachment of No. 344 Polish Adv. Dep. Med. Stores was attached to No. 3 Adv. Dep. at Campobasso to deal with medical stores.

As the Poles had no F.S.U.s or F.T.U.s., Nos. 29 F.S.U., 31 F.S.U., and 23 F.T.U., were attached to 3rd Carpathian Div., passing to command Polish Corps when they arrived in the line. As no M.A.C. cars arrived with 3rd Carpathian Div., one platoon of No. 567 (A.F.S.) A.C.C. was placed under command for forward evacuation from Field Ambulances to No. 7 C.C.S. at Campobasso. Army undertook responsibility for evacuation from Campobasso to Termoli.

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Bad weather blocking the Campobasso - Larino - Termoli road, the alternative route via Lucera to Foggia and thence to 2 District had to be used; all evacuations went extremely smoothly.

At this time D.D.M.S. Polish Corps announced that the formation of four Polish F.S.U.s and two Polish F.T.U.s was well advanced.

About this time D.D.M.S. Army decided that the forward group of Army C.C.S.s at Vasto on the coastal sector were much too far behind the forward line, being some 25 miles back from Ortona. Reconnaissances were made and it was decided that Lanciano was the only suitable place where forward C.C.S.s could be installed. Q. Branch were consulted and the D.A. & Q.M.G. accompanied by D.D.M.S. Army and D.D.s M.S. 13 Corps and 1 Canadian Corps visited Lanciano. Here they agreed that the tobacco factory was the only suitable building where C.C.S.s could be installed. This building could in the first place take two C.C.S.s and later a 200-bed General Hospital and with more engineering a 600-bed or even a 1,200-bed General Hospital. Engineering work was immediately put in hand and tentative arrangements were made for No. 5 Cdn. C.C.S. to move from 2 District to Lanciano on the 10th. They actually moved on the 16th. No. 9 Indian C.C.S. was to close at a later date and move into Lanciano as the second C.C.S. A 200-bed General Hospital was to replace No. 9 C.C.S. at Vasto. These latter moves never took place as plans changed with increasing rapidity. At the beginning of February No. 5 V.D.T.C. moved from Foggia to Scerni where they were attached to a Company of No. 132 Fd. Amb. They opened a 200-bed reception station for the treatment of V.D.; No. 48 Indian Staging Section was attached for holding Indian cases. This arrangement worked extremely well, only chronic cases that did not respond to treatment being evacuated. No Canadian cases were treated, as D.D.M.S. Canadian Corps had made special arrangements to treat these in No. 4 Cdn. Fd. Amb. and evacuate all others to Canadian Base Hospitals in 2 District.

On the 6th No. 151 Lt. Fd. Amb. moved from Foggia to Termoli where they opened under canvas for the treatment of local sick. On the 10th Ambulance Railhead opened at San Vito. Only 80 patients entrained there, but the train was filled to capacity at Vasto. Only one Ambulance Train every second day was needed to cope with evacuation from Eighth Army Area. On the 20th No. 5 Cdn. C.C.S. opened to receive cases at Lanciano.

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No. 1 Cdn. MAC relieved No. 112 MAC, who reverted from command 1 Canadian Corps to command Army and took over all commitments from No. 146 MAC who moved to 2 District area (Foggia) to rest, remaining under command Army. On the 15th 78th Div. passed from command Eighth Army to command Fifth Army, moving from the Larino - Casacalenda area. This move was completed on the 17th. On that date D.D.M.S. A.F.H.Q. Adv. Adm. Ech. requested the nomination of one C.C.S. and two F.S.U.s to move to Fifth Army area. As No. 3 polish C.C.S. had relieved No. 3 C.C.S. in Campobasso, No.s 7 C.C.S., 4 F.S.U., and 26 F.S.U. were nominated. These Units moved out of Eighth Army area on the 22nd.

On the 17th the Light Section of No. 1 C.C.S. rejoined its parent unit at Pollutri, where it remained, reverting to command Eighth Army.

By this time all stores of penicillin that had been left with Eighth Army were used up, and it became necessary to cease supply to Eighth Army forward units.

The month closed with nothing but patrol activity. The disposition of the forward troops was as follows: on the central sector - 3rd Carpathian Div. under 2 Polish Corps; next, 8th Indian Div. under 13 Corps, and on the coast 5th Cdn. Armd. Div. and 1st Cdn. Armd. Div. under command 1 Canadian Corps. The plan for the move of Eighth Army from the eastern to the western side of Italy was announced at the beginning of March, and on 2nd March 8th Indian Div. reverted from command 13 Corps to command Eighth Army, and the move of 5 Corps to Paglieta from Nocera began.

March

13 Corps on relief by 5 Corps moved to come under command Fifth Army on 5th March, and on the 7th 5 Corps, passing to command A.C.M.F., took over 8th Indian Div., 2nd Para. Bde., and 1st Cdn. Inf. Bde. Eighth Army was therefore left with the Polish Corps in the line under command and 1 Canadian Corps H.Q. with 5th Cdn. Armd. Div. in reserve in Campobasso area. The gradual move of H.Q. Eighth Army and of the essential Army troops to the west took place between 7th and 11th March, H.Q. Eighth Army being established near Alife. These moves necessitated a re-shuffle of Administrative areas, and H.Q. 60 Sub-Area, which passed to command 2 District, moved to Vasto from Termoli, thus relieving 86 Area which moved to Campobasso. To run Army Railhead and Roadhead area H.Q. 55 Area was placed under command Eighth Army and was set up at Riardo on 12th March. On the 16th the advance party of 6th Armd. Div. began to arrive in what was to be a new Eighth Army Area, with H.Q. at Piedimonte d'Alife.

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5th Kresowa Div., the second Division of 2 Polish Corps, began to move into the line on 23rd March, relieving units of the French Expeditionary Corps; The Polish Corps then had under command 3rd Carpathian Div., on the right, 1st Raggruppamento Motorizzato in the centre, and 5th Kresowa Div. on the left; The area boundary of Polish Corps was moved forward from Campobasso to Bojano at this time, and this lay-out was not changed during the remainder of the quarter.

In view of the expected arrival of 8th Indian Div. under command Eighth Army, it was decided that non-Divisional Medical Units with 4th Indian Div. should remain in Army Area in exchange for the non-Divisional Medical Units of 8th Indian Div.; the Units involved were No. 2 Indian C.C.S., "D" British Dental Unit, No. 12 Indian Dental Surgical Unit, No. 39 Indian Staging Section and No. 18 M.A.S.

On 26th March Eighth Army took command of its new area, and 13 Corps, with 78th Div., 4th Indian Div., 2nd N.Z. Div., and 3rd D.I.A., under command, came under Eighth Army. At the same time 4th Div., was placed under command 13 Corps for the relief of 3rd D.I.A. which passed from command of 13 Corps and Eighth Army on the 30th. At this time 78th Div., was holding the sector south of Route 6 to the Fifth - Eighth Army boundary with 2nd N.Z. Div. holding Cassino sector and with 4th Indian Div. just north of Cassino. A re-shuffle was arranged at the end of the month, so that 2nd N.Z. Div. took over from 78th Div., south of Route 6; 78th Div. replaced N.Z. and 4th Indian Div.s in Cassino and Cairo sectors, and 1st Guards Bde. was moved up from 6th Armd. Div. to take over sector on left of N.Z. Div., between thet Division and Fifth and Eighth Army boundary.

The plan of medical evacuation during this time was on two lines, one for Polish Corps and one for 13 Corps.

(a) The Polish route of evacuation was from Isernia to No. 3 Polish C.C.S. at Campobasso and thence by road to Ambulance Railhead at Termoli under the administration of D.D.M.S. 2 District. During this time it was arranged to place No. 2 Polish Gen. Hosp. in Campobasso to hold Polish short term casualties and establish Polish C.C.S.s in Isernia.

(b) 13 Corps evacuation was to a group of C.C.S.s (No.s 1 N.Z. C.C.S., 2 Indian C.C.S., 7 C.C.S., and, later, 19 C.C.S. in place of 2 Indian C.C.S.) under Corps. From this group the evacuation was Eighth Army responsibility, and it was co-ordinated by A.D.M.S. 55 Area. Army C.C.S.s were not established owing to the short distances involved, and cases were evacuated direct to

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General Hospitals at Caserta, specialist cases going to No.s 65 and 92 Gen. Hosp.s at Naples.

The following notes outline some of the difficulties met with in the Medical Administration of the Army during this period.

(i) Four-Wheel Drive Ambulance Cars

During the winter the roads and tracks in the forward area became almost impassable to ambulance cars without 4-wheel drives. The only 4-stretcher ambulance cars fitted with this type of transmission were those of the American Field Service Ambulance Car Company. These units performed the most useful duties, and without their assistance evacuation of casualties from the immediate forward areas would have been extremely difficult.

The necessity for 4-wheel drive vehicles in Divisional ambulance cars and the M.A.C.s was represented through Staff channels as an essential for forward evacuation of casualties.

(ii) Lighting Sets for Medical Units

Constant trouble was experienced with the 1-kw lighting sets supplied to Field Ambulances, F.S.U.s and C.C.S.s. It was recommended that 4-kw sets be substituted for 1-kw sets, and that, as each F.S.U. was attached to a parent unit, it should not be obliged to carry an independent lighting set.

Such standardization of the lighting would ensure greater economy and reliability.

(iii) Use of Jeeps and Field Ambulances

The 1942 Field Ambulance W.E. II/198/I supplied a motor-cycle for each of the officers in the companies of the unit - a total of six. It was shown that it was impossible for the Section Officer to perform his duties on a motor-cycle, and it was suggested that an alteration in the W.E. should be made to substitute jeeps for seven of these motor-cycles; in addition the jeeps should be fitted with 2-stretcher carrier frames. This would have the double effect of permitting the Section Officers to carry out their duties and, at the same time, would make an additional source of stretcher-carrying vehicles in field ambulances.

(iv) Combined Neuro-Surgical, Maxillo-Facial and Ophthalmic Teams

During the period under review a combination of Neuro-Surgical, Ophthalmic and Maxillo-Facial Teams was employed at No. 5 C.C.S., Vasto. This combination performed a very valuable piece of work, and it was open to consideration whether a combined Surgical Unit of this nature should not be a standard unit working in

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conjunction with a C.C.S. Many cases of injuries above the neck require the skilled attention of all three branches of surgery and dentistry; this attention should be given at one sitting. These three teams worked in one large theatre.

(v) Forward Surgery

On more than one occasion it was necessary to point out, particularly to Formation Commanders, the inadvisability of placing advanced Surgical Centres too near the fighting zone. There is ample evidence to show that though the surgery may be of a very high order the after-effects of being retained within sound and range of shell-fire have a very deleterious effect on the patient.

(vi) Advanced Surgical Centres

The lack of F.D.S.s available for the formation of Advanced Surgical Centres was greatly felt in Eighth Army. In almost every instance these Centres had to be formed with Divisional field ambulances.

(vii) Wireless Communication

78th Div. was equipped with a Wireless Medical Net which in battle proved invaluable. It was strongly contended that such a net should be standard in all Formations. Army was able to communicate directly with Corps with great advantage to both Formations.

(viii) Field Ambulances with Army Troops

The very large number of Army troops - Gunners, R.E.s, Road Maintenance units, etc., make it essential for a unit such as a field ambulance or two F.D.S.s to be on the permanent Order of Battle of an Army in the Field. Eighth Army Field Ambulance was always fully extended on a variety of functions.

(ix) Attachment of Special Investigation Team to Field Units

During the period a number of special teams sent out from the War Office was attached to Mobile Bateriological Laboratories, etc. The Army in the Field has as much work for these laboratories as they can perform.

It was considered essential that if these investigation teams were to be sent out they should come fully equipped in every sense - in transport, personnel and laboratories, as the legitimate work of the Mobile Laboratories on the Order of Battle of the Army was seriously handicapped by their having to hand over the whole or part of the laboratory or transport to these visiting teams, which it was impossible, as a rule, to equip from local sources.

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(x) Working Parties for C.C.S.s

The W.E. of personnel for C.C.S.s was only sufficient to permit the unit to perform its purely Medical function. In every case it was necessary to attach working parties of Pioneers or Italian labour to the C.C.S.s to enable the unit to provide stretcher bearers for loading and unloading ambulance cars, etc. These labour parties were a permanent commitment.

(xi) The Relationship of the Military Authorities and the Civilian Population

As the Army advanced and occupied one town after another, the Medical Services found that they had perforce to deal with large numbers of civilian sick and wounded. This became a heavy liability demanding very close liaison between the A.M.G. authorities and the Medical Services. The A.M.G. organization was rarely capable of rendering full assistance until, at times, several weeks had elapsed, owing almost entirely to lack of a sufficient number of Medical Officers on their Staff and of transport for civilian casualties.

(xii) Medical Officers with large Units

Many large bodies of troops, such as Corps or Army R.E.s were without Medical Officers on their W.E. The Medical care of these troops can be arranged by instructing companies to report to the nearest Medical Unit, but many of the other functions of a R.M.O. cannot be adequately performed by casual attachment to a Medical Unit.

C.R.E. Army troops produced proof that no less than twelve different Medical Officers had looked after the troops under this command in the previous three months. There was no continuity of treatment, check of inoculations, etc., and it was impossible to provide proper attention without a Medical Officer on the W.E. of the unit, which numbered some 2,500.

In practice a Medical Officer had to be removed from a Medical unit for semi-permanent attachment to the Army R.E.s.

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THE HEALTH OF THE TROOPS

Principal Diseases Affecting the Troops

Infective Hepatitis. During the four months under review Infective Hepatitis was the chief single cause of sick wastage. During December, 1943, there were 1435 cases as compared with 1487 in November. The weekly number remained remarkably constant up to the end of December, no peak period being evident. From then onwards the incidence began to fall. For the weeks ending January 8th, 15th, 22nd and 29th, the numbers of cases were 259, 224, 164 and 130 respectively. During February there was a total of 484 cases, the numbers for each week being 128, 140, 137 and 104, respectively - a drop of about 40% of the number for January. During the last month there were 284 cases, an average of about 57 cases per week.

Venereal Diseases. The incidence of venereal disease fluctuated from week to week, but on the whole tended to decrease. In December there were 331 reported cases compared with 381 in November. During January there were 63, 59, 72 and 79 cases respectively for each successive week. In February the weekly cases were 49, 11, 38, and 52 respectively; in March, 67, 23, 70, 46 and 86.

The geographical areas where the diseases were contracted were scattered, no particular "black areas", comparable with Bari and Taranto, being evident. A total of 1,046 cases was admitted during the 17½ weeks under review, an average of 61.5 per week.

The incidence of syphilis was relatively high, being approximately 1 in 10 of the total cases; gonorrhoea 1 in 4. The arrangements for treatment worked satisfactorily. The policy of treating uncomplicated cases in forward Units continued. All other cases were evacuated to No. 5 V.D. T.C., which was located in Corps areas. No. 48 Indian Staging Section was attached to No. 5 V.D.T.C. for the purpose of accommodating Indian personnel. This arrangement worked well, and relieved No. 5 V.D.T.C. of the difficult problem of feeding. There being no facilities for the treatment of officers and of West Africans, these were evacuated to Bari.

Malaria. Malaria was not an oustanding problem during the period. Fresh cases gradually diminished in number, but relapses continued to occur. The total number averaged about 60 each week.

The period was chiefly utilised for training purposes. All A.M.C.U. personnel, and as many M.O.s as could be spared, attended special courses in training at Bari, run by No. 8 Malaria Fd. Lab. These courses were very successful. In addition,

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twelve M.O.s attended the special Malaria Course at the University, Algiers. Considerable difficulty was experienced in filling the vacancies allotted on these courses owing to the long absence involved from Units. Though air passage out was obtainable, many had difficulty in obtaining a seat on returning planes.

It was decided that at least two intelligent orderlies trained in elementary laboratory technique and the diagnosis of malaria blood films would be invaluable in each Field Medical Unit during the coming malaria season. In consequence 10-day courses of instruction for specially selected personnel, two from each F.D.S., Field Ambulance and C.C.S., were arranged at No. 1 Mob. Bact. Lab. At first each course was restricted to four candidates, but this number was later raised to eight.

Diphtheria. No epidemic of diphtheria occurred, but numbers of scattered cases were reported each month. In December there were 40 cases notified - the Unit with the highest number being the 6/R.W. Kents, which had 8 cases, making a total of 12 in this battalion since 15th November. In January 75 cases occurred; in February 66, and in March 37. The policy of immunising all Medical and Nursing personnel liable to come into close contact with diphtheria could not be implemented owing to the shortage of T.A.F. The small amount held in No. 7 Adv. Dep. Med. Stores was evenly distributed to all Medical Units. This amount was sufficient to immunise 33 persons in each C.C.S. and Field Ambulance, and 25 in each F.D.S.

Enteric Fever. A total of 32 cases of enteric fever was notified during the period. In view of the deplorable conditions prevailing and previously described, this small number is little short of miraculous and speaks well for the standard of hygiene in force. The majority of cases occurred in January, when 14 were notified, of which 5 were probably infected in the Sangro valley. One patient died. According to records available, none of these cases was 100% protected with T.A.B. Investigations failed to reveal any definite cause for these cases, but the absence of an epidemic and their scattered nature suggest that the source was probably unauthorised food supplies. All Medical Officers were informed and instructions given through both Staff and Medical channels to strengthen the preventive measures in respect of water and food supplies, inoculation states and general sanitation.

Inflammation of Areolar Tissue. This continued to be an important cause of wastage.

Other diseases call for no particular mention.

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Battle Casualties. Total Battle Casualties for the period were 8,422, giving an approximate rate per thousand per day of 0.43. There were two major encounters, the Sangro Battle and the Battle for Ortona.

Medical Supplies. For the first time in Eighth Army grave anxiety was caused by the inability of Base Depots of Medical Stores to meet demands placed on them by Advance Depots serving with Eighth Army. Their inability to supply compressed tablets over long periods led to a serious shortage of these items in the forward areas.

There was a marked improvement in supply towards the end of February.

Rations. The standard of messing and cooking remained high. The scale allowed a greater variety of dishes than the M.E. scale. Fresh meat was issued fairly frequently and was greatly appreciated. Fresh fruit, particularly apples and oranges, and vegetables were readily available in almost unlimited quantities. An extra issue of tea, sugar and milk, in place of the rum ration introduced in December, was most popular.

Medical comforts were adequate and in good supply.

Clothing Scales. Clothing scales were satisfactory. Some delay was experienced in obtaining adequate amounts of protective clothing, such as leather jerkins, gum-boots, etc. Very wet weather made demands for gum-boots almost universal.

Sanitary Conditions. The standard of Camp Sanitation was fairly satisfactory, but strict supervision, especially of refuse disposal, was necessary.

Water Supplies. There are no special points to mention. A general account of the civilian arrangements, on which the Army was essentially dependent, has already been given.

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A N Z I O

January - June, 1944

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ANZIO

On 22nd January, 1944, a force - about three Divisions strong - composed of British and American troops of Fifth Army landed on the beaches near Anzio, a small and shallow port some thirty-five miles south of Rome. Naval and Air forces were in support, and the landing was co-ordinated with strong attacks by other units of Fifth Army in the Liri valley. It constituted a threat to German communications with the Gustav line, from which it was hoped thus to force a withdrawal. But, though the weather was favourable and opposition slight, no attempt at an immediate and rapid advance was made. The beach-head was extended but slowly; the enemy's defences were given time to consolidate, and on 9th February a strong counter-attack seriously threatened the Allied positions. This attack was followed by two more, the first of which drove a considerable salient into our lines. The casualties on both sides were heavy, but the beach-head was held, and by 1st March the ground lost had been recovered.

A long period of deadlock followed, and it was not till 23rd May that the Allies, now strongly reinforced, broke out of their defences and attacked the German lines. Next day they cut the Via Appia north of Cisterna, took over 1100 prisoners, and fanned out in a series of attacks against the flank and rear of the retreating enemy. On the 25th their patrols made contact with patrols from the Fifth Army main front. Thereafter the story of the beach-head force merges with that of the final advance on Rome of the two Allied Armies.

Strength of Force - see Appendix I.

The Landing

The British Medical Units engaged were those of 1st Div., to which were attached No. 25 F.S.U. and two sections A.F.S., A.C.C.; No. 3 F.D.S., No. 36 F.S.U., No. 10 F.T.U., No. 12 F.T.U. (attached No. 33 Fd. Hosp., U.S. Army); No. 2 C.C.S.; Nos. 2, 3 and 137 Gd. Ambs., and No. 18 Fd. Hyg. Sec. Medical arrangements for the landing were similar to those already successfully employed at Salerno and call for no special comment.

Period 22.1.44 - 18.3.44

I. Operations and Medical Arrangements.

A. 22.1.44 - 31.1.44

From D-Day (22nd January) to D + 2, No. 2 Fd. Amb. provided the main operational M.D.S. and evacuated casualties to No. 3 F.D.S. These units were in close proximity

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to each other in the original Beach Maintenance Area. Nos. 25 and 36 F.S.U.s (attached) operated on first priority cases and as many of the remainder as possible. Evacuation by Hospital Carrier began on D + 1. On D + 2, No. 2 Mob. C.C.S. opened in Anzio, and evacuation then took place to this unit. Both F.S.U.s and No. 10 F.T.U. were attached to this C.C.S. to augment surgical facilities, and No. 3 F.D.S. moved to Anzio area to open up for the reception of minor sick and to act as a Casualty Embarkation Centre. No. 3 F.D.S. thus came u/c Corps.

The advance of the Division (24th Guards Bde.) up the road Anzio - Albano began on 25th January when No. 137 Fd. Amb. opened an advanced A.D.S. and an operational M.D.S. The M.D.S. of No. 2 Fd. Amb. remained open in its original location to receive "exhaustion" cases. No. 3 F.D.S. received minor sick. There was a further move forward by 3rd Inf. Bde. on 30th January, with No. 3 Fd. Amb. establishing an advanced A.D.S.; the M.D.S. of No. 137 Fd. Amb. remained in the same location in main operational role.

Evacuation from R.A.P.s was usually carried out by ambulance car. In a few instances in the original Beach sector where cross-country evacuation had to be adopted Jeeps, fitted with a 2-stretcher gear, were used. In two instances, for a limited period, relays of field ambulance stretcher-bearers were used to hand-carry over difficult country. Evacuation from M.D.S. to C.C.S. was carried out by ambulance cars from Divisional resources. No M.A.C. cars were landed, but ten A.F.S., A.C.C. cars were allotted to the Division and were landed on D + 1 day. These cars, together with the twenty-four Divisional Ambulance cars, proved sufficient to carry out evacuation from forward areas to C.C.S. level. Evacuation from C.C.S. to Port was carried out by extra ambulance cars supplied from Corps reserve.

B. 1.2.44 - 29.2.44 (see MAP 6)

Evacuation of casualties from these operations provided some interesting problems.

Two Infantry Divisions were now operating in this theatre, and to all intents and purposes there was only main road on which to work. In the first part of the month Formations were disposed in depth rather than in breadth. This made the normal practice of an A.D.S. behind each brigade, evacuating back to one M.D.S., completely impossible. North of Carraceto, in the early part of the period, the position was that of one brigade at the tip, with a brigade (or part of a brigade) on each side of the salient. To establish three - or even two - A.D.S.s in such a layout was superfluous.

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One field ambulance was given the task of establishing a Divisional A.D.S. at the base of the salient. At one time no fewer than eight battalion R.A.P.s from three separate brigades were being evacuated to this A.D.S. The problem of control of evacuation from these R.A.P.s to the A.D.S. was solved by making the Commander of the field ambulance in support of each particular brigade responsible for ensuring smooth evacuation from his own brigade R.A.P.s. Ambulance cars from the field ambulance affiliated to the brigades were attached to the respective R.A.P.s, with the necessary number of "shuttle" cars at the A.D.S. Forward car control was carried out from the A.D.S. One field ambulance was detailed to establish a link between A.D.S. and M.D.S., and provided the ambulance cars and sited Car Posts for that purpose.

This scheme worked - and continued to work - extremely well, being obviously much more practicable than making the O.C. Divisional A.D.S. responsible for controlling evacuation from as many as eight battalion R.A.P.s.

Later in the period, when on 17th February 56th Div. came into this theatre, the question of control of evacuation and the siting of Medical units and sub-units reached almost a Corps plane. There was really need for only one "battle" M.D.S. - at first formed by a field ambulance of 56th Div., and later run by No. 2 Fd. Amb. of 1st Div. Two M.D.S.s, with the channels of evacuation and roads as they were, would have been redundant. The remaining M.D.S.s were therefore used for retention of sick, minor wounded and "exhaustion" cases. This one "battle" M.D.S. was sited close to the C.C.S.s (Nos. 2 and 15 Mob. C.C.S.s). All cases from both Divisions were received at this M.D.S., triage carried out, and the casualties sent direct to the appropriate department in the C.C.S. then receiving. Distances to the extreme limits of the beach-head were short, and it was unsafe and unnecessary to site a M.D.S. further forward. This solution of combining resources of M.D.S. and C.C.S. saved both manpower and ambulance cars.

The beach-head was so small and roads and tracks so few that the siting of even A.D.S.s required close liaison between the respective A.D.s M.S. Often one road or track was used by a brigade or brigades from each Division, and it was obviously more economical to site only one A.D.S. from one or other Division to evacuate casualties from both formations.

The greatest use was made of plasma transfusion at forward levels. All A.D.S.s were giving a considerable number of transfusions which were continued by a specially trained orderly accompanying the casualty all the way down to the M.D.S. Many lives

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were saved in this way. Certain R.A.P.s, from which evacuation was possible only by night and at which casualties had to be held for several hours, were also issued with blood plasma for use in suitable cases.

Whenever possible, evacuation from R.A.P.s was carried out by ambulance cars. In certain sectors, owing either to track conditions or the operational situation, or to both, this proved impossible. In such cases either Jeeps (with 2-stretcher gear) from field ambulances were utilised, or field ambulance stretcher-bearers were attached, as necessary, to the R.A.P. in order to hand-carry casualties back to the nearest point which a wheeled vehicle could approach.

C. 1.3.44. - 18.3.44.

On 11th March 56th Div. left the beach-head and was replaced by 5th Div. In the main the only difference in the policy as previously described was that 5th Div. also opened an M.D.S. in the Medical Area to act as a "battle" M.D.S. The field ambulances now worked in pairs with the two C.C.S.s: No. 2 Fd. Amb. (1st Div.) received from 2,400 - 1,200 hrs. and evacuated into No. 2 Mob. C.C.S., and No. 158 Fd. Amb. (56th Div.) received from 1,200 - 2,400 hrs., evacuating to No. 15 Mob. C.C.S. This procedure worked very satisfactorily and allowed the field ambulances, as well as the C.C.S.s, an opportunity to get some period of rest in the 24 hours.

At the end of the period No. 137 Fd. Amb. was holding stretcher accommodation for 240 sick, while No. 3 Fd. Amb. held similar accommodation for 200 "exhaustion" cases and sick. The average daily number of sick and "exhaustion" cases held in field ambulances since they opened at the beach-head was 254, the maximum total in one day being 420.

The bed state allowed for a holding policy of up to seven or eight beds. Evacuation from Nos. 137 and 3 Fd. Ambs. was direct to Hospital Ship or L.S.T. and not through a C.C.S.

II. Physical Geography. In the main a low-lying, moderately fertile plain. Certain areas are densely wooded with medium-sized trees and bushes, whilst others are intersected by deep valleys covered in scrub. In woodland and plain areas sub-soil water is high, and in rainy periods the ground very quickly becomes waterlogged.

A certain amount of canalisation had been carried out in the past by the Italians, but much had been allowed to lapse during the war. It is an area with every possibility for producing malaria.

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III. Climatic Conditions - Conditions at first varied - a few days of fine weather, followed by a day or two of very heavy rainfall, then clear again. Trenches in the forward areas were full of water for days at a time. Cold nights were usual. Later the weather improved, becoming very much milder and with less rain.

IV. Principal Diseases Affecting the Troops

A. 1st Div. (N.B. Returns refer to the whole quarter ending 18th March, unless otherwise indicated).

Sick Admissions - Period 22.1.44. - 18.3.44. - Number of admissions (including "exhaustion" cases) - 2,961. (Number of "exhaustion" cases - 810). Admission rate (including "exhaustion" cases) 3 per 1,000 per day. Admission rate of sick only - 2.24 per 1,000 per day.

Malaria

Fresh infections - 23.

Relapse infections - 63.

Total 86, giving a rate of 19.9 per thousand per annum.

The majority of cases occurred in the last four weeks of the period. It is unlikely that many of the cases diagnosed as fresh infections had contracted the infection recently, but probably did so during the malarial season in North Africa, Sicily or Italy. The criterion adopted for the classification of "fresh" was the non-occurrence of any previously recorded infection. Suppressive mepacrine treatment had not been stopped until 15th November, 1943. It would therefore seem possible that in many of these cases the infection had remained latent and been brought to the surface by the extremely inclement conditions under which the troops were living.

Venereal Disease

214 case of venereal disease occurred in the quarter, made up as follows:

(a) Syphilis or penile sores (venereal) - 88

(b) Gonorrhoea or Urethritis (") - 121

(c) Balanitis (") - 5

Total - 214, making an incidence of 49.7 per 1,000 per annum.

A vigorous anti-V.D. drive was instituted in the Division. P.A. Centres were set up in every unit; condoms and E.T. packets were made readily available; R.M.O.s and chaplains were enlisted in the effort, and every precautions was taken against the expected trouble. A proportion of the earlier cases occurred amongst men

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temporarily away from the Divisional area and not under unit supervision, (e.g. transport drivers proceeding to Naples). After the commencement of active operations by far the greater proportion of cases occurred among reinforcements joining the Division.

Immersion Foot

87 cases were admitted after the commencement of active operations. Forward troops fought under extremely inclement conditions, sometimes standing in water-logged trenches for many days at a time. Reliefs were infrequent, and maintenance difficulties made a daily change of socks a considerable problem. Orders were issued that, as far as the operational situation permitted, the troops should change into a dry, clean pair of socks daily. It was recommended that socks should be treated as unit stores, washed in "B" Echelon areas and sent up daily with rations to units and sub-units. Orders in regard to the dubbining of boots were constantly reiterated. Even though a man in a forward Company had only one pair of boots with him and thus had to put his feet, by then in dry clean socks, into wet boots, he did nevertheless derive considerable relief for some hours. These methods and the use of foot powder greatly contributed to the low incidence of the disease, which showed a rate of 32.9 per 1,000 per annum.

Infective Hepatitis

There was a total of 149 cases, giving a rate of 34.7 per 1,000 per annum. This disease showed a great decrease in incidence through the period, viz:

1st month - 98 per 1,000 per annum.
2nd month - 23.3 per 1,000 per annum.
3rd month - 16 per 1,000 per annum.

Scabies

149 cases, giving a rate of 34.7 per 1,000 per annum.

Pediculosis

Pediculosis Corporis - 44
Phthirus Pubis - 85
Total 129, giving a rate of 24.2 per 1,000 per annum.

Infectious Diseases

The only one of note was diphtheria, which showed a total of 31 cases for the period (9 positives and 22 clinical). There was never any question of an epidemic. No particular unit was ever affected, all cases being sporadic in nature.

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P.U.O.

The average incidence was 53 per 1,000 per annum.

Notes

(a) During the period 22.1.44. - 18.3.44. two of the three field ambulances in the Division were kept open for the reception of sick, "exhaustion" cases and minor battle casualties. For this purpose accommodation for a total of 400 patients (200 per field ambulance) was made available. Approximately 70% of this accommodation was tented - the remainder in small buildings near Anzio. One field ambulance was detailed to hold and treat cases of "exhaustion"; another took mainly sick; the third opened as a "battle" M.D.S.

(b) Inoculation and vaccination state was practically up to 100%. The arrival of reinforcements, large numbers of casualties, and battle conditions made it virtually impossible to keep the Division 100% protected. Every advantage was taken of the infrequent periods of rest in "B" Echelon areas to carry out re-inoculations and re-vaccinations as due.

V. Battle Casualties

A. Wounded

(i) Total casualties from Divisional personnel and attached troops - 226 officers and 3,069 other ranks - total 3,295.

(ii) Analysis of above casualties by types of weapons, missiles, etc.

(a)	Wounds due to aerial attack	-	346 =	10.5%
(b)	" " " blast "	-	133 =	4.04%
(c)	" " " H.E. shell	-	1,647 =	49.98%
(d)	" " " small arms	-	656 =	19.91%
(e)	" " " mortar	-	444 =	13.48%
(f)	" " " mines	-	29 =	0.88%
(g)	" " " grenades	-	28 =	0.85%
(h)	" " " burns	-	12 =	0.36%
	Total		3,295	100%

(iii) Analysis of specific wounds in certain areas of the body

(a) Head - 248 = 7.5% of total.

(b) Chest (penetrating) - 184 = 5.6% of total.

(c) Abdomen " - 129 = 3.9% of total.

(d) Femur (compound) - 88 = 2.7% of total.

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8. Exhaustion

Using the term "battle casualty" in its full sense and thereby including "exhaustion" cases, it is found that the latter condition caused some 17% - 18% of the total.

(i) During the period of active operations a total of 750 cases of "exhaustion" were treated in the M.D.S.s of Divisional field ambulances. A high proportion were returned to duty on the basis of their response to rest, sedatives and good food. Selection was usually possible after 48-72 hours of those cases not likely to be fit to be returned to units. The remainder were detained for a further 24-48 hours, depending on their condition, before being returned to their units for a further period in "B" Echelon and before going into the line again.

(ii) Total number admitted - 750

Number evacuated - 347 = 46.3%

Number R.T.U. - 388 = 51.7%

Number remaining on 15th March - 15 = 2%

Of the 388 R.T.U. cases 94 relapsed = 24.2%

Of the 94 cases which relapsed, 71 were then evacuated, and 23, after a further period of treatment, were returned to units.

(iii) A large proportion of these cases of "exhaustion" were undoubtedly just frightened men. It happened frequently on this beach-head that reinforcements, who had never heard a shot fired in anger before, landed at the port one day and were in the line a day or two after. There was no time to acclimatize them to war conditions. Most of these men, after a good rest, encouragement and good food, went back to the line, realising that things were not perhaps so bad as they had imagined, and became good soldiers.

VI. Medical Equipment

No special remarks. A certain amount was destroyed by enemy action or captured by the enemy, but no difficulty was found in obtaining replacements.

VII. Rations

(i) 22.1.44. - 7.2.44. - A 48-hour mess-tin ration followed by Compo. For a few days U.S. "K" and "C" rations were issued.

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(ii) 8.2.44. - 18.3.44. - Compo for forward troops, F.S. ration scale for the remainder. Two ascorbic acid tablets were issued daily for the first fortnight in March; thereafter ample supplies of fresh fruit, vegetables and meat became available.

VIII. Clothing

No special remarks.

IX. Sanitation and Hygiene

Normal field conservancy. Deep trench latrines (fly-proofed) were used whenever possible. All blankets were regularly disinfested while the men were in "B" Echelon areas. The incidence of "dirt" diseases was low. A Mobile Bath Unit and many unit-improvised showers were available. A Field Hygiene Section was fully occupied in visiting and advising units on matters of sanitation and hygiene.

X. Water Supply

This was carefully supervised. Water was taken from four main Divisional water points - a good quality, soft water, with an average requirement of three scoopfuls of W.S.P. per 100 gallons. There water points were tested regularly by personnel from No. 18 Fd. Hyg. Sec., and all water-carts were checked.

B. 56th Div.

(i) Health of the Troops. During the period 17.2.44. - 4.3.44., 1,139 all ranks of the Division were admitted to Medical Units on account of sickness, of whom 372 were treated in Divisional M.D.S.s and returned to duty. The incidence of infective hepatitis continued about the relatively low level of 10 cases per week. There were 366 cases admitted on account of physical and mental exhaustion. This represents the very high figure of 18% of total admissions, an indication of the physical and mental condition of a Division which, after some five months of very hard fighting, was flung without rest or reinforcements into this beach-head.

(ii) Wounds. The number of wounded collected to medical units was 1,049; these wounds were caused as follows:

Shell wounds	-	753
Bullet "	-	209
Wounds caused by aerial bombs	-	53
Grenade wounds	-	34

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Undoubtedly a number were evacuated through enemy medical channels also. There is little special comment to be made on the nature of the wounds. Those due to aerial action were in most cases minor wounds from anti-personnel bombs. Shell wounds were as usual serious, and became more numerous as enemy artillery activity increased.

C. 5th Div.

No returns available.

Period 19.3.44 to 30.6.44

I. 1st DIVISION

1. Operations and Medical Arrangements (See sketch map ~~attached~~ 7).

(a) Period 19.3.44 - 27.5.44

During this period the system of evacuation and the lay-out of medical units remained the same as at the end of the previous quarter.

(b) Period 28.5.44 to 6.6.44

During this period the break-out from the beach-head followed by the pursuit of the retreating enemy took place. Nos. 137 and 3 Fd. Ambs., which had been holding Divisional sick and "exhausted" cases, were closed, emptied and prepared to move on 30th May. The normal system of evacuation came into force thereafter. M.D.S., No. 3 Fd. Amb., moved forward on 4th June and M.D.S., No. 2 Fd. Amb., was closed. At first one A.D.S. in support of each infantry brigade maintained evacuation from R.A.P.s, but later when the line of advance took place along a single axis one A.D.S. to serve both forward brigades was sufficient. It was during this phase that stretcher-bearer officers were first employed in their correct role, and the system worked admirably. In addition, steps had been taken to train these officers in the technique of transfusion, and this duty was frequently carried out by them in A.D.S.s. In view of the single axis, the rear link between A.D.S. and M.D.S. was maintained by pooling ambulance cars from all field ambulances and placing the pool under command of the transport officer of one of them, usually at the location of the previous A.D.S., as leap-frogging took place. The maintenance of a small first-aid party at this site after the A.D.S. had closed and moved forward was found to be almost essential, as units in the neighbourhood had got to know of its location and, although infantry units had moved forward, many others, such as R.A. and R.E.M.E., would remain in the locality for some time. In addition, it would act as a staging post for ambulance cars and as

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a roadside first-aid post for dealing with casualties, due to sporadic shelling, etc., occurring among units passing forward.

In addition to plasma held at R.A.P.s and A.D.S.s, a small stock of whole blood was always held at A.D.S.s. This blood, if not expended, was turned over daily to the F.T.U.s attached to C.C.S.s. In practice it was found that the period of 24 hours spent out of the refrigerator did not cause any haemolysis, and the blood on return to the F.T.U. could safely be used as required. The value of being able to give whole blood at A.D.S. level was amply proved in the recent operations.

(c) Period 7.6.44 - 30.6.44

By this time the Division had pursued the enemy as far as the river Tiber and forward reconnoitring elements were across the river maintaining contracts. The Division prepared to cross the Tiber on the night of 6/7th June, but the projected move was cancelled and the Division was ordered to concentrate south of the river. Thereafter it remained concentrated and was engaged in re-organisation and training. Field ambulances opened M.D.S. in or near brigade concentration areas.

Throughout operations, whenever Divisional H.Q. was divided into Main (Adv.) and Rear elements, the A.D.M.S. was located at Adv. H.Q. to keep in touch with the operational position and the Divisional Commander and his "G" Staff, while the D.A.D.M.S. and office staff were located at Rear H.Q. with the administrative staff of the Division and in close touch with the Divisional Administrative Area and reserve medical units. Radio-telephonic communication with field ambulances was maintained from Rear H.Q. This system was found to work smoothly.

2. Physical Geography of the Country

After breaking out of the beach-head at the end of May, the Division was fighting over fertile agricultural land reaching to the left bank of the Tiber, where it remained during the rest of the period.

3. Climatic Conditions

Until the end of April the climate was temperate, with intervals of fairly high day temperatures and cold nights, broken by periods of high winds and rain lasting up to two days at a time. The weather then improved, with long successions of hot sunny days and cool nights. Humidity was not high and dust was the only discomfort. After the end of May rainfall was negligible.

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4. Diseases prevalent amongst civil population

During the period within the beach-head the few remaining civilians did not appear to be suffering from more than the prevalent scabies and impetigenous eczemas. Near the outskirts of Rome many civilians were found to be suffering from scabies, impetigo, eczema and malnutrition, with a high reported rate of V.D. Malaria was said to be common, and such few children as could be examined showed a proportion of enlarged spleens. No recent outbreaks of any epidemics were reported by the local health authorities, but infantile "summer diarrhoea" was reported as being much worse than usual this year. No preventive inoculations against the enteric group had been undertaken by the civilian authorities owing to the lack of vaccine.

5. Diseases affecting the troops

(a) Daily Sick

(1) New Divisional Sick seen by R.M.O.s and officers i/m/c troops during period - 9,930, giving a rate of 5.3 per thousand per day.

(2) New non-Divisional sick - 1,258.

New sick figures were greatly increased by a small outbreak of diarrhoea - dysentry during the last fortnight of the period. Cases of a mild nature furnished the majority of these figures - R.M.O.s treating 785 cases in unit lines during the fortnight. Of these only 122 cases required admission to M.D.S.s. Another cause for the increased figures was two explosive outbreaks of diarrhoea which were ondoubtedly due to food poisoning.

Ample supplies of sulphaguanidine were available and were used by R.M.O.s.

(b) Field Ambulances and C.C.S. Admissions

(1) Sick

(a) Admissions during battle period - 87 Officers and 2,664 O.R.s

Admission rate - 1.7 per thousand per day.

N.B. The above figure includes 294 cases of "exhaustion".

(b) During non-operational period - 19 Officers and 572 O.R.s

Admission rate - 1.8 per thousand per day.

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(2) Use of Field Ambulances

(a) During the battle period field ambulances not being used to establish battle M.D.S.s were opened for the reception and retention of sick minor wounded and "exhausted" cases. Just over 50% of the patients admitted to M.D.S.s were retained, treated and returned to units direct.

(b) During the non-operational period field ambulances opened for the reception and treatment of sick and injuries. Each held accommodation for up to 100 stretcher cases. Uncomplicated cases of malaria were treated within the Division. About half the total admissions were treated and returned direct to units. Most of the remainder, having been evacuated to No. 21 C.C.S. (located in Divisional Area), were returned in due course to the Division.

The daily average number held within all Divisional field ambulances during this period was 99.

(c) Analysis of Special Diseases admitted to M.D.S.s.

(1) Diseases of the skin - 145 giving a rate of 47 per thousand per annum.

(2) Inflammatory Conditions - 245 giving a rate of 51 per thousand per annum.

(3) Malaria

Fresh - 105 giving a rate of 21 per thousand per annum.

Relapse - 91 " " " " 17.5. " " " "

Total Cases - 196 " " " " 38.5 " " " "

Notes

Rates per thousand per annum show a great decrease during June. The Division started mepacrine on 26th March as at that time man-power in the beach-head was a pressing problem and many cases of suppressed malaria were being encountered. Careful records were kept and R.M.O.s were required to report cases of mepacrine intolerance. Only six cases were reported.

(3) Venereal Disease

Fresh cases - 110, giving a rate of 21 fresh cases per thousand per annum.

Relapse cases - 11

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Analysis:

Syphilis	1
Penile Sore (Ven.)	50
Urethritis (Ven.)	29
Gonorrhoea (Fresh)	23
Gonorrhoea (Relapse)	11
Balanitis (Ven.)	7

Cases arising in the beach-head were contracted amongst those who had been on leave or amongst reinforcements. 31 fresh cases occurred in the period 5-30 June when the Division was in the Rome area. Control was difficult in close proximity to a city the size of Rome. All units established their own P.A. Centres in addition to the large number of such Centres which abound in Rome.

The large proportion of Syphilis, Penile Sores and Balanitis is noticeable (58 out of 110 fresh cases of V.D.).

(4) Infective Hepatitis

42 cases - giving a rate of 8 per thousand per annum (in the month of June the rate was only half this and was the minimum rate recorded since early in the campaign in N. Africa).

(5) P.U.O.

344 cases - giving a rate of 66 per thousand per annum. This rate varied from time to time according to the facilities available in field ambulances for microscopic diagnosis of malaria, etc. In malaria, etc. In battle, facilities are naturally limited, and cases are often evacuated to C.C.S.s without a positive diagnosis being obtained. In non-operational periods the P.U.O. rate falls considerably. It is interesting to note the high proportion of cases of malaria admitted to field ambulances, which had been diagnosed conclusively by blood examination - 171 out of a total of 196 being so diagnosed.

(6) "Dirt" Diseases

Scabies - 114 cases - giving a rate of 22 per thousand p.a.

Pediculosis - 145 cases - giving a rate of 28 per thousand p.a.

Analysis:

Pediculosis Capitis	-	4
Pediculosis Corporis	-	48
Phthyrus Pubis	-	93

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(7) Dysentry

37 cases were notified in the period, of which 33 occurred during June. In the same month 272 cases of diarrhoea at rate of 189 per thousand per annum) were admitted to M.D.S.s, whereas in the previous period the incidence was practically nil. This rapid increase in incidence is largely accounted for by:

(a) Occupation of sites recently vacated and badly fouled by the enemy.

(b) Dry dusty weather.

(c) The two explosive outbreaks of food poisoning previously noted.

(d) Undue prevalence of flies.

(e) Large numbers of unseasoned troops (reinforcements) in the Division.

(f) Lack of care in units to instal anti-fly measures immediately on arrival in any area.

Whilst in the Anzio area importance of fly-control was fully appreciated and observed, units tended to become lax when on the move again.

(8) Clinical Diphtheria

27 cases occurred - giving a rate of 5 per thousand per annum. These were sporadic in nature throughout the Division.

(9) Other Diseases

(a) "Exhaustion" - 294 cases. The percentage of "exhaustion" to the total of wounded and "exhausted" cases equals 15 per cent. over the period under review. It is interesting to note that only 15 cases occurred from 1-5 June when hard fighting was in progress but the advance was proceeding well and morale was high.

Until the advance from the beach-head all cases were admitted to the Corps Exhaustion Centre at No. 3 Fd. Amb. From 25% to 30% were treated and returned to their units.

(b) Immersion Foot

8 cases occured at the latter end of March when conditions in forward Company locations were bad - water-logged trenches, long periods in the line, difficulties in maintaining supply of dry socks to forward troops, etc.

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(c) Pneumonia - 8 cases

(d) Ulcerative Gingivitis - 2 cases

(d) Inoculation and vaccination

Average figures showing percentage unprotected for the whole Division as on 30th June

(a) Vaccination - 16% officers and 12% O.R.s.

(b) Typhus - 15% " " 11% "

(c) Tetanus - 9% " " 4% "

6. Battle Casualties

Divisional and attached troops - 1,526

Non-Divisional - 111

P.O.W. - 23

(A) Analysis of Divisional battle casualties (wounded) by types of weapons, etc.

(a)	Aerial Missiles	36		2.29%	
(b)	Blast	73		4.78%	
(c)	Shell H.E.	460		30.14%	of total
(d)	Small Arms Fire	209	being	13.7%	battle
(e)	Shell Mortar	605	equivalent	39.65%	casual-
(f)	Mine	72	to	4.72%	ties
(g)	Grenade	39		2.56%	
(h)	Burns (enemy action)	33		2.16%	

(B) Analysis of specific wounds

(a)	Head (other than superficial)	88		5.77%	of total
(b)	Chest (penetrating)	113	being	7.41%	battle
(c)	Abdomen (penetrating)	57	equivalent	5.05%	casual-
(d)	Femur (compound fractures)	24	to	1.57%	ties

7. Medical Equipment

No special remarks.

8. Rations and Medical Comforts

Supply of medical comforts was adequate - eggs, fresh fruits and lime squash were available.

F.S. ration scale for Division as a whole, including fresh meat, fruit and vegetables.

9. Clothing

Khaki drill was in use from 1st May; slacks or denims for forward troops - shorts in daytime in rear areas. The scale of issue was adequate, and clothing exchange was instituted at the Mobile Bath Unit.

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10. Sanitation and Hygiene

(A) Anti-fly measures were carried out stringently. Adequate issues were made of sprays, flysol, swatters, wire gauze, hessian and muslin, fly-traps and food covers. Insistence was laid on the necessity for fly-proof preparation rooms.

(B) Anti-malaria measures. Control of malaria in the beach-head offered a considerable problem. Two main types of persistent water were met with -

(1) Ponds in woodlands, varying in size from 30 - 300 yds. in diameter.

(2) Marsh land leading into deep wadis. The normal Divisional anti-malaria committee was formed and the area was divided into formation and unit areas of control. The R.E.s. assisted in major clearing works - bulldozing in of smaller ponds and giving technical advice on drainage problems. They also provided boats for use in clearing the larger type of ponds. Each of the two M.C.U.s was given approximately half the area to supervise. The C.R.E. attached his two field engineers to work in close co-operation with the M.C.U.s. Units dealt with all work within their capacity. All ponds, marshy areas, wadis, etc. which needed weekly attention on a greater scale than could be carried out and supervised by units alone were numbered consecutively. The total number of such works was 99 and a conspicuous notice-board was prepared for each, showing the number, with a space for weekly insertion as to whether Paris Green, malariol or D.D.T. had been applied and the date of application. Many of these ponds were only originally found by studying air photographs, and at many of these direction boards were set up leading from the nearest track or wood so as to enable them to be found with ease by malaria squads. Work done on these ponds was carried out under the supervision of M.C.U.s by labour from Divisional sources.

Paris Green was in the main used more than malariol as the vegetation in the wadis and the rapid growth of vegetation in the ponds after primary clearing interfered greatly with the efficient application of malariol.

(C) Welfare Amenities

Frequent good-scale day-passes to Rome - cinema shows - E.N.S.A. concerts - Divisional bathing beach and canteen - unit canteens - all these played a great part in keeping up morale.

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Unit training was carried out during June, based chiefly on maintaining the physical fitness of the men.

Bathing facilities were adequate. Many units had their own showers, and three bathing points were established by No. 43 M.B.U.

11. Conservancy Arrangements

Deep-trench fly-proof latrines were universal. During the battle period forward Companies used improvised bucket latrines, the contents being buried at night some distance from the trenches.

Grease traps were installed for washing-up benches, ablution benches and bathing points. Cookhouse and dining hall swill was disposed of in Otway Pits where possible, otherwise buried. Tins were incinerated or flattened and buried.

12. Water Supply

Divisional water points maintained by the R.E. were used in operations whenever possible. This resulted in some instances in units tending to send water trucks many miles to a Divisional water point rather than use the vehicles, pumps and filters at a suitable source nearby. R.M.O.s and O.s.C. Units were reminded of their responsibilities in this respect. Unit water vehicles throughout the Division were carefully supervised and regularly inspected by field hygiene section personnel, who also tested all Divisional water points at least twice weekly.

II. 5th DIVISION

1. Operations and Medical Arrangements (see Sketch Map 8 ~~attached~~)

An A.D.S. in a house on the coast road served the entire Divisional front. Towards the east end of the lateral road was a Collecting Post in a wadi. As brigade reliefs took place, succeeding field ambulances worked this Post, which, like the A.D.S. house, was handed over complete with equipment on relief. The R.E.s did much work on the Collecting Post, reinforcing its roof with girders and sandbags.

Stretcher-bearers worked forward from the Collecting Post along the bed of a stream in the,"Fortress" Bn. position. The carry was about an hour and the whole length periodically came under intense mortar fire. A sandbagged dug-out made a half-way house in which stretcher-bearer parties and their casualties could take over.

The carry to ambulance cars on the lateral road was about 400 yds. and in full view of the enemy, who respected the large Red Cross flag which preceded each

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stretcher party. Plasma and blood were available at the Collecting Post. On the way back to the A.D.S. ambulance cars called at two R.A.P. sites on the lateral road. The remaining R.A.P.s on the left flank evacuated direct to the A.D.S. On reaching the British Medical Area, battle casualties were admitted directly to the C.C.S. to avoid delay, and a clerk of No. 158 Fd. Amb. recorded them as admissions to Divisional field ambulances and immediate transfer to C.C.S.

Ambulance cars on the lateral road were exposed to the risk of enemy reprisal action by day, and at night the entire road was under harassing fire. The A.D.S. at "Yellow House" on the coast road was shelled one morning by 88 mm. fire and received three direct hits. Fortunately, it had just evacuated its casualties, and A.D.S. personnel dispersed to slit trenches without casualty. Subsequently the house was repaired by the R.E.s, the first floor being shored-up and the ground-floor completely sandbagged inside. When whitewashed and fitted with electric light, an excellent and fairly safe A.D.S. resulted.

On 28th May local advances began on the whole of the Divisional front. 17th Inf. Bde. on the left flank continued to evacuate to the A.D.S. of No. 141 Fd. Amb. at "Yellow House". 13th Inf. Bde. in the central sector evacuated to the A.D.S. of No. 164 Fd. Amb. in a valley south-east of Ardea. 15th Inf. Bde. on the right flank evacuated to the A.D.S. of No. 158 Fd. Amb. in a deep German Medical Post.

As the enemy withdrew north to the Tiber, the Division rapidly advanced to the south bank. The M.D.S. of No. 164 Fd. Amb., which came by road from Naples as soon as the route was cleared, opened at Pomezia in a large civic centre on 14th June, but few battle casualties occurred. The M.D.S. of 141 Fd. Amb. opened for sick at Ostia on 6th June, but closed on 9th preparatory to the withdrawal of the Division to a concentration area at Pignataro near Capua. No. 158 Fd. Amb., which had remained in Medical Area, Anzio, closed and moved by sea to Naples on 15th June. The M.D.S.s of Nos. 141 and 158 Fd. Ambs. in British Medical Area at Anzio were exposed to frequent shelling, even by medium guns, and anti-personnel bombs often fell in the area. The wards were dug in deeply and head covering was provided. A ward tent of No. 141 Fd. Amb. received a direct hit on 13th April; four were killed and four seriously wounded. It was the exception for a shell or anti-personnel bomb not to arrive in the British Medical Area daily; only soft sandy soil prevented more casualties.

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2. Prevalent Diseases among the troops

Fewer N.Y.D., most of which was found to be malaria, was the only serious case of sickness. Infective hepatitis showed a seasonal decline. The Division began suppressive mepacrine (.7 grammes per week) on 15th April. This was the second season that this Division had taken suppressive mepacrine. The incidence of malaria, all being suppressed cases, rose sharply late in February about 13 weeks after mepacrine was stopped in November. There was little possibility of fresh infection at this time. Many strains of malaria had been acquired by the Division during the previous three years in Madagascar, India, Iraq, Syria, Sicily and Italy.

Malaria cases were not evacuated from the beach-head. No. 141 Fd. Amb. opened 200 beds in the British Medical Area, Anzio, for malaria cases; a few cases were sent to a C.C.S. A diagnostic pannier was in use and 69% fever N.Y.D. had positive slides.

Simple V.D. was treated at No. 141 Fd. Amb. and, if necessary, evacuated to 52 (U.S.) Med. Bn. in the beach-head. This unit treated gonorrhoea with penicillin with good results.

The little dysentry that occurred was treated at No. 158 Fd. Amb., which fly-proofed their dysentry wards.

3. Inoculation

With a few exceptions the inoculation state was good.

4. Medical Equipment

The supply of medical stores reaching the beach-head was satisfactory, though there was a temporary shortage of arsenical drugs. A good supply of tubonic morphia from Med. VI (I.S.) Corps was most useful and was carried by officers leading long patrols. Stretcher sheets, with standard clip, proved very useful in getting casualties down steep wadis in the Moletta valley and enabled stretchers to be conveyed on their sides in narrow crawl trenches.

5. Casualties

Sick. Total sick admitted during the period - 3,752

5th Div. sick admitted during quarter - 3,325

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The chief cases of sickness during the period were:-

Fever N.Y.D.	1,366
Diagnosed Malaria	844
Clinical Malaria	111
Infective Hepatitis	70
I.A.T.	125
V.D.s	208
"Exhaustion"	227
Diphtheria	4
Rubella	3

Also one case of poliomyelitis, two of food poisoning, one of congenital syphilis and one of gas gangrene occurred.

N.B. The above figures include 5th Div. troops admitted to 1st Div. medical units.

Battle Casualties

Total admitted to Field Ambulances		1,846
5th Div. " " " "		1,741
R.A.M.C. Battle Casualties	-	3 R.M.O.s
		10 O.R.s

6. Rations

Rations - A.F.H.Q. Fd. Service Scale - were of good quality and sufficiency. The variety of this scale was appreciated. Fresh bread was baked on the beach-head, and fresh vegetables brought in by sea from Naples were issued to units engaged in active operations. Medical comforts were adequate and N.A.A.F.I. supplies good.

7. Clothing

Battle dress was replaced by khaki drill on 12th May. One pair of slacks and two pairs of shorts were issued; also a small supply of denims for Rifle Companies as K.D. showed up at night. Steel helmets were worn at all times on the beach-head and were thought to have reduced head injuries.

8. Sanitation

Shallow trench latrines were in general use and were satisfactory in the prevalent sandy soil. Little fly-breeding occurred. Ablution facilities were provided by the M.B.U., all ranks having at least one bath per week. Sea bathing was possible in small parties; large groups attracted enemy shelling.

9. Water Supply

The water supply at Anzio was from streams. Water points were controlled by U.S. engineers and were chlorinated in large cisterns before issue. Quality and quantity were excellent.

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10. Anti-malaria precautions

Personal precautions were well observed throughout the Division. A malaria map of the Divisional area was compiled and indicated areas of responsibility throughout the entire Divisional area. Nos. 74 and 75 A.M.C.U.s worked chiefly in forward Brigade areas where constant relief made continuity of control difficult. There was no anophelene breeding in the Divisional area at the time of the break-out of the beach-head. A highly malarious area with heavy anophelene breeding was entered at the beginning of June in the Tiber marshes. During the advance on Rome little evidence of mosquito control by the enemy was seen. The enemy started suppressive mepacrine on 1st April.

Unit and anti-malaria squads and unit malaria officers were trained by No. 24 Fd. Hyg. Sec.; both British and U.S. malaria training films were widely shown. Liquid repellent "Scat" was thought to be far more effective than anti-mosquito cream, and owing to its non-greasy nature was much preferred by the troops.

Veils, even with mica inlay, were found seriously to impair the vision of troops on patrol.

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APPENDIX I

STRENGTH OF FORCE

Number of British troops in initial force (January)	17,000 (approx.)
Average number of troops during February	26,490
" " " " " March	35,868

MEDICAL UNITS

With Assault Force.	1 British Div.	2 Field Ambulance
		3 Field Ambulance
		137 Field Ambulance
		18 Field Hygiene Section
	Beach Group	3 F.D.S.
	with	25 F.S.U.
		36 F.S.U.
		10 F.T.U.
	Corps Troops	2 C.C.S.
		American Fd. Service team att. January 23rd
		12 F.T.U.
January 31st onwards	56 Division	140 Field Ambulance
		167 Field Ambulance
		214 Field Ambulance
		51 Field Hygiene Section
		10 F.S.U. att. 2 C.C.S.
		4 F.T.U. att. 15 C.C.S.
8th February		15 C.C.S.
16th February		3 F.D.S. left Beach-head
7th March onwards		Relief of 56 Division by 5 Division
		158 Field Ambulance
		141 Field Ambulance
		164 Field Ambulance
26th March		Relief of 15 C.C.S. by 21 C.C.S.
		" " 36 F.S.U. by 3 F.S.U.
		Arrival of 5 F.S.U.
		Relief of 12 F.T.U. by 1 F.T.U.

Distribution of F.S.U.s and F.T.U.s on 31st March

2 C.C.S.	21 C.C.S.
10 F.T.U.	4 F.T.U.
25 F.S.U.	3 F.S.U.
10 F.S.U.	5 F.S.U.

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THE CAMPAIGN IN ITALY

The Road to Rome - II

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FIFTH ARMY

PHASE 1. THE ATTACK ON NAPLES

9.9.43 - 1.10.43

In the early hours of 9th September, 1943 British and American troops, powerfully supported by the R.N. and R.A.F., landed on the beaches of Salerno, some 35 miles south-east of Naples. They composed the Fifth Army, and at that time were from $3\frac{1}{2}$ to 4 Divisions strong. Their chief immediate aims were two: the capture of Naples, and a drive right across Italy, which should cut off the retreat of the German forces retiring before Eighth Army. Beyond these, something more now than a remote and intangible hope, stood the politically glittering prize of the Eternal City.

The choice of the Gulf of Salerno was inevitable since it was the one place south of Naples where troops could be landed on a wide front and it also marked the limit of the radius of our fighter squadrons based on Sicily. Equally inevitable, in such circumstances, was the preparedness of the German High Command to meet the attack.

The weather was favourable, and, though the troops were under fairly heavy fire from the moment of disembarking, the first three days of the battle saw Allied advances at several points. Then, for a time, while the whole weight of the German armour was flung into furious counter-attacks, the issue hung in the balance. At length the crisis passed. On the 16th the decisive stage of the battle ended and the Allied Army resumed the offensive. The way was now clear for the advance on Naples, which was entered on 1st October. Of its two recorded aims the Salerno expedition had achieved the first, but had been foiled of the second, not unexpectedly, by the strength of the enemy's resistance.

I. The Landing at Salerno

The British component of Fifth Army was furnished by 10 Corps who landed on a three-brigade front a few miles south of Salerno. Medical organisation adopted, with certain modifications, the "Beach Group" system which had been employed to cover the landings at Sicily. To each of the brigades was attached a medical unit which was responsible for the immediate medical arrangements on the beach and, later, for the evacuation of casualties to a hospital ship or carrier. These units varied considerably in composition, and a comparison of their ability to carry out the functions assigned to them is readily available.

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(a) Medical Detachment of 35 Beach Group

This was a M.E. Medical Brick, consisting of a S.M.O. and four Medical Officers, including one I.M.S. Officer, one A.A.M.O. and one to form a Bn. R.A.P. It had two sanitary serjeants, 45 R.A.M.C. other ranks and 21 stretcher bearers. Its transport consisted of two ambulances and a D.R. The S.M.O. had a corporal clerk.

(b) Medical Detachment of 21 Beach Group

This was a North Africa Medical Brick and consisted of a Field Ambulance less one Company, with a F.S.U. attached.

(c) Medical Detachment of 3 Beach Group

This was a U.K. Medical Brick and consisted of a Field Dressing Station and F.S.U. attached.

The Medical Detachment of 35 Group was an unbalanced unit and was neither equipped nor able to carry out the duties assigned to it; it seemed remarkably limited in its ability to hold a reasonable number of patients. The Medical Detachment of 21 Beach Group was able to carry out all the duties required. Although a large and somewhat cumbersome unit for an assault landing, it proved its worth by holding a large number of Divisional sick - a duty which should normally have been carried out by the Divisional Field Ambulance. The Medical Detachment of 3 Beach Group proved, without doubt, to be the most suitable arrangement. Its units were small and compact and yet readily able to carry out all the duties required of them. The Light Section of the F.D.S. was landed early, formed a Beach Dressing Station, and was later incorporated into the Casualty Embarkation Point. The Heavy Section and F.S.U. were landed later and formed a Surgical Centre in a farmhouse with fair-sized holding capacity and facilities for operating in moderate comfort.

Evacuation of Casualties

The medical layout was as shown in ~~Appendix I.~~ Map 9. Evacuation was through all three Beach Groups. Casualties from the Rangers west of Salerno were evacuated daily by L.C.I., under 10 Corps arrangements, either to 10 Corps beaches or direct to hospital ships. No. 10 F.S.U. plus a corporal and four N.O.s opened 40 beds in a church in the Rangers' area.

The plan whereby a hospital ship or carrier arrived off the beaches each day was eminently satisfactory, and, with one or two exceptions, worked smoothly. But the difficulty experienced in obtaining intimation of the arrival of hospital ships

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either involved considerable delay in loading or compelled the S.M.O.s to maintain a large number of stretcher cases on the beaches without cover for long and unnecessary periods.

Very little evacuation by air was possible in the early stages since the Battipaglia airfields, being under enemy artillery fire, could not be used.

Transport of Lying Cases in the Early Stages

This was a serious problem. The beach exit was always blocked by vehicles which had just landed. One-way traffic was the rule and congestion inevitable. This necessitated all lying cases being hand-carried over considerable distances and threw an unbearable strain on the limited personnel of a F.D.S. The problem was partially solved by utilising P.s.O.W. as stretcher bearers, but the efficiency of the unit was impaired.

Naval Craft for Embarkation of Casualties

During these operations L.C.I.s were used almost exclusively; they were easily obtained from the Navy, gave a fast and smooth trip and were not affected by rough weather. They provided accommodation for a large number of sitting cases and for about 30 lying cases. The chief drawback was the difficulty of loading the lying cases and off-loading them on to the hospital ship; there was also no cover for the stretcher cases. L.C.T.s and "water ambulances" were on occasion used, but their value is rapidly nullified by a choppy sea.

Without doubt, the D.U.K.W.S. provided by far the best means of evacuation. They produced a smooth passage over rough roads and on the sea and proved the ideal method for the removal of serious cases from the M.D.S., which cases could then be transferred direct to the hospital ship by means of davits.

The Loading and Landing of Medical Units

The loading of Medical Units requires very careful planning. If it is necessary to divide a Medical Unit, it should be done in such a way that each portion is an entity in itself. With large units, such as general hospitals, the stores should always be accompanied, if possible, by their officers and personnel. At one stage in this campaign the staff of No. 59 Gen. Hosp. was complete, but without stores, and No. 65 Gen. Hosp. arrived with 200 tons of G.1098 stores, the Second-in-command and the Q.M., but without the remainder of the unit. There were thus the elements of two general hospitals, but neither was able to function.

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Battle Blocks

These proved adequate and satisfactory. It would have been better if some medical personnel, preferably the Port Medical Detachment, had arrived earlier to help in the checking and distribution of these stores.

Sick Incidence

There was at first no malaria and very little dysentery or diarrhoea. "A" F.D.S. was open for minor sick, P.U.O., diarrhoea, and some septic skin cases. No. 12 C.C.S. was also open for sick.

Battle Casualties

Details are not available. There was a high incidence of abdominal wounds. See Appendix V for figures of all casualty evacuations.

II. From Salerno to Naples

16.9.43 - 1.10.43

Very little information is available of operations as they affected the Medical Services during this period, but the main features of the advance and the Medical dispositions made may be followed in the sketch maps attached. The Germans in their withdrawal pivoted on their left flank on high ground north of Salerno, where strong opposition held up 10 Corps for some days. At Capezzano 201st Guards Bde. engaged in particularly heavy fighting. The advance continued but slowly owing to strong rearguard actions and extensive demolitions by the enemy. On the 17th the Montecorvine airfield was taken and on the 18th Battipaglia. On the 21st the capture of Montecorvine town and Campagna gave control of the Battipaglia plain. By the 23rd a strong thrust north of Salerno had brought the Allies in sight of the plain of Naples. (See ~~App. II~~ MAP 10). But it was not till the 29th that, with the fall of Nocera, enemy resistance finally slackened. Naples was entered on 1st October and occupied by American airborne troops on the 2nd. The city was by-passed by 10 Corps, who continued their advance to the River Volturne. On 6 Corps front mountainous country was a further obstacle to the advance.

One of the reasons for the German withdrawal from Salerno was, no doubt, the growing threat involved in the rapid advance of Eighth Army from the south, as described in the previous narrative. On 16th September troops of 5th Div. made contact with American patrols near Valle, and on the 19th reached Auletta, while on the same day the Canadians captured Potenza. A continuous Allied front was now established right across Italy.

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Evacuation

Evacuation by sea continued to run smoothly, British requirements remaining at one ship or one carrier per day.

Montecorvino airfield was now available and became the air evacuation terminal, but the number of cases evacuated was still small. The Light Section of "B" F.D.S. was located on the airfield.

Equipment and Medical Supplies

These were adequate. "A" F.D.S., located in Italian barracks where there was good covered accommodation, acted as a Corps Medical Dump as well as taking minor sick.

Hygiene

Malaria had now begun to appear, 18 cases being reported up to 25th September, and No. 78 A.M.C.U. undertook a survey of the Corps area. There was no increase in dysentery, but P.U.O. continued to be common. The cases did not conform clinically to either malaria or sandfly fever. Reports of cholera and typhus in Naples were not confirmed, but conditions in the city were undoubtedly bad, and in view of these an additional Field Hygiene Section was requested.

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PHASE II. NAPLES - VOLTURNO - GARIGLIANO

1.10.43 - 30.11.43

1. Medical Order of Battle and location statement will be found in Appendix VIII.

2. Physical Geography of the Country

During October 10 Corps occupied an area limited in the south by Salerno and northwards by the northern bank of the River Volturno. This region contained the plain of Vesuvius, its volcanic outlet still moderately active, the damaged city of Naples, and flat marshlands, unbroken by hills, limited to the west by the Mediterranean and to the east and north by an irregular mountain range.

The plain of Vesuvius consists mainly of dark lava ash and cinder, with a marginal fertile strip, well cultivated and inhabited, lying between the volcano and the sea. Only one large river, the Fiume Sarno, traverses this area, from east to west, originating in the hills north-east of Salerno. The immediate slopes of Vesuvius are bare, except to the north-west where some coniferous fir has survived or escaped recent laval eruptions. North of Naples the terrain is flat, well cultivated, well watered and thickly populated with small towns and hamlets. About midway between there is a large drainage canal, the Regi Lagni, running approximately east to west with many ramifications created to improve the drainage of marshy or meadow land inundated in winter. As a consequence of destruction of pumping machinery and viaducts by the retreating enemy, very large areas of flooding had occurred, especially in regions west of Villa Liturno, involving thousands of acres and hundreds of dwellings.

In November the Corps area extended to an indefinite line from east to west along the southern margins of the River Garigliano. This locality includes the large and important barrier, the River Volturno. North of the Volturno the low-lying lands diminish in size, and the terrain presents a countryside of undulating hills and steep ravines with rapidly flowing streams and well-wooded slopes. Extensive bridge and viaduct demolitions were in evidence.

3. Climatic Conditions

In October the climatic conditions were comfortable. Days were moderately warm and sunny, with a temperature ranging from 65° to 75°F. Nights were cool with temperature varying from 50° to 65° F. Rain fell on 13 days during the

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month, and was mainly very heavy with a sudden onset, lasting from a few minutes to several hours. Warm summy days were followed by heavy night dews.

In November rainfall varied in intensity, but was mostly very heavy and torrential in type, swamping the countryside and turning tented camps into seas of mud. Rain fell on 14 days during the month.

The average mean daily temperature during the month was 65°F., with a lowest temperature reading of 55°F. on the plains. Night temperatures averaged 55°F. with a minimum of 45°F. reached on 25th and 28th November.

4. Diseases Prevalent amongst the Civil Population

(i) Venereal Disease was rife among the whole civil population. Civil organisations to combat this menace were negligible, and in consequence wholesale infection of military personnel of all Allied forces took place. Although every village contribited its full complement, Naples returned approximately 68% of infections. From scrutiny of the returns submitted it would appear that three quarters of the cases reported as having been contracted in Naples were of gonococcal origin. Elsewhere sores and syphiloid conditions were about equal in number to those of the gonococcal groups.

(ii) Malaria. Definite data of the prevalence of this disease were difficult to obtain. Conflicting reports were rendered by various M.O.s even from the same locality. It is evident, however, that outside Naples and the contiguous towns the whole of the civil population was heavily infested, especially on the belt of marshland lying west of the road Naples - Capua.

(iii) Skin Diseases of every type were exceptionally prevalent among the rural population, especially among the younger people. The exact etiology is unknown, but this condition may well have been due to faulty nutrition or avitaminosis, conditions only to be expected among the rural population during time of war.

(iv) T.B.: The incidence of this disease, chiefly pulmonery, was high among the civil population, numbers of whom looked phthisical and under-nourished.

(v) Undulant Fever was not excessive and is considered a normal hazard of the rural and poorer classes of the civil population.

(vi) Diphtheria: This is essentially a disease of childhood among the civilians, and appears to have approximately the same incidence as in northern countries. Outside the large towns little or no immunisation had been introduced.

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(vii) Pediculosis: Louse infestation of the population was far in excess of what would be expected of a country so allegedly advanced in civilisation. Migration, destruction of homes, and overcrowding had undoubtedly produced factors friendly to large-scale reproductions of lice. 40 cases of typhus were reported as having occurred in Naples during November, but none in 10 Corps area.

5. Principal Diseases Affecting the Health of the Troops

(i) Venereal Disease incidence in the Corps during these months reached alarming proportions, rising from 0.4 per thousand for the week ending 2nd October to a maximum of 2.1 per thousand for the week ending 6th November, with a gradual decline to 1.57 per thousand for the week ending 27th November. Every precaution from M Branch was taken. Ample supplies of condoms and E.T. packages were made available in readily accessible places, P.A. Centres were established in towns and unit lines, and propaganda and lectures were dispensed. Ideal conditions for the dissemination of V.D. existed - a reasonably attractive womonhood driven to prostitution by poverty and hunger, and a bored soldier. Outside the large towns amenities and relaxations were few or non-existent. There was hardly any beer and no non-alcoholic drinks at all. Reading material was very restricted and hard to obtain.

Simple gonorrhoeas were treated in unit lines or in advanced medical formations. All other forms were admitted to the nearest V.D.T.C. or V.D. wing of a General Hospital. The number of cases of V.D. from 3rd October to 27th November was 837.

(ii) Infective Hepatitis: From 3rd October to 27th November 1071 cases were notified. These were of varying severity and occurred in widely spread units and formations on the Corps axis. No common etiological findings were apparent. The highest incidence was returned by 46th Div. This may be explained by the fact that most of 56th Div. and Corps Troops had been mounted from the Middle East, where this disease had been predominant during the previous four years. It is possible that through constant association with these conditions 56th Div. and Corps Troops had been salted by previous minor infections.

(iii) Malaria: 385 cases of B.T., 185 of M.T., 1298 of Clinical, one of Q., and 95 relapses of all types were reported for the period 3rd October to 27th November inclusive. A decline in the ratio per thousand from 14 for the week ending

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2nd October to 0.95 for the week ending 27th November occurred. The whole area occupied by 10 Corps during this period had been designated as highly malarious, but operational necessity demanded that the Corps should remain therein. Restricted anti-malarial control could be carried out with the limited resources available.

When bed accommodation was available, the malaria cases were treated in Medical Units within the formation. In the early stages, on account of the numbers involved, this was seldom possible, and cases had to be admitted to Base Installations in Italy, Sicily and North Africa.

(iv) Diphtheria: Cases of diphtheria were continually being notified throughout the Formation. These were sporadic and scattered in distribution, indicating the presence of a considerable number of healthy carriers. No local epidemic was encountered, which made the disease more difficult to control and eradicate. The comparative incidence of diphtheria was much lower among the American troops of Fifth Army than among the British troops of 10 Corps. It was stated that no protective immunisation had been carried out in the American Army to account for this difference. It is probable that through the greater protective immunisation carried out in infancy and early childhood in the U.S.A. as compared with the U.K. a relative permanent immunity had been established.

(v) Immersion Foot. In November about 30 cases were reported to have occurred amongst forward troops. Histories obtained were very similar - the men had spent from three to six days in exposed positions on mountain sides, under constant enemy observation and hostile action, unable to light fires or to take off boots and change socks, and all the time subjected to torrential rain. These cases were all reported to be mild, with hospitalisation periods rarely extending to six weeks.

(vi) Inoculation. The whole Force was approximately 94% protected against smallpox, and had been inoculated with T.T. and T.A.B.

6. Wastage

See Appendix VI.

7. Medical Equipment

At no time was there an acute shortage.

In November the Corps began to try out the use of two-tier bunks for C.C.S.s and F.D.S.s. They were of light wood, readily taken to pieces and easily transportable,

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and it was thought that they would serve a useful purpose in the nursing of minor sick and minor surgical injuries. Trestles, both wooden and metal, for placing under stretchers instead of petrol tins, ammunition boxes, etc., were also on trial.

7. Rations

Except for the absence of fresh or chilled meat rations were satisfactory. The meat issue consisted of preserved meat and occasionally meat-and-vegetables. Two or three issues of dehydrated mutton were made. Bulk issues were general, although forward troops in the line were issued with Compo rations. Bread was excellent in quality and quantity. All personnel were able to augment their rations with apples, oranges, passion fruit, tomatoes and nuts of all varieties. Cabbages, broccoli, cauliflower, spinach, onions and carrots were very plentiful, and could be bought at a reasonable price.

During November Divisional troops operating at a high altitude received an addition to the normal scale.

9. Clothing

As a part of passive anti-malarial precautions it was recommended that the wearing of khaki drill shorts should be completely banned. Despite repeated warnings the general attitude of the average soldier was one of indifference towards the protective covering of exposed parts of the body, and he was frequently to be found dressed in shorts and shirt, with sleeves rolled up, after dark.

Battledress was found satisfactory. In selected cases it was recommended that long under-pants should be made available in place of shorts.

10. Sanitary Conditions

In the early phase following the occupation of Naples sanitation in the city was primitive. Before his hurried departure the German had succeeded in demolishing most of the aqueducts and main water channels feeding the city. Moreover, innumerable breaches were made in the underground sewage system with delayed action mines and bombs. It was then feared that an epidemic of typhoid or associated excremental diseases was imminent. Fortunately, this never occurred, and afterwards water-supply plants and the sewage system were expeditiously repaired.

In the rural zones no sound sanitation existed. The whole coutryside was highly fertilized with natural manure, human, bovine, etc., making ideal conditions for an undue incidence of gas gangrene; only a few cases of this were recorded.

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Most units, where possible, established billets in villages, farms, etc., into which by dint of labour, scavenging and control, a fair degree of sanitation was gradually introduced.

11. Conservancy Arrangements

For static and semi-static units in the Field the deep trench latrine system was installed. Mobile formations and units used the deep bore or shallow trench latrines, thus, where transportation, was limited, obviating the necessity for carrying large numbers of 4- and 6-seater superstructures at every movement.

Very few units encountered a piped water supply. Most Formations were supplied by water-trucks and trailers either issued or improvised. Thus, with only limited supplies available, very little water was wasted and disposal of sullage water offered little or no problem. Swill and cookhouse leavings were appreciated by the local inhabitants.

12. Water Supplies

During the period sources of water supply were many and varied. Where possible, fast-flowing streams, of which there are many in this country, were used, although at times deep wells were pressed into service. There was never any shortage of water at any phase of the campaign.

All waters were considered contaminated, whether tested or not, and instructions were issued accordingly. Official Water Points were established at recognised places. Filtration was carried out by means of "autominors", and the output chlorinated at the site. In congested areas with limited facilities, such as storage tanks, bulk water-supplies were filtered, with strict instructions that the contents of the truck or trailer must be treated with so many scoopsful of W.S.P. before departure. This duty was usually carried out by field hygiene section personnel to ensure that the instructions were complied with. Water supplies to smaller Formations, in 2- and 4-gallon containers, were filtered and sterilised before issue.

The work at times for the R.E. was arduous, especially after very heavy rains when the rivers or streams had become excessively turbid. Plants rapidly became clogged with mud and silt, necessitating very frequent dismantling and reassembling.

13. Operations

The period under review is readily divisible into three phases:

(a) The advance to the River Volturno.

(b) The crossing of the River Volturno.

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(c) The advance to the River Garigliano.

(a) After the fall of Naples 7th Armd. Div. continued the advance in the centre directed at Aversa, with 56th Div. on the right and 46th Div. on the left, on the general line Caserta - Aversa - Qualiano. Acerra fell to 56th Div. on 3rd October, and the outskirts of Caserta were reached on the 5th. The movements of 7th Armd. Div. were considerably hampered by demolitions. The Corps, nevertheless, forged slowly ahead, and by 9th October the general line of the Volturno was reached. (See ~~App. III~~ MAP 11.).

(b) The crossing of the river was carried out from right to left by 56th Div. at Capua, 7th Armd. Div. at Grazzanise and 46th Div. at Cancello. 46th Div. was repeatedly counter-attacked, but held the bridge-head established. The initial attempt to cross at Capua by 56th Div. was frustrated, but by 16th October the Division was across further to the east at Triflisco and pressed northwards with 201st Guards Bde. in the van. Monte Grande was captured on the 17th.

7th Armd. Div. was withdrawn from the central sector on 26th October and moved to the left, 46th Div. taking over the area vacated, a change no doubt due to the more favourable country for armour in this sector and to the operational necessity for a two-Divisional drive through the defile following the road Capua - Francolise, through Cascano, and the road Capua - Teano. The enemy, pressed all along the front, was falling back on his "Barbara Line" (Mondragone - Cascano - Furnolo and Monte S. Angelo). (See ~~App. IV~~ MAP 12).

(c) Our advance towards the Garigliano was maintained in the south by 7th Armd. Div., and extensive patrolling revealed no enemy position south of the river. To the north the enemy held on to Calabritto. 56th Div. were preparing to attack Monte Camino. In November the real fighting was continued by 56th Div., while active and offensive patrolling up to the Garigliano was maintained by 7th Armd. Div. and 46th Div. Here certain features were taken, lost and re-taken, namely Coccaruzzo, Calabritto, Monte Camino, Mieli and Monastery Hill.

By the middle of November 7th Armd. Div. was withdrawn from the line and passed under command A.F.H.Q. Adv. Adm. Ech., their sector being taken over by 46th Div., side-stepping to the left, with 23rd Armd. Bde. passing from command 56th Div. to 46th Div. The withdrawal and the handing over were satisfactorily completed by 14th November.

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46th and 56th Divs. had now been fighting continuously since 9th September, and on 5th November 46th Div. was more or less pulled out to rest, one brigade remaining in the line patrolling down to the river, and handed over a portion of their sector to 23rd Armd. Bde.

56th Div. were withdrawn from the Monte Camino area on 15th November after suffering many casualties in heavy fighting.

The position of the Corps at the end of November was on the general line of the Garigliano, falling back in the north and north-east, with the Monte Camino and Monte Maggiore massifs guarding the highway to Rome and dominating the surrounding country towards the Cassino plain.

168th Bde. (56th Div.) joined the Corps in mid October, and 7th Armd. Div. was withdrawn into reserve, preparatory to returning to the U.K., on 14th November.

There is nothing of special note to record as affecting the Medical Services before the crossing of the Volturno.

Ambulance transport throughout gave rise to no difficulties, and was ample. The vehicles stood up to the stresses and strains imposed by the machinations of an enemy who was a past-master at all engineer demolition work, leaving nothing of value and destroying everything likely to assist our advance. Large trees were not felled - nothing so old-fashioned - instead, they were tied round with explosives and later touched off. Smaller trees were frequently fixed up with booby traps.

Casualties throughout were successfully evacuated, and the work of the field ambulance stretcher bearers and ambulance drivers was excellent. The total number of casualties passing through Divisional and Corps Medical Installations, together with sick casualties for the period, is recorded in Appendix VI.

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PHASE III. THE ADVANCE TO THE GUSTAV LINE

1.12.43 - 31.3.44

1. Medical Orders of Battle and location statements will be found in Appendices IX and X.

2. Physical Geography of the Country

During the period under review the Corps remained between the River Volturno and the mountain basin west of the Garigliano in the southern sector, and the Rapido River in the northern sector. The soil of the Garigliano is mostly heavy clay, causing during heavy rainfall very muddy conditions which clear rapidly during the intermittent spells of fine weather. On the high ground the same muddy conditions were experienced, except on the rocky outcrops of the steeper slopes.

3. Climatic Conditions

During December rain fell intermittently on nineteen days. The old year ended with torrential rain and a hurricane which demolished or flattened many tented camps.

In the plains the mean day temperature was 58°F; night temperatures fluctuated between 27°F. and 45°F.

In February and March heavy rain fell on ten and sixteen days respectively. Many camps were flooded in February. Day temperatures fluctuated rather more. The maximum figure registered was 70°F., but nights were very cold - 32° to 45°F.

4. Diseases prevalent among the Civil Population

There is little to add to the comments already made on this subject.

Louse infestation continued to be excessive. During the period 40 cases of typhus were reported as having occurred in 10 Corps area. In January the Naples epidemic increased out of all proportion. Active steps were taken by Military authorities in conjunction with A.M.G. Public Health authorities. Continuous dusting with D.D.T. on an unprecedented scale produced its effect after two months, and by the end of March the number of cases was reduced to a negligible figure.

5. Diseases Affecting the Troops

(a) Venereal Disease. This presented the outstanding problem not only in the Corps, but in all other Formations in this theatre of operations.

All measures to combat the incidence of these diseases were taken. Hospitals for infected women, taken there on suspicion when accused by a man, were set up in the larger towns and areas under A.M.G. Treatment was enforced.

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Active propaganda by posters and by frequent showing of V.D. films were carried out.

Naples was placed out of bounds on account of the prevalence both of typhus and of V.D. This act contributed more to the reduction of the incidence than any other single factor.

The figures of notified cases occurring in the Corps are reproduced below:

	Gon.	Syph.	Chancroid	Other Forms	Average Strength
Dec.	177	15	1	367	64703
Jan.	133	8	1	386	78696
Feb.	58	5	1	293	75507
March	30	1	1	81	57230

(b) Infective Hepatitis. The incidence of this disease shows a considerable reduction compared with the previous period, but it remained a factor in man-power wastage. Little could be done by preventive medicine to reduce the prevalence.

		Average Strength
Dec.	576 cases of Infective Hepatitis	64703
Jan.	550 " " " "	78696
Feb.	263 " " " "	75507
March	86 " " " "	57230

(c) Malaria. The incidence was low in the early part of the year, gradually increasing throughout the period.

This rise was expected, since B.T. infections dating from the end of the last malarial season begin to appear in the following spring. Some of these infections could be traced to hibernating mosquitoes, but most were due to relapses after cessation of suppressive mepacrine.

		Average Strength
Jan.	85 primary cases notified	78696
Feb.	106 " " "	75507
March	150 " " "	57230

Throughout the period field hygiene sections were employed, among their other duties, in adult mosquito destruction, smoking out and spraying civilian houses and billets.

In March anti-malarial courses were undertaken by the Corps Field Hygiene Section in preparation for the coming season. 317 Officers, N.C.O.s and other ranks were trained in the duties of units squads.

No breeding of anopheles was discovered in the Corps area.

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(d) Immersion Foot. 50 cases were reported in December. The U.S.A. troops suffered a much higher incidence.

Most cases were mild. The causative factors were: exposure in sangars or redoubts in the mountains for periods of from three to eight days without relief; continuous rain, and faliure to take off boots and change socks.

In January 22 cases occurred; in February 48; in March 61.

Enforcement of rigid foot discipline and the provision of extra socks reduced the incidence.

6. Wastage

See Appendix VII.

7. Medical Equipment

The standard of quality and supply of Medical equipment was high throughout the period, including the supply of blood and plasma. The Mobile Section of No. 10 Adv. Dep. Med. Stores was able to work well forward of the Depot, and provided a quick supply of the common expendible items, as well as saving units a long journey to collect their routine indents.

There was never an acute shortage of blankets and stretchers, although supplies were extended to their utmost owing to the necessity for large dumps on the line of evacuation from the mountains.

Metal trestles to raise stretchers 18 inches off the ground were constructed by 10 Corps R.E.M.E., and proved excellent for the use of C.C.S.s and field ambulances holding short term sick. Additional leg-cradles and back-rests (particularly for head and chest wounds) were also made by the R.E.M.E. and supplied to C.C.S.s.

Red Cross supplies became more abundant towards the end of the period, when units were well stocked. The supply of wireless sets was difficult at first owing to the shortage of battery sets. By the end of the period all Medical units under command 10 Corps possessed at least one Red Cross battery set.

Mules were used for transportation of sick and battle basualties, and the general opinion in forward Medical Units was that cacolets were useful for sick and minor wounded, but that the use of litters was neither practical nor safe.

Plasma was held by all units up to and including R.A.P.s, and F.T.U.s held blood which was sent up to A.D.S.s as required. It was again obvious that if resuscitation is started forward, the patient must not be allowed to relapse before reaching a surgeon, as "re-resuscitation" is extremely difficult. Various forms

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of stand for holding bottles on stretchers were devised and continuous transfusion was carried out in ambulance cars in transit.

The Neil Robertson stretcher was not found satisfactory for mountain warfare, as it is an awkward stretcher to carry, being designed for use with a crane or for lowering down the side of vertical objects, such as a ship or building. Some of these stretchers were badly made, the splicing in the ropes giving way.

8. Rations and Medical Comforts

The Corps was on Field Service Ration Scale, with minor exceptions, throughout the period. Fresh commodities, such as frozen or chilled meat, fresh vegetables and fruit, either imported or purchased locally, supplemented the normal scale.

Some forward units on Monte Camino were fed on a "10-Man Pack" for a short spell, with an augmented breakfast ration.

Medical comforts were in good supply and were greatly appreciated. D.D.S.T. co-operated whole-heartedly, and chickens, eggs, and fish were provided whenever possible.

9. Clothing

All troops were clothed to normal winter scale. In certain areas on the Corps front Divisions had to be fitted out with leather jerkins and extra woollen clothing.

10. Sanitation

(a) Civil. In the earlier days of the period large numbers of civilians returned to their former homes to live under most insanitary conditions. Extensive damage to buildings, which occurred during operations, led to much overcrowding with its attendant dangers. Louse infestation soon became prevalent, and the inevitable cases of typhus followed. These were dealt with under A.M.G. arrangements - field hygiene sections co-operating in disinfestation as far as their commitments would permit.

(b) Military. During inclement weather considerable numbers of troops were accommodated in billets, an arrangement which was admirable from the point of view of comfort, but tending to produce overcrowding owing to the scarcity of suitable buildings. Despite this, louse infestation never reached serious proportions among troops, and was at all times under control, adequate bathing and disinfestation facilities being available. In this connection much use was made of personnel of A.M.C.U.s, who were utilised to form anti-typhus squads, the necessary training being carried out by field hygiene sections.

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Close supervision of all military water points was maintained, all sources being periodically checked and notices erected indicating the amounts of sterilising agent required.

Hygiene personnel co-operated with Town Majors in the inspection of local cafes and barber's shops, unsatisfactory premises being placed out of bounds to troops.

11. Conservancy

Deep trench latrines were generally used, even for billets where the existing facilities were either defective or insufficient to serve the increased demands. Large numbers of latrine superstructures were provided by field hygiene sections in order to avoid the nuisance likely to result from blockage of the water-carriage system.

Disposal of cookhouse refuse was generally satisfactory, burning and subsequent burial being the method employed.

12. Water Supplies

The existence of official R.E. Water Points established throughout the Corps area maintained an adequate water supply. The largest point was installed at Sessa, where the storage tanks were fed by gravity from reservoirs in the mountains. On the northern bank of the Garigliano some wells and springs were used, the water being boiled for consumption. Several cases of slight diarrhoea were reported, presumably due to the sulphurous content of one of these water points. One point in the vicinity of Minturno could be used only after dusk on account of enemy shelling. Water-duty personnel of field hygiene sections continued to exercise supervision over all these points.

A matter of interest arose in the establishment of water points at Suja during January. Wells were found to be unsuitable owing to depth and insufficient yield. The only other source was spring-water which was warm and highly sulphurous. In consequence the Horrocks test could not be used but, after boiling, the water was found to be perfectly suitable for making tea, though unpalatable when drunk alone. German prisoners confirmed these findings.

No epidemics of water-borne diseases occurred in the Corps. The water discipline was good.

13. Operations

Operations can be divided into two phases:

(i) those that took place before the crossing of the River Garigliano, and

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(ii) The actual crossing and subsequent consolidation of the bridgehead over the River Garigliano.

(i) The first phase opened with a major attack to capture the Monte Cassino massif which dominates the surrounding country and obstructed our advance northwards.

The attack made by 56th Div. on the right, supported by 46th Div. on the left, was successful after a hard-fought battle. Later 46th Div. exchanged with 56th Div. and pressed onwards towards the Liri valley, while 56th Div. held the coastal sector. By the beginning of January after steady progress by 46th Div. the ground was cleared for the crossing of the Garigliano. At this stage 5th Div. came under command 10 Corps to assist in the crossing and take over the coastal sector from 56th Div., which moved to the centre, with 46th Div. on the right flank.

(ii) The operation of crossing the Garigliano was timed to take place shortly before the landing at Anzio, some 35 miles to the south of Rome in the enemy's rear. The operation was begun on the 18th January and was successful in securing a narrow bridgehead over the Garigliano, with 5th Div. capturing Minturno on the left, and 56th Div. the approach to Castelforte in the centre.

The operation at Anzio began a few days later and achieved surprise, but was not successful in cutting off the enemy's supply lines to forces engaged on the Garigliano. As a result, the expected enemy withdrawal from the Garigliano sector did not take place. In the first week of February the 1st Guards Bde. arrived under command 10 Corps and was allotted a role with 46th Div.

During February and March considerable changes took place on the Corps front as follows:-

(a) 56th Div. was withdrawn in the second week of February for Anzio, leaving 5th Div. to take over its sector.

(b) At the beginning of March 4th Div. arrived to relieve 46th Div. who, having been continuously committed over a long period, were withdrawn to Middle East for rest and refit.

(c) Later, 88th (U.S.) Div. arrived to release 5th Div. for Anzio.

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(d) Finally, towards the end of March, the 4th D.M.M. (a French Division) relieved 4th Div., who moved under command 13 Corps.

The enemy having been forced to retire over the Garigliano to his defensive positions on the Gustav line, no further major operation was undertaken during this period, at the end of which 10 Corps was preparing to withdraw from operations for rest and training, pending a new role with Eighth Army.

The operation which presented the greatest difficulty from the medical point of view, was the attack on Monte Cassino massif. Here all the difficulties of mountain warfare were experienced and added to by the long carriage made necessary by the selection of roads hidden from enemy observation, amounting in some cases to a 12-hour carry. This great strain was admirably borne by the R.A.M.C. personnel, who required the assistance of every available man and porter not needed for the actual fighting.

The crossing of the Garigliano presented no probeems other than those encountered in previous river crossings. The lessons learned in the crossing of the Volturno were successfully applied and, though the crossing was strongly opposed, Medical arrangements ran smoothly.

Psychiatric Work in 10 Corps

See Report in Appendix XI.

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APPENDIX V

CASUALTIES - EVACUATIONS

September, 1943

Date	3 F.D.S.	21 Beach Gp.	35 Beach Gp.	Total	Ship
9	60 (57)		245	305 (301)	St. David
10	50 (67)	167 incl. P.W.4 Colonial 4	-	217 (234)	St. Julian
11	28 (73)	217 incl. P.W.2	230	375 (420)	Somersetshire
12	40	43 incl. P.W.2 U.S.2	-	223	Tairea
13	30 (in 2 by air)	45 incl. U.S.4	?	289	Tairea
14	24	45 incl. U.S.4	?	248	Oxfordshire
15	9	62 incl. U.S.4		188 incl. U.S.4. Col. 1.	St. Julian
16	Nil	10		200 Breakdown Sick Bt.27 US.1 Wounded Bt.155 US.1 PW 16 200	St. Julian Incl. 10 by air.
17	-	No Ship	-	-	-
18	Awaiting Evacuation		Wounded	BT.282 US. 13 Col. 1 PW. 8	
			Sick	Bt.115 US. 1 Col. 2	

Figures in brackets are those reported by D.D.M.S. 10 Corps where they differ from those obtained direct from units.

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1.10.43 - 30.11.43

WASTAGE

Total Admissions, all causes		15,132
October	8,489	
November	6,643	
		15,132

CLASSIFICATION OF BATTLE CASUALTIES

Type	Number	
Head and Neck	251	
Shoulder	113	
Chest	149	
Abdomen	112	
Limbs	914	
Multiple	321	
Blast Effects	83	
Unclassified	92	
Total		2,035

SICK

Diseases of the Alimentary System	1,689	
" " " Respiratory "	648	
" " " Nervous "	72	
" " " Skin	607	
Psychosis	4	
Psychoneurosis	392	
I.A.T.	1,810	
Injuries, Accidental	102	
" Self inflicted	15	
" Burns	159	
" Others	750	
Other Diseases	6,849	
Total		13,097

INFECTIOUS DISEASES

Diptheria	168	Pneumonia Pneumonococcal	6
Dermophytosis	137	Pediculosis, Capitis	8
Dysentery, Amoebic	3	" Corporis	38
" Bacillary	16	" Pubis	85
" Clinical	179	Scabies	141
Enteric Gp Clinical	1	Sandfly	1
Food poisoning	1	V.D. Gonorrhoea	290
Influenza	4	" Syphilis	33
Infective Hepatitis	1,071	" Chancroid	39
Jaundice, other causes	23	" Other Forms	475
Malaria, Primary, B.T.	385	Erysipelas	2
" " M.T.	185	Varicella	1
" " Q	1	Scarletina	1
" " Clin	1,298	Black Water Fever	1
" Relapse, B.T.	37	Rubella	1
" " M.T.	17	Parotitis	1
" " Q	2	Post Diphtheria Neuritis	1
" " Clin.	39	Polio Encephalitis	1
Meningitis Meningococcal	1	Anterior Poliomyelitis	5
Pneumonia, other causes	8	Chicken Pox	2

N.B. The average strength of the Corps during this period was 74,032.

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1.12.43 - 31.3.44

WASTAGE

Total Admissions, all causes:-	Brit. & Col.	U.S.
December	5,836	
January	11,420	
February	5,911	
March	2,773	853
TOTAL	25,940	853

CLASSIFICATION OF BATTLE CASUALTIES

Type	Brit. & Col.	U.S.
Head and Neck	949	
Trunk	862	
Limbs	2,541	
Miscellaneous	1,241	
TOTAL	5,593	177

CLASSIFICATION OF SICK

	Brit. & Col.	U.S.
Diseases of the Alimentary System	2,516	14
" " " Respiratory "	1,609	107
" " " Nervous "	148	-
" " " Skin	1,689	21
Psychosis	5	-
Psychoneurosis (Exhaustion)	1,316	36
I.A.T.	2,090	-
Injuries, Accidental	237	116
" Self-Inflicted	17	16
" Burns	223	1
" Others	1,358	129
Trench Foot	181	86
Other Diseases	8,969	150
TOTAL	20,347	676

INFECTIOUS DISEASES

	Brit. & Col.	U.S.
Diphtheria	239	5
Dermophytosis	55	-
Dysentery, Amoebic	1	-
" Protozoal	4	-
" Bacillary	34	-
" Clinical	184	13
Enteric Group	1	-
" " Typhoid	2	-
Influenza	10	3
Infective Hepatitis	1,469	7
Jaundice, Arsenical	5	-
" Other Causes	6	6
Malaria, Primary B.T.	271	-
" " M.T.	27	-
" " Q.	6	-
" " Clinical	4,011	-
" Relapse B.T.	281	4
" " M.T.	42	-
" " Q.	2	-
" " Clinical	125	-
Meningitis, Meningococcal	1	-
" Other Causes	1	-
Gas Gangrene	13	-
Helminthic Diseases	5	-
Pneomonia, Pneumococcal	2	4
" Other Causes	52	2
Pediculosis, Capitis	12	-
" Corporis	525	-
" Pubis	180	-
Scabies	596	1
V.D. Gonorrhoea	398	20
Syphilis	29	-
Chancroid	4	14
Other Forms	1,127	-
Erysipelas	1	-
Varicella	1	-
Rubella	1	-
Parotitis	4	-
Polio Encephalitis	1	-
Anterior Poliomyelitis	5	-
Anthrax	1	-
Scarlet Fever	2	1
Tuberculosis Pulmonary	1	-
Measles	1	-
Whooping Cough	1	-

N.B. The average strength of the Corps during this period was 69,034.

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APPENDIX VIII

MEDICAL ORDER OF BATTLE AND LOCATION STATEMENT

AS ON 25 OCT. 1943

Unit	Location	Remarks
21 Mob. C.C.S.	AVERSA	Moving S. MARIA 2275
14 Mob C.C.S.	AVERSA	-
8 Lt. C.C.S.	S. MARIA	
150 Lt. Fd. Amb.	AFRAGOLA	For duty at POMIGLIANO
'A' F.D.S.	S. MARIA	-
'B' F.D.S.	PARETE	Moving AVERSA 1764
52 Fd. Hyg. Sec.	AVERSA	10 Corps Fd. Hyg. Sec.
78 A.M.C.U.	AVERSA	10 Corps A.M.C.U.
3 F.S.U.	AVERSA	With 21 Mob CCS-moving S. MARIA
6 F.S.U.	-	u/c 7 Armd. Div.
9 F.S.U.	S. MARIA	with 8 Lt. C.C.S.
10 F.S.U.	PARETE	att B FDS - moving AVERSA
23 F.S.U.	S. MARIA	with 8 Lt. C.C.S.
24 F.S.U.	-	u/c 46 Div.
25 F.S.U.	S. MARIA	att A FDS - from 21 Beach Gp.
36 F.S.U.	PARETE	att B FDS - from 4 Beach Gp.
5 Gen. Surg. Team Det 2 US Aux Surg. Grp.	AVERSA	with 14 Mob. C.C.S.
25 Gen. Surg. Team Det. 2 US Aux Surg.	S. MARIA	with 8 Lt. C.C.S.
23 Gen. Surg. Team Det. 2 US Aux Surg. Gp.	AVERSA	with 14 Mob C.C.S.
1 F.T.U.	-	u/c 56 (L) Div.
12 F.T.U.	S. MARIA	with 8 Lt. C.C.S.
25 F.T.U.	AVERSA	with 14 Mob C.C.S.
132 M.D.U.	AVERSA	with 21 CCS-moving S. MARIA
135 M.D.U.	-	u/c 56 (L) Div.
140 M.D.U.	-	u/c 46 Div.
133 M.D.U.	AVERSA	with 21 CCS-moving S. MARIA
153 M.D.U.	NAPLES	for T/duty 57 Area
155 M.D.U.	S. MARIA	with 8 Lt. C.C.S.
25 MAC RASC	S. MARIA	-

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APPENDIX IX

10 CORPS MEDICAL ORDER OF BATTLE AND LOCATION STATEMENT

(as on 31 Dec. 1943)

Unit	Location	Remarks
21 Mob. C.C.S.	FRANCOLISE	With u/c 3 F.S.U.
8 Lt. C.C.S.	SPARANISE	With u/c 25 F.S.U.
14 Mob. C.C.S.	FRANCOLISE	With u/c 9 F.S.U. and 3 (Cdn.) F.S.U.
220 Fd. Amb. (less 'B' Coy)	PIZZONE	Corps Fd. Amb.
150 Lt. Fd. Amb.		23 Armd. Bde.
865 F.D.S.		With u/c 36 F.S.U., 23 F.S.U. and 12 F.T.U. (Adv. Surg. Centre)
866 F.D.S.	SPARANISE	Closed
52 Fd. Hyg. Sec.	SPARANISE	Corps Fd. Hyg. Sec.
78 A.M.C.U.	SPARANISE	Corps A.M.C.U.
3 F.S.U.	FRANCOLISE	Att 21 Mob. C.C.S.
9 F.S.U.	FRANCOLISE	Att 14 Mob. C.C.S.
25 F.S.U.	SPARANISE	Att 8 Lt. C.C.S.
36 F.S.U.		Att 865 F.D.S.
10 F.S.U.	SESSA	Att 140 Fd. Amb. (56 Div.)
23 F.S.U.		Att 865 F.D.S.
24 F.S.U.	SIPICCIANA	Att 185 Fd. Amb. (46 Div.)
3 (Cdn.) F.S.U.	FRANCOLISE	Att 14 Mob. C.C.S.
1 F.T.U.	FRANCOLISE	Att 21 Mod. C.C.S.
12 F.T.U.		Att 865 F.D.S.
25 F.T.U. (Blood Bank and Distribution)	FRANCOLISE	Att 14 Mob. C.C.S.
3 (Cdn.) F.T.U.	FRANCOLISE	Att 14 Mob. C.C.S.
1 Mob. Ophth Unit	FRANCOLISE	Att 14 Mob. C.C.S.
10 Corps Exhaustion Centre	FRANCOLISE	Att 14 Mob. C.C.S.
132 M.D.U.	PIZZONE	Att 220 Fd. Amb.
133 M.D.U.	S. MARIA	Att M.I. Room
135 M.D.U.	-	U/c 56 Div.
140 M.D.U.	-	U/c 46 Div.
153 M.D.U.	NAPLES	T/Duty 57 Area
155 M.D.U.	NOLA	T/Duty 57 Area
25 M.A.C., R.A.S.C.	SPARANISE	

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APPENDIX X

10 CORPS MEDICAL ORDER OF BATTLE AND LOCATION STATEMENT

(as on 18 Mar. 1944)

UNIT	LOCATION	REMARKS
21 Mob. C.C.S.	FRANCOLISE (closed)	With u/c 3 F.S.U.
8 Lt. C.C.S.	SESSA	With u/c 30 & 24 F.S.Us. & 25 F.T.U. (Adv. Surg. Centre)
14 M.O.B. C.C.S.	FRANCOLISE	With u/c 5 & 9 F.S.Us., 33 F.T.U., 1 Mob. Ophth Unit, Corps Exhaustion Centre.
220 Fd. Amb.	SPARANISE	Corps Fd. Amb.
865 F.D.S.	-	-
866 F.D.S.	SPARANISE	-
52 Fd. Hyg. Sec.	-	Corps Hyg Sec.
78 A.M.C.U.	-	Corps A.M.C.U.
3 F.S.U.	FRANCOLISE	Att 21 Mob. C.C.S.
5 F.S.U.	FRANCOLISE	Att 14 Mob. C.C.S.
9 F.S.U.	FRANCOLISE	Att 14 Mob. C.C.S.
24 F.S.U.	SESSA	Att 8 Lt. C.C.S.
30 F.S.U.	SESSA	Att 8 Lt. C.C.S.
25 F.T.U.	SESSA	Att 8 Lt. C.C.S.
33 F.T.U.	FRANCOLISE	Att 14 Mob. C.C.S.
1 Mob. Ophth. Unit	FRANCOLISE	Att 14 Mob. C.C.S.
10 Corps Exhaustion Centre	FRANCOLISE	Att 14 Mob. C.C.S.
132 M.D.U.	-	Att 220 Fd. Amb.
133 M.D.U.	-	Att 4 Division
140 M.D.U.	-	Att 4 Division
152 M.D.U.	FRANCOLISE	Att 21 Mob. C.C.S.
161 M.D.U.	CAPUA	Att M.I. Room
25 M.A.C. (R.A.S.C.)	-	-
485 (A.F.S.) A.C.C.	SPARANISE	-

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APPENDIX XI

Psychiatric Work in 10 Corps

Report for period 1st December, 1943 to 31st March, 1944

Part I. Organization

During the period the Corps Psychiatrist and his ad hoc unit, the Corps Exhaustion Centre, were located as follows:-

1st Dec. to 25th March with 14 CCS at Francolise
26th to 31st March with 865 FDS near Sparanise - closed.

Experience tended to confirm the view that the most forward CCS on the main line of evacuation offered, in most circumstances, the best location.

The period covered two battles which produced psychiatric casualties in large numbers, the second battle for Monte Camino, early in December, 1943 and the Garigliano Battle, 18-25th January, 1944. On the latter occasion 480 cases were handled in eight days. A special report was submitted on the organisational problems involved.

Additional mental nursing orderlies were received in December and a Medical Officer with some Psychiatric experience, in February. Establishment proposals were submitted in January with the object of placing the Unit on a firmer basis.

The opening of a Psychiatric Wing at 2 General Hospital and of a Psychiatric Rehabilitation Centre at 198 Transit Camp completed the chain of psychiatric evacuation.

With the publication of GRO 613 of 1943 the function of finding the most suitable employment for downgraded psychiatric casualties was taken over by a team sent out by the Department of Selection of Personnel.

Equipment

Store tents were replaced by hospital extending marquees. Two-tier bunks were introduced and found useful.

Part 2. Clinical

In accordance with instructions received from the Adviser in Psychiatry AFHQ, cases were classified as ACTION CASES - evacuated from or immediately after battle, NON-ACTION CASES - referred in interim periods, including all out-patients and usually involving chronic problems of military unsuitability.

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Summary of Cases by Diagnosis

	Neurosis	M.D.	Psychosis	Non-psychiatric conditions	Total
Action Cases	1344	5	2	68	1419
Non-Action Cases	243	2	3	1	249

Summary of Cases by Disposal

	RTU	Change of Emplyt. Without Red. in Cat.	With Red. In Cat.	Psychiatric Wing or Rehab. Centre	Med. Surg.	Total
Action Cases	416	16	15	906	66	1419
Percentage	30%	1%	1%	63%	5%	100%
Non-Action Cases	29	15	49	155	1	249
Percentage	12%	6%	21%	61%	-	100%

N.B. Introduction of the Personnel Selection Scheme for psychiatric casualties in December, 1943 meant that men who would formerly have been recommended for change of employment by the Corps Psychiatrist were now sent back to the Psychiatric Wing or Rehabilitation Centre for assessment by the Personnel Selection Team.

Among the 1344 cases classified as "ACTION CASES" - NEUROSIS" there were 110 which could be justifiably described as purely exhaustive in origin and character. The majority were acute or subchronic anxiety states of mild or moderate severity. Mild acute anxiety states occurring in men of good personality and morale with no previous history or breakdown offered the best prognosis.

(Sgd.) H. D. HUNTER

Major RAMC
Psychiatrist 10 Corps.

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The Attack on the Gustav and Hitler Lines

1.4.44 - 30.6.44

The static situation which followed the capture of Ortona lasted until the commencement of Operation "Honker" on 11th May, 1944. There is therefore very little of interest to report from the Medical aspect concerning the tactical situation during the opening weeks of the period under review. During these weeks Eighth Army was in process of re-grouping and training. Medical conferences were held to decide on the Medical Plan for the forthcoming Operation.

The Medical Plan and arrangements are given in the narrative which follows.

A map showing progress of Eighth Army during the whole period 3.9.43 - 30.6.44 is given at ~~Appendix V~~ MAP 17.

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THE ATTACK ON THE GUSTAV AND HITLER LINES

(OPERATION "HONKER")

1. Constitution of Eighth Army

Before the start of the offensive with the Battle of Cassino on 11th May, 1944, Eighth Army was constituted as follows:-

(a) 13 Corps consisting of 6th Armd. Div.
4th Inf. Div.
78th Inf. Div.
8th Ind. Inf. Div.
6th Army Group R.A.
1st Cdn. Army Group R.G.A.

(b) 2 Polish Corps consisting of 3rd Carpathian Inf. Div.
5th Kresowa Inf. Div.
2nd Polish Armd. Bde.
Polish Army Group P.A.

(c) 10 Corps. consisting of 2nd N.Z. Inf. Div.
24th Guards Bde.
Corps Italiano Liberazione
2nd Army Group R.A.
Hermon Force

(d) 1 Cdn. Corps. consisting of 5th Cdn. Armd. Div.
1st Cdn. Inf. Div.
25th Tank Bde.

Field Medical Units available are shown in the account of Medical arrangements.

2. Plan

The Army Commander's plan was briefly as follows:-

To isolate Cassino, to attack and break through the Gustav line and to advance as rapidly as possible with the purpose of making a breach in the Adolph Hitler Line so as to join up with the troops in the Anzio bridgehead for the advance on Rome.

Fifth Army to attack simultaneously and capture the heights south of the Liri river and to push on in a north-westerly direction to outflank the Hitler Line from a southerly direction.

3. Eighth Army Medical Arrangements

A. 13 Corps

C.C.S.s available:

(i)	2 Ind. C.C.S.	Vairano Group
(ii)	7 C.C.S.	
(iii)	19 C.C.S.	Presenzano Group
(iv)	1 N.Z. C.C.S.	

Each of the above C.C.S.s to have three complete surgical teams (including their own surgeons) attached, and each one F.T.U. attached.

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Method of Evacuation of Casualties

(a) To M.D.S.s - under Divisional arrangements.

(b) From M.D.S.s as follows:

British battle casualties to 19 C.C.S. and 7 C.C.S.

Indian battle casualties to 2 Indian C.C.S.

Exhaustion cases to Exhaustion Centre at Corps Fd. Amb.

Sick (both British and Indian) to field ambulances established under arrangements of Corps.

Note: 1 N.Z. C.C.S. to assist with battle casualties if required.

(c) Corps ambulance cars available for evacuation:

3 plns 485 (A.F.S.) A.C.C. - 90

18 M.A.S. (Indian) - 25

115 cars

Army Responsibility

From the above C.C.S.s to 3 District Control Post at Capua by 88 M.A.C. (two plns) and 146 M.A.C. (one sec.) under arrangements made by A.D.M.S. 55 Area.

Note: At Capua Control Post cases to be unloaded from Army ambulance cars, sorted out according to the type of battle casualty, and transferred as soon as possible to the particular hospital in Naples area associated with the particular kind of casualty.

This Control Post and the evacuation therefrom to be under control of D.D.M.S. 3 District.

For the initial stages of the battle, the policy to be the evacuation of battle casualties from advanced positions as soon as possible to the M.D.S.s, two of which were to be established at Mignano. Cases to be resuscitated here, if considered necessary, and F.T.U. to be attached for this purpose, but owing to the importance of getting casualties to the surgeons at the C.C.S.s as quickly as possible most of the cases, after a short examination in the ambulance cars at the M.D.S.s, to be sent straight through to the C.C.S.s. This would not be difficult in the case of 13 Corps as the only route of evacuation was along the main Cassino road, and once the cases were at the A.D.S.s the time involved in getting them to the C.C.S.s would be an average of about two hours.

Two main principles to be adhered to throughout the battle;

(i) Rapid evacuation of all cases to the Base Hospitals.

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(ii) Only "life-and-limb-saving" operations to be undertaken by the surgeons in forward areas, which included the C.C.S.s.

B. Polish Corps

Medical Units available:

3 Pol. C.C.S.	In vicinity of Venafro
5 Pol. C.C.S.	
6 Pol. Gen. Hosp. (200-beds)	

Seven Pol. F.S.U.s, including the surgeons of C.C.S.s and the General Hospital, and one British F.S.U.

Two F.T.U.s attached to Medical Units.

Method of Evacuation of Casualties

(a) To M.D.S.s under Divisional arrangements.

(b) From forward M.D.S.s as follows:-

Battle Casualties to the above C.C.S.s in Corps ambulance cars.

Exhaustion and Sick cases to Pol. Corps Fd. Amb. in area Venafro.

(c) Corps ambulance cars available:

29 Pol. M.A.C. (Two sec.s) -	50
567 (A.F.S.) A.C.C. (one pln.)-	30
	80

Army Responsibility

From this group of C.C.S.s to Campobasso, via Isernia and Bojano (cases to be staged if necessary), by 29 Pol. M.A.C. (one sec.) and 567 (A.F.S.) A.C.C. (one pln) under arrangements made by A.D.M.S. 86 Area.

The 600-bed Pol. Gen. Hosp. at Campobasso to be raised to 800 beds, and a division (1,000 beds) of Pol. Conv. Depot to be established.

Further evacuation from Campobasso to be undertaken by ambulance cars under the arrangements of D.D.M.S. 3 District to Termoli on the east coast, where hospital rail coaches would convey the cases to the Polish Base at Taranto.

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C. 10 Corps

Medical Units available:

(i) 15 C.C.S. at Mecchia with three surgical teams and one F.T.U.

(ii) 1 N.Z. C.C.S. at Presenzano with three surgical teams and one F.T.U.

(iii) Two F.D.S.s.

(iv) One extra F.T.U. with 6 N.Z. Fd. Amb. for forward co-ordination of blood supply and resuscitation duties.

Method of Evacuation of Casualties

(a) To M.D.S.s under Divisional arrangements.

(b) From M.D.S.s as follows:

N.Z. cases to 1 N.Z. C.C.S.

Others to 15 C.C.S. in Corps ambulance cars.

For troops on eastern end of line, through evacuation routes of 5 Corps.

(c) Corps ambulance cars available for evacuation:

N.Z. M.A.C.	-	25 cars
25 M.A.C.	-	75 cars
567 (A.F.S.) A.C.C. (one pln)	-	30 cars
	Total:	130

25 M.A.C. to help 86 Area if necessary with one platoon.

Army Responsibility

From 1 N.Z. C.C.S. to Capua by 88 M.A.C. under arrangements of 55 Area.

From 15 C.C.S. by cars of 25 M.A.C. (10 Corps) to Capua Control Post.

D. 1 Cdn. Corps

Medical Units available:

(i) 4 Cdn. C.C.S.

(ii) 5 Cdn. C.C.S.

(iii) 3 Cdn. Gen. Hosp. (200 beds)

(iv) Six F.D.S.s (three Divisional, three Corps and G.H.Q.).

(v) Eight complete surgical teams including four F.S.U.s.

(vi) Two F.T.U.s.

(vii) Cdn. M.A.C.

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(viii) Mob. Hyg. Lab.

(ix) Mob. Bact. Lab.

Dispositions of above units not be be settled until the tactical plan for the Corps was known.

E. Army Formations and Medical Units

(i) 55 Area

Ambulance cars available:

88 M.A.C. (less one pln.)	-	60 cars
146 M.A.C. (less two sec.s)	-	25 cars
485 (A.F.S.) A.C.C. ($\frac{1}{2}$ pln. only)	-	15 cars
Total:		100

A.D.M.S. to be responsible and undertake evacuation of casualties from Corps and Army C.C.S.s to 3 District Capua Control Post.

(ii) 86 Area

Ambulance cars available:

567 (A.F.S.) A.C.C. (one pln.)	-	30 cars
29 Pol. M.A.C. (one sec,)	-	25 cars
25 M.A.C. (one sec.) if necessary	-	25 cars
Total:		80 cars

A.D.M.S. to be responsible for evacuation of Polish casualties from Polish Corps C.C.S.s to Polish Gen. Hosp. Campobasso.

(iii) 4 C.C.S., except 50 beds for sick officers, closed at Vairano.
2 C.C.S. closed at Pietramelara.
58 Gen. Hosp. (200 beds) at Pietramelara. } Held in reserve.

12 C.C.S. for V.D. only.

18 C.C.S, for malaria and N.Y.D. fever.

9 Conv. Depot (1,000 beds) for convalescents from 18 C.C.S., and other minor sick.

Two F.S.U.s and one F.T.U. held in reserve.

N.B. Map showing Medical layout as at 10th May, 44 is attached at ~~Appendix I~~. MAP 13

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4. The Opening Attack

The offensive opened at 2300 hours on 11th May, with a terrific artillery bombardment.

(a) North of Cassino the Poles advanced against heavy opposition and took Mt. San Angelo and Phantom Ridge during the night. However, early next morning they were counter-attacked and had to abandon these positions. Casualties were heavy.

(b) On 4th Div. sector the crossing of the Rapido proved to be difficult on account of the enemy's well prepared gun positions and mortar fire, and also on account of the rapid current of the river.

(c) 8th Ind. Div. crossed the Gari, meeting a good deal of opposition, and captured San Angelo on the morning of 12th May.

Casualties to both Divisions were heavy. It was decided to move 78th Div. across the Gari on the night of the 15th/16th and take over the right sector of 13 Corps from 4th Div. Later three brigades of 1st Cdn. Inf. Div. crossed the Gari on the night of the 17th/18th, relieving 8th Ind. Div. and afterwards Cdn. Corps took over the left sector from 13 Corps between the railway and the river Liri.

5. General Medical Arrangements for the First Phase of the Battle

A. 13 Corps

4th Div. and 8th Ind. Div.

Casualties which occurred from enemy shelling and machine-gun fire before the attempt was made to cross the river were collected in the ordinary way, and the stretchers were man-handled to the jeep ambulance posts and thence taken to A.D.S.s.

As the assaulting troops gained a footing on the other side of the river, which was crossed in assault boats, casualties soon began to occur, due mostly to machine-gun and mortar fire.

Some cases were sent back in the dark in the returning assault boats but, as the banks of the river were steep and the current very strong, many difficulties presented themselves, especially as the demand for the quick return of the assault boats became of paramount importance. Casualties were attended and collected, as far as was practicable, in certain selected areas to await the first opportunity to convey them across the river. By first light on both fronts, there was at least one bridge completed, over which vehicles were moving.

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From car collecting posts or A.D.S.s casualties were then transferred either by ambulance car (4-wheel-drive A.F.S.) or jeeps with stretcher fixtures to Route 6, where they arrived at the Medical Centre. Here two M.D.S.s were established and an ambulance car rank with a check post.

Evacuation was rapid and all cases, except those which required immediate resuscitation or urgent attention, were sent at once to either one of two groups of C.C.S.s, viz., Nos. 2 N.Z. C.C.S. and 19 C.C.S. located at Presenzano, or Nos. 2 Ind. C.C.S. and 7 C.C.S., situated at Vairano about five miles from the first group. Each C.C.S. was raised to 300 bed capacity, with three surgical teams and one F.T.U. Here "life-and-limb-saving" operations were performed, other cases resuscitated, while still others were evacuated as soon as possible, under arrangements of 55 Area, to the Capua Control Post. At this Post under D.D.M.S. 3 District all cases were re-sorted and despatched to various Base hospitals, according to the nature of their wounds.

B. Polish Corps

The fighting was for the most part in mountains, and the casualties had to be man-handled from one relay post to another before they arrived at the car posts for evacuation to the M.D.S.s. From these the cases were then sent to Venafro, where were established Nos. 3 Pol. C.C.S., 5 Pol. C.C.S. and 6 Pol. Gen. Hosp. (200 beds). The C.C.S.s had three surgical teams apiece, and the General Hospital two F.S.U.s with a F.T.U.

The route of evacuation from Venafro was by M.A.C. cars to Campobasso via Isernia and Bajano to the 800-bed Polish Hospital, where further evacuation of cases to Termoli came under arrangements of D.D.M.S. 2 District.

General evacuation of casualties from both Corps worked very smoothly, and, as all adhered to the two main principles already stated, there was never any hitch by a hold-up of cases.

6. The Gustav Line was completely passed by midday 19th May, and forward elements were approaching the defences of the Hitler Line. This line ran roughly from Piedimonte and Aquino to Pontecorvo.

There was much fighting which continued unceasingly until 24th May, when the Canadian infantry penetrated the Hitler Line, while 5th Cdn. Armd. Div. exploited the success by passing through the breach. The Polish Corps captured Piedimonte on the same day.

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Two points of medical interest may be mentioned here:

(i) For the first ten days of the battle the number of wounded attended to by Medical Units and evacuated from front areas was 6,979. The number of sick evacuated was 5,286.

These figures compare very favourably with the Casualty and Sick estimates that had been made.

(ii) The Canadian Corps was the first Corps which had gone into battle with the completed set-up of the new Medical organisation.

On 28th May the Polish sector came under command 10 Corps, and 2 Pol. Corps began to pull out of the line for a new destination. In addition, the S.A. Armd. Div. passed to command 1 Cdn. Corps and moved up to the forward area.

Changes in Medical Locations and Arrangements

On account of the success of the advance it was necessary to accelerate change of locations of some of the Corps and Army Medical Units.

(a) 2nd June found Nos. 4 C.C.S., 2 Ind. C.C.S., 132 Fd. Amb. and "C" F.D.S. forming 13 Corps Medical Centre at Aquino.

(b) On 4th June No. 19 C.C.S. and the Light Section No. 2 Ind. C.C.S. moved to Frosinone to form a new 13 Corps Medical Area. The Aquino Medical Group returned to command Army and became the Army Medical Area.

(c) The Heavy Section Indian C.C.S. and No. 132 Fd. Amb. Moved from Aquino to Frosinone on 5th June. On that day air evacuation began from Aquino Aerodrome, some 60 casualties being despatched to Naples by air. The following evacuation scheme was working smoothly on 5th June:

Road Evacuation

(1) Cases needing evacuation out of Army area

(a) Cases from Cdn. C.C.S.s in No. 3 Cdn. Gen. Hosp. (Ferentino area) were evacuated in cars of No. 146 M.A.C. to 3 District Control Post at Cassino.

(b) Cases from 13 Corps Medical Area, Frosinone, were evacuated in cars of 567 (A.F.S.) A.C.C. to 3 District Control Post at Cassino.

(c) Cases from Army Medical Area, Aquino, were evacuated in cars of No. 88 M.A.C. to 3 District Control Post at Cassino.

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(d) Cases from No. 15 C.C.S. were evacuated to 3 District Control Post at Cassino under arrangements made by 10 Corps.

(e) Road evacuation from 3 District Control Post at Cassino to General Hospitals at the Base under arrangements made by 3 District.

(2) Cases not needing evacuation out of Army area (Malaria, Short Term Sick, etc.)

(a) Canadians under Canadian arrangements.

(b) From 13 Corps Medical Area Frosinone, Eighth Army Medical Area, Aquino and No. 15 C.C.S., Malaria and N.Y.D. Other Ranks to No. 18 C.C.S. ar Riardo; Officers to No. 58 Gen. Hosp. at Pietramelara; Short Term Sick Other Ranks to No. 58 Gen. Hosp. or "B" F.D.S. at Riardo.

(c) V.D. cases to No. 12 C.C.S. at Riardo.

Air Evacuation

Cases for Air evacuation were sent to No. 4 C.C.S. at Aquino from all Medical areas.

Lt. Sec. No. 12 C.C.S. with Section of V.D.T.C. attached moved from Riardo to Frosinone Medical Area on 6th June, where it opened for the reception of all British and South African V.D. cases.

On 6th June No. 8 (S.A.) C.C.S. moved from Vairano and opened as 13 Corps Advanced C.C.S.

On 7th June No. 1 N.Z. C.C.S. moved from Presenzano to Frosinone as 10 Corps Advanced C.C.S. No. 3 Adv. Dep. Med. Stores also moved from Isernia to Frosinone Medical Area on that day and opened on 8th June.

No. 2 C.C.S. with Nos. 24 F.S.U. and 12 F.T.U. attached moved from Cassino during the night of 7th/8th June and opened for the reception of casualties on 9th June.

One platoon of 567 (A.F.S.) A.C.C. was placed under command 13 Corps to evacuate casualties from the Valmontone Medical Area to No. 19 C.C.S. at Frosinone.

Otherwise evacuation arrangements were mainly the same.

On 8th June a second platoon of 567 (A.F.S.) A.C.C. reverted from command 10 Corps to command Army, and moved up to Medical Area, Frosinone to help with evacuation from that Area.

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On 8th June arrangements were made for one section of No. 151 Lt. Fd. Amb., which had arrived from Campobasso, to take over air evacuation from Aquino from det. No. 21 Mob. Fd. Hosp., who, on relief, moved to Frosinino on 9th June to be ready for reception of cases for air evacuation from the Frosinone area on 19th June.

On 9th June No. 9 F.T.U. (Advanced Blood Bank) moved from Aquino to Frosinone, as did No. 2 Mob. Ophth. Unit.

A section of No. 146 M.A.C. moved to Frosinone Medical Area and relieved a platoon of 567 (A.F.S.) A.C.C. who, on relief, moved to Rome Medical Area and became responsible for backward evacuation from No. 2 C.C.S.

A diagram at ~~Appendix II~~ MAP 14 shows route of evacuation as on 9th June.

The dispositions of troops in the line on 16th June were as follows:-

13 Corps: Still on the right flank of Fifth Army, advancing up the Orvieto - Chiusi road, meeting stiff opposition.

10 Corps: Advancing up to the right of 13 Corps, directed to Perugia. During the week the Army rapidly advanced, and Perugia fell to 10 Corps on the 20th; 13th Corps reached the southern shores of Lake Trasimeno on the same day.

Air Evacuation

Air evacuation during the week was from Osa Aerodrome, Base Medical Area, and from Civita Castellana Aerodrome.

Diagram giving location of general hospitals, C.C.S.s and F.D.S.s on 23rd June is attached at ~~Appendix III~~. MAP 15

On 30th June the Medical arrangements and principal sites of Medical units, with evacuation routes, were as shown at ~~Appendix IV~~. MAP 16

Evacuation of Casualties

In the initial stages of the battle evacuation of the wornded from the C.C.S.s proceeded very smoothly. From 13 and 10 Corps areas many of the wounded were admitted into general hospitals in the Naples area within eight hours of being wounded, and the sorting and distribution of cases was organised so efficiently at Capua Control Post that an equal number of cases was transferred to each Base hospital, thus avoiding over-crowding, with all its implications, in any one hospital.

However, after the breakthrough of the Hitler Line, the evacuation scheme of casualties became more and more difficult, chiefly on account of the increasing length of the L. of C., of the many demolitions over which diversions had to be made, and of the continuous flow of maintenance traffic.

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Priority of passage over the road could not always be guaranteed for ambulance cars, with the result that they were often held up with wounded for several hours. Under these trying conditions it was of the utmost importance to site F.D.S.s as far forward as was compatible with the tactical situation and with the working efficiency the F.S.U.s attached, bearing in mind always the comfort of the patients during the post-operative nursing period.

On 5th June air evacuation by American transport planes began at Aquino, and, as the advance continued, the air evacuation strip was also advanced from place to place.

By 30th June the road evacuation involved a long distance before the cases arrived at the Army Medical Centre six miles south of Rome, and, although there were three staging centres on the road at which patients could be attended and rested, yet this method was a source of great anxiety. It can thus be realised that if the American Transport Aircraft Coy. had not come to our assistance, conditions would have been very grave.

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THE HEALTH OF THE TROOPS

Period 1.4.44 - 30.6.44

1. Physical Geography

The Army was concentrated for attack in the valleys of the Volturno, the Liri and the Gari rivers. The attack commenced on 11th May; the two latter rivers were crossed and the advance continued up the Liri and Sacco valleys, crossing the high ground between the Sacco valley and the Roman Campagna at Valmontone. Thence the drive continued up the Tiber valley and, on the east, the Terni plain. From here advance was made through the Tiber valley on the left and, crossing the high ground between Terni and Spoleto, another column advanced down the valley of the Topino. It will be seen that the whole operation was carried out along river valleys and, except where these open out on alluvial plains, the country is mountainous. Good roads existed in the main, but the many bridge demolitions caused numerous diversions from the main roads.

2. Climatic Conditions

These were typical of a short Italian spring and early summer; a gradually increasing temperature, with occasional thunderstorms and spells of wet weather of two or three days' duration. Generally, the conditions might be described as good, though the wet spells hampered operations.

3. Diseases Prevalent among the Civil Population

Apart from battle casualties, due mostly to mine accidents, there were few civilian sick. Malaria among civilians was slight and patchy in distribution; typhoid occurred sporadically but did not cause alarm. There appeared to be little dysentry, and all cases seemed to get emetine. This was probably due to the Italian medical profession's predilection for giving injections rather than to a specific treatment based on laboratory diagnosis. Venereal disease was common. Most villages seemed to have one or two women infected, but Naples and Salerno areas infected most of the cases occurring in troops.

A better organisation of civilian hospitals was evident near Rome, but the standard of diagnosis and treatment in the small hospitals remained lamentably low. In many cases surgical treatment was all but archaic.

The general cleanliness and sanitation of towns improved a little, and there was a progressive decline in scabies, as the Army moved northwards.

There was no civilian typhus in the Army area.

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The civilian refugees were now better catered for by A.M.G. with a chain of evacuation camps. This chain saved much improvisation by the Army for dealing with civilian refugees.

A.M.G. also gradually improved transport facilities, so that food distribution was better. The standard of nourishment amongst civilians was, on the whole, remarkably good, though there were complaints everywhere that the enemy had pillaged or destroyed many herds and much poultry. Some of these statements were checked, and many were found to be true.

Close liaison was maintained with Eighth Army A.M.G. Public Health Officer at all times.

4. Principal Diseases Affecting the Troops

Venereal Disease

The incidence of V.D. was higher than at any time in the history of Eighth Army. Total cases were 3,183, giving an average per thousand per week of 0.97.

The main sources of infection were Naples and Salerno, Bari and Campobasso. The three former were leave centres, and the last a transit and staging area.

The main feature of the V.D. situation was the establishment of a complete C.C.S., with an Indian Staging Section, as a V.D. Diagnosis and Treatment Centre. This worked admirably, as of the 2,181 cases admitted only 306 were evacuated out of the Army area. Many of these evacuations were Mauritians and Cypriots, whose incidence of V.D, is notoriously high.

During mobile phases the C.C.S. functioned as two parts. One, forward, received, diagnosed and treated patients, whilst the rearward section ceased admissions and in a few days was prepared to leapfrog the forward section. In this way V.D. cases were all treated as far forward as possible; evacuation of some cases was actually forward.

Experimental quantities of penicillin were obtained and were used by the Venereologist in collaboration with the Consulting Venereologist A.F.H.Q. 216 cases were treated. These were all cases of selected key personnel who were not clearing up with sulphonamides. Only eight failures of treatment were reported.

The policy of treating cases in unit lines was discontinued, as hospitalisation of patients was possible in the forward area. Standardisation of diagnosis and treatment was thus obtained, and close scientific and disciplinary control of cases was possible.

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Indian patients were treated in the Indian Staging Section attached to the V.D.T.C. Canadian, New Zealand and Polish patients were treated according to arrangments made by their own formations.

A system was introduced whereby a "Vice Squad" of the C.M.P. detained all known prostitutes and those accused by patients.

Malaria

The incidence of this disease was not alarming, the average of admissions for the three months April, May and June being .95 per thousand per week of primary cases and .58 relapses. The incidence was higher before 20th May, i.e., before active transmissions began. This rise was due to infections from the previous season, with a few fresh cases infected by hibernating mosquitoes. The subsequent drop corresponded with the rising blood level of mepacrine. This drug was commenced on 25th April.

During the building-up period before the battle the Army was in potentially highly malarious territory. Although malaria had been absent in epidemic proportion from the Volturno valley for several years, a few cases constantly occurred among civilians. Suppressive medication was common but not universal among them. The common type of anopheles found, maculipennis var. typicus, was breeding in profuse numbers in the irrigation and drainage channels that had been blocked by war damage. At the same time many of the cattle had been dispersed by the enemy or taken into hiding in the hills by the local inhabitants. Further, over 50% of our troops were actual or potential malaria carriers. Hence it was considered that the potential malaria threat was grave, since the increased mosquito population had a decreased cattle population on which to feed and were of a type that would readily divert to human feeding.

These conditions pertained in all valleys which the Army traversed. It was considered that, since the commencement of the season, the Army was at all times in an area where malaria transmissions was always possible.

A complete malaria control organisation was set up on the basis of the A.M.C.U. employing military and civilian Italian labour and using power sprayers with D.D.T. spray solution, and dusting by aircraft in certain areas through the M.A.A.F.

The evacuation organisation, obtaining early diagnosis and a minimum of travel for all malaria cases (as well as their retention within the Army area), worked well,

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but was severely taxed during the rapid advance. The existence of a section of a Convalescent Depot in the Army area was of the utmost assistance in keeping hospital beds free of minor cases, and was of great value to the short term hospital patients, who, by passing through the Convalescent Depot, avoided going straight from hospital to duty.

The Enteric Group

Enteric, though frequently sporadic amongst the civilian population, was of no importance in the Army.

Dysentery

The ratio per thousand per annum was 8.84. This represents 607 cases admitted.

Shock

The M.R.C. Shock Team worked in the Army area throughout the quarter.

Pediculosis and scabies caused no problems

There were no other diseases prevalent.

Protective Inoculations

The inter-vaccination period was reduced to two years on 31st March '44.

Most of the troops in the Army had lived in smallpox localities in the Middle East but were over two years between vaccinations, having been vaccinated at five year intervals. It was decided that mass re-vaccination was impossible because of impending operations, and that a gradual re-vaccination of all troops over the quarter, beginning from about 6th April, should be undertaken. This was put into effect as rapidly as operations permitted and supplies of lymph became available to R.M.O.s.

The state of T.A.B., Tetanus Toxoid and Typhus protection at the end of the quarter was over 90% in almost all formations.

The number of troops who voluntarily re-appeared for their refresher dose of tyhpus vaccine points to extremely good results from propaganda.

5. Battle Casualties

Most of the battle casulaties dealt with by Field Medical Units were from mortar and shell fire. The Battle Casualty Rate per thousand per annum was 233.6.

6. Medical Stores

Units at Battle of Cassino:

No. 3 Adv. Depot of Med. Stores

No. 10 Adv. Depot of Med. Stores.

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No. 1 Cdn, Dep. Med. Stores

No. 344 Polish Adv. Dep. of Med. Stores.

On the whole, supply of Medical Stores to Eighth Army was very satisfactory. The supply of blood and other transfusion stores was also satisfactory. On a few occasions, due to poor communications, blood failed to arrive, but plasma and intravenous glucose saline were always in ample supply.

7. Rations

Rations as supplied were entirely satisfactory with the following exceptions: Dehydrated meat and vegetables were growing more and more unpopular with the troops. The basis of the trouble was that cooks did not seem to re-hydrate the material sufficiently well. Rigorous instructions for correct preparation were issued,

Various complaints were made about the rations issued to Italian troops. The basis of the complaints was probably the lack of olive oil in the issued ration, and the substitution of cotton seed oil, which is completely unpalatable to the Italian.

8. Clothing and Equipment Scales

These were satisfactory. A decision to withdraw shorts entirely from the British Army seemed to be the only way to ensure covering the knees after sundown in malarious theatres of war. It was considered that the continued provision of shorts in a malarious theatre unnecessarily endangered the health of the troops.

9. Sanitary Conditions

A general improvement in civilian sanitary arrangements the further north the Army proceeded was noted.

Military sanitation was, on the whole, good, though naturally the standard varied from unit to unit and with nationality. It is not out of place here to remark on the value of N.C.O. Sanitary Assistants, R.A.M.C., whose work was done with uniform excellence and enthusiasm.

10. Conservancy

Deep trench latrines were in general use, even with Divisional unit B. Echelons. Troops in F.D.L.s used shallow trenches or the "cat" method.

11. Water Supplies

These came more and more from R.E. "bulk" points. The use of the individual water container is very restricted, and a wide issue would have been a waste of material.

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MEDICAL ASPECTS OF EIGHTH ARMY OPERATIONS

1.7.44 - 30.9.44

OPERATION "OLIVE"

1. The period under review divides itself into three phases.

Phase I covers the advance from the general line of Castiglione - Pescara to the line Florence - Ancona. During this time the main strength of Eighth Army was exerted in the Florence-Arezzo sector, where the equivalent of eight Divisions were employed. On the Adriatic front was 2 Polish Corps, comprising two Divisions. This phase lasted from 1st July to the first week in August.

Phase II lasted from the first week in August to 25th August, when Operation "Olive" began. During this phase the whole of the planning for the Operation took place, and the strength of Eighth Army moved across the Apennines to concentrate on the Adriatic coast. 13 Corps, with four Divisions under command, passed over to Fifth Army. At the end of this phase there were ten Divisions on the East Coast. The central sector was lightly held by 10 Corps with one Indian Division and an Armoured Brigade.

Phase III began with the commencement of Operation "Olive" on the night 25/26th August.

The three phases will be considered in detail.

2. Phase I. 1.7.44 - 4.8.44

(a) The disposition of Corps and Army Medical units on 1st July is shown at ~~Appendix I.~~ MAP 18

(b) Allotment of medical units between Army and the Corps was as follows:-

Under Command	F.D.S.	C.C.S.	F.S.U.	F.T.U.	Gen. Hosps. (200-beds)
Eighth Army	1	6	5	2	2
13 Corps	2	1	-	-	-
10 Corps	2	2	3	2	-
2 Polish Corps	-	2	4	2	1
1 Cdn. Corps	5	2	4	2	-

(i) The six C.C.Ss. under command Eighth Army were employed as follows:-

In Rome Medical Area

2 C.C.S.	-	Treatment of Short Term Sick
12 C.C.S.	-	Treatment of V.D.
18 C.C.S.	-	Treatment of Malaria
Lt. Sec. 3 Ind. C.C.S.	-	Treatment of Indian Short Term Sick.

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At Orvieto

15 C.C.S.	-	Light Section staging cases for air evacuation at Orvieto. Heavy Section staging for road evacuation to Rome at Civita Castellana.
Heavy Sec. 3 Ind. C.C.S.	-	Staging Indian cases for air evacuation at Orvieto.
2 N.Z. C.C.S.	-	In reserve.

(ii) The two 200-bed General Hospitals under command Eighth Army were employed as follows:-

54 Gen. Hosp.	-	In Rome Medical Area, used as an Officers' hospital.
59 Gen. Hosp. (with det. 4 Max-Fac. Surg. Unit. 5 Mob. Neuro-Surg. Unit, 1 Mob. Ophthal. Sec.)	-	Receiving specialist cases. (Neuro-Surg., head injury etc., and sick at Orvieto.

(iii) 9 Con. Dep. was established in Rome Medical Area for reception of Eighth Army convalescents.

(c) An Air Evacuation Centre was established at Orvieto. On the airfield were two sections of No. 151 Lt. Fd. Amb. and one R.A.F. Air Evacuation Unit, which provided stretcher-bearers for loading aircraft, and shelter and refreshment for patients.

As the airfield was some 15 miles from Orvieto and approached by a bad road, it was found desirable to stage patients overnight at a place nearer the airfield. Lt. Sec. No. 15 C.C.S. was opened a mile away. Patients were detained overnight, and surgery was available for the few cases which required it.

A total of 3,841 cases were evacuated by air to Naples in the first fortnight of June.

(d) To the south of Orvieto, Eighth Army was responsible for road evacuation to the Rome Medical Area. A staging post was formed by the heavy section of No. 15 C.C.S. at Civita Castellana.

3. By the middle of July Eighth Army had moved forward to the line of Arezzo. Road evacuation to Rome Medical Area from the forward areas was now nearly a 200 miles journey. It was therefore decided to move Eighth Army Medical Area from Rome to Lake Trasimeno. This Area was known as "Eighth Army Medical Area R.3801" and comprised:-

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	Unit	Employment
(i)	58 Gen. Hosp. (with a Max.-Fac. Surg. Unit, 5 Mob. Neuro-Surg. Unit and Ophthal. Sec. 59 Gen. Hosp. att.)	Treatment of all Maxillo-Facial, Neurological and eye injury cases.
(ii)	12 C.C.S. and 7 Ind. V.D.T.C.	All British and Indian V.D. cases.
(iii)	14 C.C.S. 18 C.C.S.	All British Short Term Sick, including malaria.
(iv)	15 C.C.S.	All British battle casualties and cases for air evacuation.
(v)	9 Ind. C.C.S. 39 Ind. Stag. Sec. 4 Brit. Stag. Sec.	All Indian sick and battle casualties and Indian cases for air evacuation.
(vi)	151 Lt. Fd. Amb.	Opened as a Con. Dep. and held up to 600 convalescents.
(vii)	9 F.T.U.	Blood Bank.
(viii)	3 Adv. Dep. Med. Stores.	-

The Air Evacuation Centre was moved up to the airfield at Castiglione del Lago by 15th July. This airfield was not more than two miles from Medical Area R.3801, and cases for air evacuation could be called forward each morning direct to the aircraft.

4,938 cases had been evacuated by air to 4th August.

Road evacuation out of Eighth Army Area was kept to a minimum. No. 9 Con. Dep. could not be released from the Rome Medical Area, and to enable convalescent cases to be held in the Army Area No. 151 Lt. Fd. Amb. was used in the role of a convalescent depot. Extra tentage was obtained, and P.T. Instructors and extra cooks were attached from No. 8 Con. Dep. which was awaiting the arrival of its stores at Naples. By this means up to 600 convalescent cases were kept in Eighth Army Area.

4. At the end of this phase Eighth Army was engaged in the battle for Florence on the left and was established some ten miles to the north of Arezzo in the centre. On the right 2 Polish Corps had reached Ancona.

During the previous phase there had been 6,178 battle casualties (wounded) in 10 Corps and 13 Corps. Figures for 2 Polish Corps are not included in this total.

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5. Phase II. 5.8.44 - 25.8.44

(a) During mid-July, when it appeared that the fall of Florence was imminent, plans were made to establish a large medical area im that city. However, Florence failed to fall, and the character of the enemy's oppcsition was such that it became obvious that, even if the city were captured, it would be useless as a medical centre for a considerable time, because it was overlooked by the enemy from high ground to the north.

The five hospitals and two convalescent depots were entrained accordingly to programme and began to arrive in Eighth Army Area. Their positioning was a matter of great difficulty, as Florence was out of the question, and the plan for Operation "Clive" was in embryo. All that was known was that the main strength of Eighth Army was to be moved to the Adriatic coast. Until more information became available, it was impossible for D.D.M.S. Eighth Army to allot sites to this torrent of men and G.1098 which arrived daily at Army Railheads. They were dumped in field and buildings, "Q" providing some 800 3-tonners for the second lift.

While this was going on, further medical installations were arriving by sea at Ancona as follows: 66 Gen. Hosp.; 71 Gen. Hosp.; 83 Gen. Hosp.; 31 Comb. Gen. Hosp.; 2 S.A. Con. Dep.

At the beginning of August 1 District came under command Eighth Army and became responsible for administration behind the rear Corps boundaries, in Eighth Army Area. The hospitals and convalescent depots were placed under direct administrative control of 1 District, so that, although this District remained under command Eighth Army, D.D.M.S. Eighth Army had no operational or administrative responsibility for the hospitals.

As has been shown, the hospitals were sited under conditions of haste and with an imperfect knowledge of the dispositions of formations for the coming battle. Consequently, when the plan became known, it was evident that certain of these were unfavourably placed. No. 5 Gen. Hosp. at Assisi and No. 14 Cdn. Gen. Hosp. at Perugia were a liability to the medical plan, as they were so far from the main axis of the battle, but this was unavoidable in the circumstances.

(b) Early in August a substantial part of Fifth Army was withdrawn for Operation "Anvil". This necesitated Eighth Army taking over a further 4,000 yards of front to the west from Fifth Army.

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On 10th August, 13 Corps, with under command 6th Armd. Div. and 8th Ind. Div., left Eighth Army to come under command Fifth Army. They took with them three C.C.S.s, seven F.S.U.s and four F.T.U.s.

5th Corps came under command Eighth Army on 6th August, with 46th Div. and 56th Div. under command. Later, 1st Armd. Div. also came under command Army.

(c) The essential preliminary to Operation "Olive" was to mislead the enemy into believing that the main attack on the Gothic Line was to be in the Florence sector, and, at the same time, to concentrate Eighth Army, with ten Divisions, on the Adriatic sector. The following Formations were moved across the Apennines in a very short time and without the Germans discovering the move:

5 Corps.	1 Cdn. Corps.
4th Div.	5th Cdn. Armd. Div.
46th Div.	1st Cdn. Inf. Div.
56th Div.	2nd N.Z. Div.
4th Ind. Div.	

This movement from its inception to its execution took less than three weeks.

6. Plan for Operation "Olive"

The plan was for Eighth Army to advance on a three-Corps front, to break through the Gothic Line in the Adriatic coastal sector and to enter the Po valley.

The Army's objectives were the general line of the R. Marecchia running west from Rimini, and then Bologna - Ferrara.

Grouping of Corps from right to left was:

2 Polish Corps, 1 Cdn. Corps, 5 Corps, 10 Corps.

The Corps tasks were:

2 Polish Corps - to attack and seize the high ground north west of Pesaro, by-passing the town itself; on completion of this task to withdraw to Army reserve.

1 Cdn. Corps - to attack and seize the high ground west of Pesaro; to strike north to cut the main road at Cattolica; to drive along the coastal axis, direct on Rimini.

5 Corps - to attack the Gothic line on the left of 1 Cdn. Corps; to continue on the inland axis west of Rimini, directed on Bologna and Ferrara; to protect the left flank of the Army thrust by using 4th Ind. Div. in the hills.

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10 Corps - a purely defensive role, and acting as a link between 5 Corps and Fifth Army.

7. General Administrative Plan before Operation "Olive"

The general plan for maintenance arrangements of Eighth Army was as follows, and Medical evacuation channels were, to some extent, dictated by them.

There were two main L.s. of C.

Western L. of C.

(Railhead at Arezzo) - Foligno-Perugia-Arezzo-Bibbiena.

Eastern L. of C. - (a) Foligno - Fabriano
(Railheads at Assisi and Ortona) (b) Ortona - Ancona
} Falconara Route 16

10 Corps was maintained on the Western L. of C.

13 Corps (under command Fifth Army) was also maintained on this L. of C., and 13 Corps casualties were evacuated by Western L. of C. arrangements.

5 Corps, 1 Cdn. Corps and 2 Polish Corps were maintained on the Eastern L. of C.

There was one port, Ancona, and hospital ships were called forward as required from Bari.

Forward Landing Grounds were used for evacuation of casualties by air.

They were:

Western L. of C. - Malignano and Castiglione del Lago.

Eastern L. of C. - Falconara.

8. Medical appreciation of the situation before Operation "Olive"

A short summary of the factors considered before Operation "Olive", is given herewith.

(a) Strength of Formations:

2 Polish Corps	-	61,500
1 Cdn. Corps	-	53,500
5 Corps	-	117,000
10 Corps	-	38,500
Eighth Army (Army Troops & 2nd N.Z. Div.)	-	40,000
District and Area Troops	-	100,000
	Total:	410,500

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(b) Availability of beds in General Hospitals and C.C.S.s in Army Area:

Unit	Beds
One 1200-bed. Gen. Hosp. (Cdn.)	1,200
Eight 600-bed. Gen. Hosps.	4,800
Four 200-bed Gen. Hosps. (including one Polish General Hospital)	800
Four Army C.C.S.s (held in reserve)	1,200
Total:	8,000
Add estimated number of minor sick who could be held in Corps and Divisional Medical Units:	4,000
Total capacity of Army	12,000

(c) Estimated Daily Sick

Estimated at 2.5 per thousand per day of a Force of 410,500 = 1,025 per day.

(d) Estimated Battle Casualties

400 per day for first three days of Operation; 1,000 per day for third to tenth day of Operation.

(e) A summary of the deductions made from these factors is as follows:

(i) Total casualties for ten days of Operation:

D Day to D+2:	Sick	Battle Casualties (Wounded)
	3,075	1,200
D+3 to D+9	7,175	7,000
	10,250	8,200
Total:	18,450	

(ii) Relation of Casualties to available beds

Total casualties during first ten days = 18,450; total beds = 12,000; therefore, total casualties requiring evacuation from Army area in the first ten days = 6,450 - say 6,500.

It was therefore assumed that the daily evacuation of casualties out of the Army would be about 650. (This estimate does not take into account cases which would return to duty in less than ten days).

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(iii) It was not considered that there would be any difficulty in evacuating 650 cases per day from Army area.

The following potential channels of evacuation were available:

Air evacuation - 400 per day

Ambulance Train - 200 per day

Hospital Carrier - 300 per day

Total 900 per day

9. Medical Plan

There were two sub-divisions of the plan, one for the eastern and one for the western sector of the Adriatic front. (Medical arrangements for 10 Corps, which was not directly involved in Operation "Olive", were not changed from those already in force).

(a) Eastern sector

2 Polish Corps had a limited objective - Pesaro, after reaching which it was to be withdrawn into reserve. Also Nos. 161 and 162 Polish Gen. Hosps. were sited in Ancona; there was an easy evacuation route on good roads.

Therefore 2 Polish Corps was completely self-contained and evacuated all Polish casualties to Ancona. No. 29 M.A.C. and one Sec. No. 683 Coy. R.A.S.C. (M.A.C.) were under command for this purpose.

At the start of the Operation 1 Cdn. Corps evacuated all casualties to No. 1 Canadian Gen. Hosp. at Jesi. This was about ten miles behind Rear H.Q. 1 Canadian Corps, and it was easily possible for the Corps to be completely self-contained, using only No. 1 Canadian M.A.C.

As the battle moved forward, an additional platoon of 567 (A.F.S.) A.C.C. was allotted to clear casualties from the rearmost Canadian Corps C.C.S.

(b) Western sector

At the start of the Operation, 5 Corps were unable to evacuate casualties laterally to the coast as no lateral roads were open and the Fabriano - Jesi road was unsuitable owing to the volume of traffic. Therefore all casualties had to pass through Fabriano where No. 18 C.C.S., with No. 23 F.S.U., was established. Thereafter casualties were evacuated via Tolentino and Macerata to No. 11 Gen. Hosp. at Porto Recanati or No. 71 Gen. Hosp. at Loreto. No. 151 Lt. Amb. with No. 5 F.S.U., established a staging post at Tolentino.

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As soon as the "Hamburg" lateral (Fano - Urbino) was available, No. 14 C.C.S., with Nos. 5 and 23 F.S.U.s attached, was to open at Fano. All 5 Corps casualties would then pass through No. 14 C.C.S., thus greatly improving and shortening the route of evacuation.

It was recognised that road communications in 5 Corps area were very difficult, and for this reason eight F.S.U.s and five F.T.U.s were allotted to 5 Corps to enable them to deal with priority I, II and III cases before further evacuation.

(c) It was planned to hold as many casualties as possible in Army (including 1 District) areas as follows:-

(i) As many as possible to be retained in Corps areas.

(ii) Cases from 10 Corps to hospitals in the Arezzo or Perugia - Assissi area.

Cases from 5 Corps, 1 Cdn. Corps and 2 Polish Corps to hospitals in the Jesi - Ancona - Loreta area.

(iii) In addition there were three convalescent depots opening in Army areas No. 8 Con. Dept. at Castiglione, No. 9 Con. Dep. at Bastia and No. 2 S.A. Con. Dep. at Macerata.

(d) Evacuation from forward areas as follows:

(i) 2 Polish Corps

3 Polish C.C.S. (with 7 F.S.U. attached) near Chiara Valle.

5 Polish C.C.S. (with 45 and 47 Polish F.S.U.s attached) at Falconara.

Evacuation from forward areas down the coast road from Senigallia - Ancona.

Priority I and II cases dealt with in the C.C.S.s and in 2 and 6 Polish Amb. (with 46 and 48 Polish F.S.U.s attached). All other cases to 161 and 162 Polish Gen. Hosps. in Ancona.

(ii) 1 Canadian Corps.

16 Cdn. F.D.S. and 4 Cdn. C.C.S. open near Mondavio. Allotment of F.S.U.s and F.T.U.s:

4 Cdn. C.C.S. - 1 and 4 Cdn. F.S.U.s, 1 and 3 Cdn. F.T.U.s.

16 Cdn. F.D.S. - 2 and 3 Cdn. F.S.U.s, 2 Cdn. F.T.U. and 1 Cdn. Research Lab.

Evacuation to 1 Cdn. Gen. Hosp. at Jesi.

5 Cdn. C.C.S. closed in reserve at Jesi.

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(iii) 5 Corps

"F" F.D.S. (21 and 32 F.S.U.s, 25 F.T.U. attached) at Cagli.

9 Ind. C.C.S. (3 Ind. Mob. Surg. Unit, 31 F.S.U., 3 F.T.U. attached) at Scheggia.

6 C.C.S. (1 and 36 F.S.U.s, 34 F.T.U. attached).
"G" F.D.S. (10 and 25 F.S.U.s, 26 F.T.U. attached. (closed)
} At Sasso Ferato

1 C.C.S. (closed).
5 Lt. Fd. Amb. - holding minor sick, V.D.s and exhaustion cases
} at Fabriano

Evacuation from forward areas via 18 C.C.S. (Army) near Fabriano.

It was originally intended that all cases from 4th Ind. Div., whose axis was the Scheggia - Caglia road, should be evacuated direct from No. 9 Ind. C.C.S. to No. 54 Gen. Hosp. at Perugia. This road was badly blown, and so Indian cases travelled via No. 5 C.C.S. to No. 18 C.C.S. and thence to Perugia.

British cases from the 46th Div. axis (Sasso Ferata - Pergola) were evacuated via No. 18 C.C.S. either by the Jesi road (Northern Route) to Falconara where No. 15 C.C.S. staged cases for air evacuation, or by the Castel Ratmondo - Tolentino - Recanti road (Southern Route) to No. 71 Gen. Hosp. at Loreto and No. 11 Gen. Hosp. at Porto Recanati.

When the tank transport traffic on the Foligno - Jesi road was heavy all except priority cases for air evacuation travelled by the southern route. D.P.M. Eighth Army undertook that ambulances on the northern road should be given special priority over all other traffic.

The lines of evacuation from 5 Corps to general hospitals were long (50 - 60 miles); therefore the Corps was well reinforced with F.S.U.s and F.T.U.s. It was considered that by this means all Priority I and II cases could be dealt with in the Corps area, and that only specialist cases would arrive unoperated upon at the general hospitals.

(e) Specialist cases

(i) "A specialist" surgical centre was established at No. 71 Gen. Hosp. at Loreto. Here the "Trinity", consisting of a detachment of

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No. 1 Max-Fac. Surg. Unit, detachment of No. 4 Mob. Neuro-Surg. Unit and the Ophthalmic Section of No. 50 Gen. Hosp., set up and were guaranteed up to 200 beds to hold their cases.

It was arranged that priority would be given to their cases for air evacuation to Barletta where the main parts of their teams worked.

Similar arrangements were made on the Western L. of C., where the other "Trinity" remained at No. 58 Gen. Hosp. in Medical Area R.3801.

(ii) Exhaustion cases

It was planned to evacuate these cases from Corps Exhaustion Centres by road to No. 7 Base Psychiatric Wing at No. 5 Gen. Hosp. at Assisi.

(iii) V.D. cases

No. 12 C.C.S. continued to treat V.D. The heavy section, together with No. 2 Mob. Bact. Lab., remained in Medical Area R.3801 to deal with cases from 10 Corps and also from 13 Corps, though the latter had passed to command Fifth Army.

The light section moved to Osimo near Ancono to deal with the bulk of Eighth Army cases. Laboratory work for this section was carried out at No. 71 Gen. Hosp. at Loreto.

(f) Supplies of Transfusion Fluids and Penicillin

The requirements of whole blood were estimated at 400 pints per day. These, together with plasma and glucose saline, were flown up to Falconara airfield from Bari each day. The aircraft then proceeded to deposit transfusion fluids at Castigliano del Lago and at Malignano for 10 Corps and 13 Corps use respectively.

Penicillin was supplied in the same way except that 1 Cdn. Corps obtained it through Canadian sources.

Nos. 4 and 9 F.T.U.s were utilised as blood banks. No. 4 F.T.U. worked from Falconara and supplied 1 Cdn. Corps, 2 Polish Corps and the hospitals in Ancona area. No. 9 F.T.U. was sited with the forward 5 Corps C.C.S. Blood, etc., was collected from Falconara airfield and distributed to F.T.U.s in the Corps area.

To enable the two "blood banks" F.T.U.s to distribute blood over the wide areas which their duties covered, each was given the following additional vehicles:

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One car (5-cwt. 4 x 4); one truck (15-cwt. 4 x 2); 2 lorries (3-ton 4 x 2).

(g) Air evacuation

(i) An air evacuation centre was established at Falconara airfield; two sections of No. 151 Lt. Fd. Amb. were sited on the airfield to shelter cases before embarkation.

No. 15 C.C.S. opened close to the airfield to hold cases overnight for air evacuation the following day.

The only cases who were to be sent direct to the airfield were "specialist" cases from No. 71 Gen. Hosp. and Canadian cases from No. 1 Cdn. Gen. Hosp.

The evacuation programme was complicated by the fact that there were no Canadian hospitals on the east side of Italy. Arrangements were therefore made to call forward aircraft from Naples for Canadian cases and from Bari for all others. Thus no Canadian casualties were sent to hospitals in the Bari area.

One platoon of 567 (A.F.S) A.C.C. was sited with No. 15 C.C.S. to ferry cases to the airfield.

(ii) Air evacuation centres also remained open at Castiglione del Lago and Malignano near Siena, the former to deal mainly with "specialist" cases from No. 58 Gen. Hosp., and the latter to evacuate battle casualties and sick from 13 Corps.

10. Phase III. 26.8.44 - 30.9.44

This phase started on the night 25th/26th August when Operation "Olive" commenced.

The layout of Medical Units on 11th August is shown in ~~Appendix II~~ MAP 19 and on 25th August at ~~Appendix III~~. MAP 20

11. Progress of Operation "Olive"

At the start of the operation the forward elements of Eighth Army followed the contour of the Gothic Line positions, and on the coastal sector 2 Polish Corps was just south of Fano. The first five days of the operation showed a general advance of about eight miles against slight opposition. During this time there was a total of 900 battle casualties (wounded), with 5 Corps and 1 Cdn. Corps bearing the brunt of the fighting.

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By 2nd September Pesaro had been cleared, and 2 Polish Corps, having fulfilled its appointed task of occupying the high ground north-west of the town, was withdrawn into reserve. 1 Cdn. Corps found Gradara strongly held and started to by-pass to the south, capturing Pieve.

After this, enemy opposition stiffened and very bitter fighting ensued on both fronts. The battle casualty rate (wounded) rose to about 600 a day, of which two thirds were from 5 Corps.

On 8th September No. 3 Greek Mountain Bde. and 4th Div. came under command 1 Cdn. Corps.

Progress was slow, and it became evident that 5 Corps would have to fight a major battle for the Coriano Ridge and the Marano river. These features were taken by 14th September, but at heavy cost. There were 700 - 800 wounded coming down the line each day, and on 13th September there were 1,000 wounded.

At the same time the port of Rimini fell to No. 3 Greek Mountain Bde., and with it the Adriatic end of the vital Route 9, which runs north-west up to Bologna.

It appeared that the capture of Rimini would result in a rapid advance into the Po valley, but it was not so. The Germans held to their remaining mountain posts very doggedly, and by the end of the month comparatively slight progress had been made.

On 30th September the Adriatic front ran almost due north and south, with Eighth Army attacking towards the west. It had been found comparatively easy to push forward on the coast, while inland the going became progressively more difficult.

On 30th September the line ran roughly along the road Gatteo a Mare - Savignano - Solignano - Mercato.

Battle casualties (wounded only) for the period 25th August - 30th September were:-

5 Corps	-	7,093	
10 Corps	-	322	
1 Canadian Corps	-	5,682	
2 Polish Corps	-	323	(25th August to 4th September)
Others	-	181	
Total battle casualties (wounded)		13,601	

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12. Medical Aspect of Operation

(a) Evacuation of casualties

At the start of the operation, evacuation followed the scheme shown in the medical plan.

By 1st September, however, the position had altered and it became possible to use the Fano - Urbino lateral road. It was evident that Fano would always be a convenient staging area for casualties en route to the Ancona hospitals, and as soon as the town was captured a search was made for accommodation for medical units. No. 14 C.C.S., with two F.S.U.s and a F.T.U., opened at Fano on 1st September, and a few days later No. 19 C.C.S., No. 18 Ind. Stag. Sec. and No. 151 Lt. Fd. Amb. and two additional F.S.U.s were also moved up. Thus a medical area capable of staging a large number of casualties, and in addition possessing a surgical potential sufficient to deal with large numbers of Priority III cases, was established.

When the port of Rimini fell in the middle of the month it became possible to move more medical units forward. The town was badly damaged but a large civil hospital, the Ospedale Bolognese, was taken over. No. 1 C.C.S. opened there on 25th September to deal with battle casualties. No. 83 Gen. Hosp. to which the "Trinity" were attached, opened on 27th September.

Eighth Army was responsible for evacuating cases from rearward Corps C.C.S.s to 1 District hospitals in Jesi, Ancona, Loreto and Porto Recanati. During the peak casualty period in the middle of the month 170 ambulance cars were employed on this duty and were worked almost to the limit of endurance. In addition, 60 other cars were fully employed in transporting Canadian cases from No. 1 Cdn. Gen. Hosp. at Jesi to No. 14 Cdn. Gen. Hosp. at Perugia.

Circumstances combined to make evacuation of casualties an extremely complicated proceeding. The various nationalities within Eighth Army were anxious to treat their casualties in their own hospitals; thus it was necessary to despatch separately British, Canadians, New Zealanders, Poles, Greeks, Indians and Basutos to their respective units of election. Then it was necessary to make provision for holding and conveying casualties to airfield, sea port and rail head for evacuation by aircraft, hospital carrier or ambulance train. In the case of air evacuation, Canadians had to be transported across Italy to Naples or Rome, as there were no Canadian hospitals to receive them on the east side.

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It is greatly to the credit of the reception and evacuation departments of C.C.S.s and general hospitals that the flow of cases through these multitudinous channels was controlled so successfully.

(b) A diagramatic layout of medical units on 30th September is shown at ~~Appendix IV~~. MAP 21

(c) Although the distances involved in transporting cases from field ambulances to general hospitals were not very great and even at the end of the period did not exceed 80 miles, there were three factors which affected the speed of evacuation. Firstly, the incredibly difficult terrain and bad narrow roads in the forward areas caused congestion to traffic. Secondly, frequent heavy rain storms turned tracks into rivers of slime. And thirdly, all roads were tributaries to Route 16, the coast road running from Rimini to Ancona. This road is a good one, but the volume of traffic upon it imposed considerable delays to ambulance cars, in spite of the full co-operation of military police who always facilitated their passage.

For this reason it was desirable to open as many units as possible in the forward areas, and arrangements to effect this were completed by the end of September.

The following were already established, just about to open by this time:

At Rimini and Riccione	Available beds
54 Gen. Hosp.	300
83 Gen. Hosp.	300
1 C.C.S.	300
53 F.D.S.	150
At Pesaro	
12 C.C.S.	200
8 Con. Dep.	900
At Fano	
59 Gen. Hosp. (under command 1 District)	300
19 C.C.S.	300
151 Lt. Fd. Amb.	200
Total	2,950

This eased the flow of evacuation and enabled a considerable number of short term sick and battle casualties to be retained in the Army area.

In addition, all maxillo-facial, neuro-surgical and eye injury cases were held and treated at No. 83 Gen. Hosp., and V.D. cases were treated at No. 12 C.C.S.

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THE HEALTH OF THE TROOPS

1. Physical Geography

During July the Army pressed on slowly but steadily towards the central portion of the Gothic line, taking over the sector on the left, previously held by the French, towards the end of the month. In August a general regrouping was effected and Eighth Army concentrated in the Adriatic sector, massing nine Divisions and two independent brigades for the main assault on the eastern portion of the Gothic line. The attack was launched on 25th August. It carried the right flank of the Army in a great bulge northwards into the country between Pesaro and Rimini, and finally in the latter half of September into the southern corner of the Lombardy plain.

The topography of the Army area after the switch to the Adriatic sector is somewhat unfavourable to operations directed towards the north. The ridges and foothills on the eastern side of the Apennines run roughly north-eastward at right angles to the axis of advance, and the chief motor roads (apart from the coast roads) and the half dozen sizeable rivers take a similar direction. The rivers are shallow in summer with, near the coast, wide beds where the water flows in many channels between mud and gravel flats - conditions very favourable to mosquito breeding. Extensive breeding actually occurs in the lower reaches of the Cesalo and Esino. Heavy rain rapidly converts all these streams into wide Muddy torrents.

The coast line is regular and featureless, and the only ports of military importance are Ancona and Rimini. The flat coastal strip as far north as Rimini is narrow and low-lying, and the hilly region behind it, rising towards the Apeninnes, consists for the most part of gently rolling country scantily wooded and highly cultivated. The soil is clay, and the heavy military traffic in dry weather left most roads inches deep in fine white dust and after rain turned every secondary road into a sticky slippery quagmire; at times many of these became impassable except to jeeps.

2. Climatic Conditions

The weather until the end of September was warm and settled. The heat by day seldom became excessive, but for long periods the nights were warm and sultry enough to interfere with sleep. Dust rising in thick clouds to a height of twenty feet above the roads made road movement uncomfortable and dangerous, especially for motor cyclists, and when it rained roads and camps rapidly became miry and flooded. One or two heavy falls of rain occurred in July and August, and on 20th and

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28th September there were sudden changes in the weather to cold blustery winds and downpours of rain severe enough to impair movement. On 18th August there was a localised freak hailstorm with hailstones up to ¾ of an inch in diameter, followed by torrential rain.

3. Diseases Prevalent among the Civil Population

Enteric fever is endemic in all occupied districts, and minor epidemics were reported with increasing frequency towards the end of the quarter. Practically all cases were treated in their homes by civilian doctors. No traceable incidence of spread to troops was recorded.

Only occasional cases of malaria were reported. This disease was not a serious problem during this summer.

Venereal disease is not prevalent in the rural districts. Prostitution was not a serious factor except in Florence, where the civil incidence of V.D., moderate to begin with, was known to be increasing, syphilis in particular.

Scattered cases of diphtheria occurred; in one village twenty cases of "Laryngeal diphtheria" were reported, with one death. Antitoxin, both for treatment and prophylaxis, was issued by A.M.G.

Almost the whole of the battle area on the Adriatic sector had been evacuated before operations began, and in the initial stages there were few civilian casualties. Later, however, returning refugees, following close on the heels of advancing troops, suffered fairly severely.

Damage to buildings was extensive, hundreds of houses having been reduced to rubble by German demolitions before the battle, and the vast majority of those left standing being extensively damaged during the advance.

4. Principal Diseases Affecting the Troops

The daily sickness rate averaged 1.93 per 1,000 for the quarter. It showed a definite but irregular decline after the end of July.

Infective Hepatitis

The curve of incidence of this disease was remarkably smooth and symmetrical throughout the year, descending gradually from its initial level of 1.55 per 1,000 per week in the first week of January, passing the bottom of its swing (0.17 per 1,000 per week) towards the end of May, and rising regularly throughout the third quarter to reach 1.67 per 1,000 per week at the end of September. Figures for 1943 showed no similar regularity of incidence, no doubt because of the rapid transitions of environment through which the Army passed.

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An interesting feature is the much higher incidence in Canadian and New Zealand troops than in others. Over the whole quarter the rate for Canadian troops was 2.05 per 1,000 per week, as against 0.79 per 1,000 per week for the whole Army. One Canadian Division (5th Armd.) suffered much more severely than the others, weekly notifications climbing steadily throughout the quarter from less than 20 cases per week to 148 cases in the last week in September. The following is quoted from the Quarterly Report of D.D.M.S. 1 Cdn. Corps:

"The increased incidence was first noted in 5th Cdn. Armd. Div. in which for the first six weeks of the quarter 190 cases occurred as compared with only 114 cases for the rest of the Corps. In the middle of August there began a gradual rise in 1st Cdn. Div., reaching the peak of 54 cases in the week ending 16th September. But this has at no time kept pace with the incidence in 5th Cdn. Armd. Div. Numerous investigations have been carried out in an attempt to ascertain some common factor in these cases, which would explain its epidemiology, but nothing significant has been learned. The incidence has at all times been widespread throughout the Divisions, cases occurring in at least 35 different units each week. While certain units showed higher rates than others during brief periods, these were more or less equalised in subsequent weeks. It was not possible to prove secondary cases as a result of contract. Neither has there been any satisfactory explanation for the fact that the incidence amongst Corps troops has not been appreciably higher than the average for the year. Proportionate rates amongst officers have been slightly higher than that for other ranks".

During the three weeks in September in which 2nd N.Z. Div. was under command the average weekly incidence was 117 cases - a rate of 6 per 1,000.

Malaria

The incidence gradually declined from the beginning of August onwards. In the last week of July it was 1.34 per 1,000 per week; by the end of September it had sunk to 0.36 per 1,000 per week. As Eighth Army was operating throughout the quarter in only mildly malarious or non-malarious territory, there is nothing remarkable in the fact that the incidence was low.

An extensive outbreak in 5th Div., due to infection during movement by rail before joining Eighth Army, showed what might have happened in other Formations had they been suddenly exposed to dangerous mosquito-ridden conditions, e.g. had the hoped for break-through into the Po valley taken place. It is undeniable that a

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certain degree of complacency had crept into the Army, partly attributable to excessive propaganda at times when the country occupied was merely potentially and not actually "highly malarious". (e.g. the area on the southern shores of Lake Trasimeno was designated "red" because of the presence of numerous anophelenes, although it was known that malaria had not existed for a considerable time amongst the civil population). Troops who occupied such an area for a few weeks, aware that their own precautions were slack, and who nevertheless suffered few cases of malaria, were apt to conclude that warnings about highly malarious conditions ahead were exaggerated; the same attitude was noticed even among medical officers. To help counteract this tendency two important directives were issued, one through medical channels on 27th July and another on the order of the Army Commander on 23rd August. A noticeable improvement in the standard of personal precautions followed upon the issue of each of these instructions.

A comprehensive scheme organised for the implementing of A.M.C.U.s on an Army basis worked admirably. In its final application it took the following form:

(a) Fourteen flysol power spraying teams, each consisting of one driver and two operators, equipped with a power sprayer mounted on a vehicle, operated in forward areas. They were allocated on a Divisional basis and covered the entire front. A N.C.O. of the Divisional Field Hygiene Section supervised their work locally, but their operations were co-ordinated by an A.M.C.U. officer who visited all areas at regular intervals and maintained close liaison with A.D.sH. Corps and O.s C. Field Hygiene Sections.

(b) DDT - spraying A.M.C.U.s were distributed across the whole front on a basis of two per Divisional axis. They followed up the work of the flysol spraying teams, covering an area extending to three km.s on either side of the axis. Most of these A.M.C.U.s were supplied direct from the Malaria Control Depot, an arrangement which made them independent of other units which were liable to move frequently, and enabled Army H.Q. to keep in almost daily touch with their activities. Their work was closely supervised by Nos. 8 and 9 Mal. Fd. Labs. who paid frequent visits to all A.M.C.U.s to check up on their work and ensure that all Divisional territories were covered. Malaria field laboratories kept Corps informed of the situation in their sectors by personal liaison with A.D.s H. Corps and by forwarding copies of their reports direct

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to D.D.s M.S. Corps. If they decided during their visits that any Army A.M.C.U. should change its location or sphere of activity, they were authorised to arrange this on the spot, informing A.D.H. Eighth Army afterwards. The entire scheme was notable in practice for its flexibility and effectiveness.

(c) Dusting with Paris Green by airplane was carried out weekly, first in the Trasimeno area and over the canal systems near Perugia and Arezzo, later on the Esino and Cesano rivers. The effects on breeding were excellent.

Venereal Disease

Incidence of V.D. reached a peak in the week ending 1st July (1.49 per 1,000 per week), from which it declined to a ratio of 0.48 per 1,000 per week early in September, since when it showed a rising tendency. Average ratio for the quarter was 0.78 per 1,000 per week as compared with 0.97 for the previous quarter.

No. 12 C.C.S., the main V.D. diagnosis and Treatment Centre for Eighth Army, moved from Rome (Hy. Sec.) and Orvieto (Lt. Sec.) to Castiglione del Lago towards the end of July, and at the end of August it moved across to the east coast when the grouping for the Gothic line assault was effected. While at Castiglione del Lago a Canadian V.D.D.T. was temporarily attached. At the end of August the formation of three V.D. Treatment Teams was commenced, Nos. 13 and 14 at No. 12 C.C.S., and No. 12 under 5 Corps. Formations had been practically completed by the end of September.

Treatment with penicillin was now standard, and adequate supplies were forthcoming. O.C. No. 12 C.C.S. makes the following comments:

"Treatment of syphilis and gonorrhoea with penicillin commenced in earnest at the beginning of September and a most dramatic change has come over the whole picture. Bed States have fallen and sore cases predominate. The amounts of penicillin used are enormous, and when considering its previous scarcity, almost shocking. But the results achieved in restoring manpower are immense. So far there have been no relapses in gonorrhoea cases treated with 100,000 units. The treatment of syphilis is revolutionary".

Dysentery

Incidence of dysentery was greatest in the last three weeks of July (for week ending 22nd July, 0.67 per 1,000), after which time it declined throughout the quarter.

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5. Battle casualties

Casualties over the whole period were heavy, averaging 0.73 per 1,000 per diem. They were heaviest during the second week in September when they reached 1.51 per 1,000 per diem. About two thirds of those dealt with by Field Medical Units were due to shell or mortar fire.

6. Medical Equipment

During the whole period the Medical Stores situation in the Army was on the whole satisfactory.

During the battle of the Gothic line the supply of oxygen was insufficient. The position was finally stabilised by making arrangements with A.A.I. to send all oxygen for forward distribution to No. 10 Adv. Dep. Med. Stores at Ancona, from which Nos. 7 Adv. Dep. 1., Cdn. Adv. Dep. and 344 Polish Adv. Dep. drew oxygen on the exchange basis of one empty cylinder for one full one. This arrangement worked admirably.

Horrocks boxes during the whole period were never in sufficient quantity to meet demands or to equip units to full G.1098 scale. During the last two weeks some 200 complete boxes arrived in Advanced Depots of Medical Stores, sufficient to meet immediate demands.

7. Rations

Rations for British troops were satisfactory throughout the quarter. Increasing difficulties in rail communications with the onset of wet weather, and the very restricted scope for local purchase, threatened however to limit the supply of fresh rations in the near future.

During August representations were received that the ration for Indian troops operating in the mountainous country north of Arezzo was insufficient. Supplementary items were accordingly authorised for both British and Indian troops of 4th Ind. Div. whilst operating under these conditions.

8. Clothing and Equipment Scales

These were satisfactory. Change from drill to winter clothing was effected on or after 1st October, at the discretion of Formation commanders.

Agreement was reached at a Malaria Committee on 12th September as to the prohibition of shorts in the area north of Rimini, in view of the especially malarious nature of that part of the country.

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9. Sanitary conditions and surroundings

Taken as a whole sanitation in the Army reached a high standard. Disposal of refuse, and anti-fly measures generally, showed an improvement as the summer advanced, and the fly menace never became formidable. In September, during periods of heavy fighting, decomposed corpses, which could not be buried for several days, presented a problem which was temperorarily solved by spraying with tar oil, a duty which was undertaken by field hygiene sections' personnel, who also supervised burial parties as soon as these could be obtained.

10. Conservancy methods

There was no change from those employed during the previous quarter.

11. Water supplies

Investigations by field hygiene sections into the state of training of orderlies in charge of water vehicles drawing water supplies at water points disclosed that a high percentage were completely untrained. For example, 36 out of a series of 61 orderlies interrogated at water points stated that they had received no instruction in their duties. In view of the enormous amount of training which had been carried out, such a revelation was astonishing at this stage of the war.

It would appear at first sight that trained orderlies did exist in units but were not being employed, but it is probable that many units had simply neglected to keep their quota of trained personnel up to strength. Conditions in the desert, where unit purification of water was rarely necessary on account of the efficiency with which bulk supplies were operated, probably had a bearing on this matter, but unit commanders and unit M.O.s were obviously seriously to blame.

There was evidence, also, that the equipment on water vehicles had suffered from neglect on a large scale.

The principal difficulty with regard to water supplies during the period was due to the quantity of silt, sometimes in collodial suspension, in the river water after rain. To quote D.D.M.S. Canadian Corps:

"Streams at times became so filled with silt that the filters became clogged. This was overcome by digging large sump holes near the bank and allowing the water to seep through the natural sand and gravel filter. This method had now become routine where necessary, and power-driven shovels had been made available for the purpose".

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MEDICAL ASPECTS OF EIGHTH ARMY OPERATIONS (continued)

1.10.44 - 31.12.44

1. Progress of Operations.

Hard and continuous fighting, without any very spectacular gains, was the lot of Eighth Army during the last quarter of 1944. The ground and the weather were at times even more formidable adversaries than the Germans, who throughout the slow, bitter retreat fought doggedly and lost no chance of trying to gain the initiative by strong counter attacks. In all, Eighth Army advanced some 25 - 30 miles during the quarter on a front of about 40 miles.

This advance, across the southern edges of the Po Valley, consisted in a series of river-crossing operations. The enemy so designed their retreat that they retired across a series of river obstacles some five to ten miles apart from one another. These rivers appear insignificant on the map, but at this season of the year they are deep and their banks high, treacherous and muddy. On the east part of the line the land is reclaimed marshland, and it had been extensively re-flooded. Fields, and even roads, became quagmires in the rain. In December falls of snow on the plains added to the difficulties of the campaign.

At the beginning of October 1 Cdn. Corps was on the Adriatic sector and 5 Corps was in the hilly country to the south of Route 9, pushing on towards Santarcangelo and Cesena.

On 23rd October Cesena on Route 9 and Cesenatica on the coast both fell. In Cesena the inter-corps boundary actually passed through the town, units of both 5 Corps and 1 Cdn. Corps being concerned in the capture.

About this time 2 Polish Corps took over from 10 Corps, which had been holding the eastern part of the Eighth Army front very lightly. 2 Polish Corps was then given the task of advancing on the axis San Pietro - Galatea - Forli. A number of British units was placed under command 2 Polish Corps, including a C.C.S., a F.D.S., three F.S.U.s and a F.T.U.

The last week in October produced violent gales and rainstorms, with rivers in spate and destruction of bridges. No progress was therefore possible.

In the first week of November the rivers Ronco and Rabbi were crossed and Forli was captured fairly intact. Then the River Marezzo was crossed, next the River Lamone, and finally Faenza was encircled and fell to the New Zealanders and 43rd Ind. Inf. Bde. on 18th December. In the meantime the Canadians had pushed on northwards along the

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coast and had captured the old town of Ravenna on 4th December, and Russi two days later. The remainder of the month witnessed patrolling only, with no further gains of note.

The layout of medical units as on 31.12.44 is shown in ~~Appendix II~~. MAP 23

2. Evacuation of Casualties

Three important factors served to lighten the load on Eighth Army M.A.C.s and A.C.C.s at the beginning of October.

The first was that it became possible to open up Army medical units well forward, in the Rimini - Riccione - Pesaro area. Nos. 83 Gen. Hosp. 54 Gen. Hosp., 15 C.C.S., 12 C.C.S., and 8 Con. Dep. all began to hold patients at about the same time, and the numbers travelling the long road to hospitals south of Ancona fell considerably.

The second factor was that 1 District took over responsibility for all road evacuation south of Fano (except to No. 1 Cdn. Hosp. at Jesi).

The third factor was a large fall in the battle casualty rate, and an absence of increase in the sick rate. As a consequence, ambulance drivers passed from a state of over-strain and excessive hours to what was almost a leisurely existence.

Responsibility for evacuation remained the same. In general, the D.D.s M.S. Corps were responsible for evacuation as far as their rearmost C.C.S. where Army cars took over.

Air evacuation of casualties diminished greatly, and varied from nil in some weeks, when the weather was very bad, to a plane-load a day in good periods. No reliance was placed on the arrival of aircraft, and so the types of cases selected for air evacuation were no longer those in urgent need of surgery. Maxillo-Facial and Neuro-Surgical cases formed the bulk of the evacuees, and the members of the "Trinity" all felt that their cases had a much better chance of arriving at the Base in good condition by this means. Although it was troublesome to keep air evacuation going for so few cases, it was felt worth while as it obviously benefited a small but important section of the wounded.

Ambulance trains were not called forward into Army area during the period.

3. Battle Casualties

The number of battle casualties (wounded only) was markedly less than in the last quarter.

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Week ending	5 Corps	10 Corps	1 Cdn. Corps	2 Pol. Corps	Total
6 October	485	52	465	-	1,002
13th "	755	39	282	-	1,076
20th "	474	-	492	96	1,062
27th "	402	-	319	179	900
3rd November	170	-	60	32	262
10th "	247	-	20	181	448
17th "	374	-	46	130	550
24th "	568	-	51	267	886
1st December	455	-	39	18	512
8th "	484	-	451	81	1,016
15th "	569	-	756	151	1,476
22nd "	576	-	626	166	1,368
29th "	313	-	376	74	763
	5,872	91	3,983	1,375	11,321

D.D.s M.S. of 5 Corps and 1 Cdn. Corps followed the principle of opening a F.D.S. well forward to deal with Priority I and II cases. Three F.S.U.s and one F.T.U. were usually attached to this advanced surgical centre. This enabled round-the-clock surgery to go on for an indefinite period, and was popular with the surgeons themselves.

In close support of this advanced surgical centre one of the Corps C.C.S.s was usually opened, also with two or three F.S.U.s and one F.T.U. attached. The surgeons at the C.C.S. dealt with Priority III cases. This arrangement brought a large surgical potential well forward, and divided the work fairly between the surgical teams, as the larger numbers of Priority III cases were not as onerous or time-consuming as the more serious I's and II's.

All "specialist" cases, i.e. cases in which a head or face wound was the main feature in a casualty, were taken direct to No. 83 Gen. Hosp. where the "Trinity" worked. There were often associated wounds with which the surgical specialist of the hospital dealt at the same time.

In the colder weather, and with shorter evacuations over good roads, casualties travelled well and arrived in the hospitals in remarkably good condition.

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British F.S.U.s worked with New Zealand and Indian C.C.S.s. N.Z. wounded seldom found their way into British medical units, but were evacuated in their own M.A.C. cars to the N.Z. Gen. Hosp. at Senigallia.

4. Medical Arrangements

For the greater part of the period there were some 2,700 British beds available in Eighth Army area in general hospital, C.S.S.s and a convalescent depot, as well as 300 Canadian and 200 Polish beds. Distribution of beds and functions was as follows:-

	Unit	No. of beds	Location	Function
British	54 Gen. Hosp.	300	Riccione area	Medical cases Infectious cases.
	83 " "	200	"	"Specialist" cases and surgery.
	15 C.C.S.	170	"	Triage of all surgical cases.
	18 C.C.S.	150	"	General surgery.
	151 Lt. Fd. Amb.	120	"	V.D. and minor sick.
	53 F.D.S.	100	"	Minor sick.
	59 Gen. Hosp. (with 18 Ind. Stag. Sec.)	450	Pesaro - Fano area	General.
	19 C.C.S.	150	"	General.
	12 "	180	"	General.
	8 Con. Dep.	400	"	Convalescents.
Canadian	3 Cdn. Gen. Hosp.	300	Cattolica	General.
Polish	162 Pol. Gen. Hosp.	200	Riccione	General.
	Total:	2,720		

These figures do not include beds in C.C.S.s under command Corps.

It was possible to hold cases with a hospital expectancy of about three weeks, and this was done.

V.D. cases were held at No. 14 V.D.T.T. attached to No. 151 (Army) Lt. Fd. Amb.

The medical installations in Riccione were the ones which received the flow of sick and wounded from forward, and it was here that triage was carried out. All surgical cases were taken to No. 15 C.C.S., where they were segregated into their priorities, and the "specialist" cases were directed to No. 83 Gen. Hosp.

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which was in the same large building. Medical cases went through much the same process at No. 54 Gen. Hosp. The remainder of the British medical units took the overflow from the three mentioned above, and also local and minor cases.

The "specialist" Surgical Centre at No. 83 Gen. Hosp., consisting of detachments from Nos. 4 Mob. Neuro-Surgical, 1 Maxillo-Facial Surgical Unit and the Ophthalmic Section of No. 50 Gen. Hosp. was busy throughout the quarter and was very favourably placed for securing patients at the earliest possible moment. At the beginning of the quarter they were but twenty miles behind the line, and at the end only about forty. The layout of the building suited them admirably, and it was possible to allot them three good operating theatres. The nursing of their cases was a heavy strain on the personnel of a 200-bed hospital and presented the one disadvantage to attaching the "Trinity" to this type of unit. In other respects it was very suitable, as the number of "specialist" cases in hospital at one time filled almost all the beds. This meant that the hospital was used for one purpose only, with resulting economy in function.

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THE HEALTH OF THE TROOPS

1. The layout of Eighth Army Medical Units on 1st October is shown at ~~Appendix I~~ MAP 22.

2. Physical Geography

The area of operations during the quarter is divided into two regions of contrasting character by the Rimini-Bologna road. This highway, the ancient Via Emilia, forms a straight line running roughly west-north-west, with the principal towns disposed at 10-mile intervals along it - Savignano, Cesena, Forli, Faenza, Imola. To the south the country is hilly, intersected with valleys and small streams, and the secondary roads are narrow and winding. To the north lies the great plain of Ravenna, flat, low-lying, featureless. The Rimini - Ravenna road runs along its eastern border, close to the coast for half its length, until at Cervia the coast line recedes to leave a marshy wedge-shaped strip between the highway and the sea. Between these two main roads lies a network of secondary roads, and a number of useful laterals.

The flat nature of this region, in itself unfavourable to defence, is more than compensated by the abundance of water obstacles. The neighbourhood of Ravenna has been noted for its marshy nature since Roman times. Extensive reclaimation schemes were undertaken in pre-war years, but the enemy disrupted this work and carried out deliberate flooding; at this time thousands of acres, both north and south of Ravenna, were under water. In addition, half a dozen large streams and numerous smaller ones, crossing the plain at right angles to the axis of advance from Rimini, presented natural lines of defence. In summer, under dry conditions, these rivers are small and shallow, and the cultivated land between is reasonably firm; during this autumn the weather was such that great tracts became morasses traversed by torrents. Vehicles were bogged for days on end, and occasionally patrols which had crossed a stream were cut off a few hours later by its rapid rise.

3. Climatic Conditions

The quarter opened with a sharp fall of temperature, and the weather was bad throughout. October and November were wet; December was dry but very cold. In October, in particular, the weather caused serious interference with operations. Rain fell on 20 days during the month, with long continued downpours on several occasions, camps being flooded and vehicles bogged. In November heavy storms occurred about the middle and towards the end of the month, and there was flooding on several main roads; even the delivery of supplies from the Base was interrupted

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at times by the collapse of bridges and railway tunnels. In December the cold increased rapidly and snow settled on the hills; there was a general snowfall on 23rd December, which rapidly cleared, but at the end of the year one main route (Route 77) was blocked by snow.

4. Diseases prevalent among the Civilian Population

The civilian population in the area at this time occupied by Eighth Army suffered severely during the cold weather at the end of the year, and the outlook for the remainder of the winter was very miserable. Large numbers of dwellings had been destroyed or extensively damaged. Window glass or any substitute was unobtainable. Fuel was very scarce and the ration inadequate. Casualties from exposure were almost certain to be high before the warmer weather should bring relief.

Enteric fever

An epidemic which gave rise to over a thousand civilian cases of enteric fever flared up in the republic of San Marino in October and rapidly spread to Rimini, where 307 of the 400 odd cases which occurred before the end of the year were definitely traceable to San Marino. San Marino, being a neutral state, had been swollen by an influx of refugees from its normal population of about 15,000 to 80,000 or more. The epidemic was brought under control and rapidly subsided, but one to three cases a day were still being admitted to hospital in Rimini at the end of the year. The mortality was about 7%. There was no evidence of spread to troops. When the epidemic broke out the Republic of San Marino was being used as a rest centre, and in several instances troops were being billeted in houses where civilian cases of typhoid were lying. As the Republic was seriously overcrowded and there was no operational objection, it was evacuated of troops and put out of bounds. Control of the epidemic was rapidly achieved by co-operation between the military medical authorities and A.M.G.; the water supplies of San Marino and Rimini were placed under military control; the services of No. 2 Mob. Bac. Lab. were made available; a system of health visiting in Rimini was organised, and sanitary assistants were posted to the civilian hospital in San Marino to carry out disinfection and supervise sanitation generally.

Diphtheria

This disease was widespread, but probably not quite so prevalent as reports would suggest. At least 25% of cases admitted to hospital proved, on investigation, not to be true diphtherias. No actual epidemic of diphtheria was reported.

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Malaria

Comparatively few cases were reported. Civil authorities in Ravenna stated that when it was first entered there were few cases in the town, and only about 50 in the marshy area to the north.

Venereal Disease

This disease did not appear to be unduly prevalent. In the towns about 60% of women arrested for soliciting were found to be infected. In the country districts there was probably little venereal disease. Only a small proportion of military infections were acquired locally. In Pesaro, Italian women who associated openly with troops were threatened with reprisals. This may have acted as a deterrent.

Typhus Fever

There was no evidence of heavy louse-infestation, and no cases of typhus fever were reported.

Infective Hepatitis

Nine cases of "catarrhal jaundice", of which six were young children, were reported in Savignano early in December. These were the only cases of possible infective hepatitis which came to notice in the civilian population. The illness was characterised by jaundice, pale stools and a temperature of 102°F., but had none of the haemorrhagic features seen in Weil's Disease.

5. Principal Diseases Affecting the Troops

The health of the troops remained good, the average daily sickness rate being 1.58 per thousand for the quarter. The rate for the week ending 23rd December (1.28 per thousand) was the lowest for the year.

The rate for "alimentary diseases" declined smoothly from 1.36 per thousand per week at the beginning of the quarter to 0.79 at the end. Diseases of the respiratory system showed little variation from an average of 0.75 per thousand per week.

Infective Hepatitis

The 1944 epidemic, which began towards the end of June, had reached its maximum at the beginning of the final quarter of the year. It continued with little change until the last week in November, after which there was a rapid fall.

The heaviest incidence occurred amongst Canadian and New Zealand troops. A biological Research Team was studying the problem in Eighth Army, working particularly with these two Formations.

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Venereal Disease

From its first peak at the end of June, the incidence of venereal disease in Eighth Army declined during July and August, but rose steadily during the last four months of the year. The average number of notifications weekly was:

September (5 weeks)	=	190
October (4 weeks)	=	245
November (4 weeks)	=	281
December (5 weeks)	=	303

Most cases were infected while on leave, notably at Rome.

Canadian Corps instituted an interesting experiment in an attempt to improve their V.D. figures. Specially selected Medical Officers were appointed as "V.D. Control Officers", and N.C.O. volunteers from field ambulances were given courses of training to assist them. Their duty was to visit all units in the Formation, paying particular attention to units showing a high incidence of V.D., to inspect E.T. Rooms and "Pro" Stations, and to give talks to small groups of officers and other ranks. During November, while Canadian Corps was out of the line, a V.D. propaganda week was organised.

D.D.M.S. 1 Cdn. Corps reports:

"A central building was taken over, and in the main room were displayed specially prepared charts, posters and diagrams showing the comparative incidence in various groups; a question booth, well supplied with pamphlets, was set up; educational films were shown in another room several times a day. A model E.T.C. was demonstrated, and a clinic in charge of a M.O. was operated where volunteer blood samples could be taken. Although attendance was voluntary, the general interest created brought in over 900 all ranks each day, and more than 200 volunteered for blood samples daily." With regard to treatment, the following figures given by O.C. No. 12 V.D.T.C. are of interest:

Average number of days in hospital (Gonorrhoea - fresh)

During the quarter April - June 1944	=	19.1
During month of June (penicillin used for sulpha-resistant cases only)	=	13.22
During the quarter October - December (penicillin used for all cases of gonorrhoea - fresh)	=	3.48

The average rate per thousand per week during the quarter under review was 0.93.

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P.A.C.s were in operation in all towns. The number of treatments given was very small indeed compared with the number of condoms and E.T. packets issued, but there was little evidence that any considerable proportion of infections were acquired in the Army Area. As mentioned above, the majority dated from leave, especially at Rome. It would appear from reports of interrogation of patients that the treatment given at P.A. Centres in Rome may not have been very reliable.

D.D.M.S. Eighth Army writes:

"The solution of the V.D. problem in this theatre will not be found in the provision of better P.A. Centres, in propaganda or education, or by suppressing or controlling prostitution. During the quarter under review 3,580 cases were notified amongst troops in Eighth Army, equivalent to an annual ratio of 48 per thousand. 'The British Army in France had, in 1914-18, 26.2 cases per thousand per annum, and in 1939 - 40, 28.2 per thousand per annum'. (Quoted from Harrison, British Journal of V.D., 1941, quoted in the Bulletin of Hygiene, March, 1942). The only measure likely to produce any substantial lowering of V.D. rate in an expeditionary force is leave to U.K. at reasonable intervals.

"The majority of cases of V.D., and the majority of men making use of P.A. Centres, are individuals who have served overseas for two years or more. The well known relationship between distance from home and V.D. incidence (which certainly obtains in the case of U.K. troops) is perhaps reflected in the higher incidence amongst Canadian troops, but the chief factor is individual length of service abroad. The newcomer to any formation which has been serving overseas for a considerable length of time observes a subtle peculiarity of psychology which is difficult to define, but which is reflected in the case of officers in a narrowing of intellectual activity and in the type of conversation and humour which finds favour. Amongst other ranks, with their more limited resources for sublimation through social and intellectual interests, the effect of long continued service overseas is seen in an increase in the V.D. rate, and perhaps in the type of commerce from which infection results. The sense of guilt lessens and the proportion of cases resulting from the more sordid forms of prostitution seems to increase."

"If it were possible to arrange for home leave during the third year of overseas service, the V.D. problem could be reduced by at least a third. It is of interest to note that the incidence of V.D. in Desert Air Force personnel

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in this area during the fourth quarter of 1944 was appreciably lower than that for Eighth Army, i.e., equivalent to 35 per thousand per annum, as against 48 per thousand for Eighth Army. (Figures supplied by P.M.O. D.A.F.). When the fact is taken into account that throughout this period a large proportion of the Eighth Army was in the line, where the opportunities for infection are practically nil, the difference assumes a larger significance."

Malaria

The incidence of fresh cases showed a steady decline from 0.4 per thousand per week at the beginning of the quarter to 0.08 per thousand at the end. The average incidence for the season was 0.77 per thousand per week.

The final meeting for the year of the Malaria Committee was held on 22nd November. The principal lessons of the 1944 season were summarised as follows:-

"D.D.T. has revolutionised malaria control under mobile conditions, concentrating attention on the adult mosquito, and relegating larval control to the more static establishment which followed the advance.

"It is exceedingly difficult to achieve a really satisfactory standard of personal precautions, particularly regarding clothing, and from this point of view it will be an advantage if the use of shorts could be abolished.

"It is difficult to ensure that unit squads work properly or effectively; they are much too inclined to neglect flysol spraying in favour of anti-larval measures.

"The system of Army control of M.C.U.s was an unqualified success, but would be greatly facilitated by the formation of a Malaria Control Coy.

"It is essential that powder sprayers for use in forward areas be mounted on jeeps; heavier vehicles cannot be operated far enough forward."

A.M.C.U.s, which had been placed under command Army for the season, were re-allocated to Formations during November on a basis of two per field hygiene section. They were given instruction in typhus control, and were employed on disinfestation duties, supervision of labour for scavenging duties, etc. It was the intention to give refresher courses on malaria before the end of the winter, officers and serjeants at the malaria field laboratory, and other ranks at field hygiene sections.

It was probably fortunate that the advance into the Ravenna region was delayed until the close of the malaria season. Enormous tracts of country were under water,

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and extensive airplane dusting and D.D.T. spraying would be required before the next season. It is of interest to note, however, that if any reliance can be placed in the testimony of a German medical officer questioned in the P.O.W. cage, who had been in the Po Valley throughout the season, the enemy did not suffer any very large numbers of casualties from malaria. This, if true, appears to have been due to efficient personal precautions. It is possible that enemy discipline in this matter was better than ours; the prisoner detailed the precautions taken, but seemed surprised when asked about measures to enforce them.

Scabies

Scabies first began to increase in the last week of September (from the low level of 0.03 per thousand in the week ending 23rd September) and rose steadily thereafter. In the last week of the year the incidence was 0.61 per thousand.

Diphtheria

During the quarter 428 cases of diphtheria were notified, of which nearly 40% occurred amongst Canadians. The disease in Canadian Corps produced 170 cases between the middle of October and the end of the year, scattered through 70 different units, in no unit assuming epidemic proportions. An immunisation programme was begun, using Formol Toxoid from Canadian sources, and, having been interrupted when the Corps went into action, was being completed at the end of the quarter. As immunisation during childhood is carried out on a wide scale in some parts of Canada, it would be interesting to know the history of the men who developed diphtheria in Italy, but it was found impossible to obtain any accurate data. Infection in almost all cases was probably from civilian sources. There were no severe cases in Canadian Corps.

6. Battle Casualties

Casualties were lighter than in the previous quarter. The peak incidence (0.82 per thousand per day) occurred in the week ending 16th December.

7. Medical Stores

i. Advanced Depots of Medical Stores under command during the period were:

No. 7 Adv. Dep. of Med. Stores.

No. 1 Cdn. Adv. Dep. of Med. Stores

344 Pol. Adv. Dep. Med. Stores.

ii. The Medical Stores situation in this theatre gave rise to concern during October and November on account of the great delay which ensued from the time indents were submitted by No. 7 Adv. Med. Stores to the time of the arrival of items -

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a delay of more than two months, which might have led to a serious breakdown in the provision of medical supplies to the forward troops had it not been for the energetic work of the Mobile Section which daily toured the countryside to try and procure the necessary items from other advanced depots and medical installations, thus tiding over a long period until the full scale of the indented items arrived on 10th December.

Sometimes items marked "Not Available" on the monthly indents could be produced very quickly when requests for these items were placed by D.A.D.M.S. Army to Staff Captain Stores, A.A.I., by telephone.

The arrangement that No. 10 Adv. Dep. Med. Stores would be responsible for the supply of oxygen to all advanced depots worked well until the 16th December, when this store ran completely out of oxygen. The emergency was met by 1 District switching cylinders from No. Ind. Dep. Med. Stores overnight.

With the establishment of No. 2 Base Dep. Med. Stores at Ancona, the situation as regards the supply of medical stores to forward units was expected to become much easier.

iii. Supply of blood and other transfusion fluids.

With the move of No. 5 B.T.U. from Bari to Ancona, the daily anxiety concerning the blood supply to Eighth Army medical installations was relieved.

There were occasions when the forward F.T.U.s, particularly Nos. 9 and 26, seized the initiative and coped with emergencies by bleeding donors in their respective areas.

The supply of other transfusion fluids was adequate, but an increasing rate of reaction from plasma transfusion was reported.

Penicillin was in good supply and distribution of the drug by No. 9 F.T.U. was very satisfactory.

8. Rations

The decline in the availability of fresh fruits and vegetables began to cause anxiety at the beginning of October, and a study of issues during the second half of that month showed that the gross vitamin content had fallen to not more than 30 mgm per man per day. As cooking might reduce this to 12 mgm or less, an issue of compound vitamin tablets was authorised, to be commenced at the discretion of formation commanders on medical recommendation. Strenuous efforts were made to improve supplies, and by the end of November it was possible to discontinue issues of vitamin tablets to all but Army troops, as fresh rations were by then available in almost all areas. The special efforts of Supply and Catering branches at Christmas produced a further

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if temporary, improvement, and all troops in Eighth Army undoubtedly had a more than sufficient vitamin supply over the quarter as a whole.

The issue of additional rations to troops operating under exceptional conditions of altitude and climate was authorised on 6th October (A.F.H.Q. Ration Scale No. 6); with the onset of cold weather, however, some complaints were received about the bulk of the ration. These came principally from Medium and Heavy Regiments, R.A., who submitted that, while the ration was adequate in calories, troops employed on heavy duties at night in exposed conditions suffered from hunger unless they were supplied with extra items of food. After due investigation an application was made to higher authority for approval of an issue of an additional 2 ozs. of bread in such circumstances.

9. Clothing and Equipment Scale

The change-over from khaki drill to battledress was effected at the beginning of October, and early in November a fourth blanket was issued to all troops. Repeated representations had been made to higher authority that a fifth or even a sixth blanket might be necessary during the colder months in norther Italy, but the supply position did not permit of even a limited issue of a fifth blanket. A number of sleeping bags was made available, however, and 5,000 each were issued to Polish Corps and 5 Corps, to be held as a pool for distribution as necessary. Duffle coats and leather jerkins were issued widely to selected personnel. Despite the severe cold towards the end of the year no complaints about the clothing situation had been received at Army H.Q.

The nature of the terrain in which Eighth Army was operating made the danger of trench feet a very real one, and this problem received early consideration. Orders on the subject were published, and every opportunity taken to encourage regimental officers to realise their responsibilities in this regard. Foot-soap and foot-powder were made available in adequate quantities, and a number of empty insect repellent containers (1500 per Corps) was issued for use as powder receptacles. The sock position caused anxiety; the American socks originally in use were very thin and afforded poor protection compared with the British pattern and medical representations that a fourth pair of socks would probably be required on a large scale were met with the information that, owing to a world-wide shortage of wool, sufficient stocks did not exist in the theatre to permit this. Eventually, however, the thin-type American sock was replaced by one very similar in weight to the British sock, and sufficient stocks were found to enable a fourth pair to be issued on a fairly generous scale to troops whose situation made them necessary.

10. Sanitary Conditions and Surroundings

Each town, as it was entered in the course of the advance, required a

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considerable general clean-up, but owing to the absence of the majority of the inhabitants conditions were not usually bad from the sanitary point of view.

Flies continued to be troublesome in some areas until the end of October.

Sewage disposal systems existed in all the small towns, but were very primitive, crude sewage being discharged into any convenient stream or canal; in some places the water supply was so poor that a special sluice was used to flush out the sewers from time to time. As would be expected in flat country, a high proportion of houses were on the cesspit system

In peace time the towns and villages of this part of Italy must have presented a standard of sanitation which would have compared very favourably with that of places of a similar size in England. The public buildings are imposing and soundly built; dwelling houses are generally of a high standard and contain such amenities as water closets, baths, central heating and electric light, and in the newer suburbs the streets are wide and every house has its own garden.

11. Conservancy

Unsatisfactory sewage disposal systems, damage to the sewers, and an inadequate water supply determined the general use of deep trench or bucket latrines in all towns when first occupied. As the water supply was restored, it became possible in many instances to take house water closets into use. Cesspits offered a difficult problem, however, as very few cesspit emptiers were found in a serviceable condition.

Control tips were established in all towns, usually supervised by Hygiene or Malaria Control personnel.

12. Water Supplies

With reference to previous observations about the state of training of Water Duty personnel, further investigation revealed that, on the whole, operational units were much more satisfactory in this respect than Army units. All units now had their proper quota of fully trained water duty personnel and reserves.

Municipal supplies were restored, in part at least, in most towns which had been occupied for any length of time, although the supply was generally intermittent. Chlorination was carried out at the source, wherever possible, although with an intermittent water supply this is exceedingly difficult with improvised apparatus, and calls for constant attention and frequent checks.

Sub-artisian and shallow wells abound throughout the area; most of the latter were subject to pollution. Cases of enteric fever frequently showed a history of having drunk untreated well water in the area north of Pesaro during active operations.

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Progress of Operations

1. The quarter saw very little fighting and, apart from two local advances, Eighth Army was content to occupy the east bank of the River Senio and to carry out patrols. The first local advance was at the beginning of January when 1 Canadian Corps reached the south shore of the Valli di Commachio, and the second was on 3rd March when the Cremona Italian Combat Group unexpectedly earned the plaudits of Eighth Army by capturing Tre di Primaro and 500 German prisoners for a loss of 150 to themselves.

2. Evacuation of casualties

Casualties were light, averaging about 30 per day for the quarter, and so evacuation presented no great problem. When 567 (AFS) A.C.C. were withdrawn in February, their 120 ambulance cars were easily spared. The Company was reviewed by the Army Commander before leaving, when he gave to them the privilege of wearing the Eighth Army Shield in perpetuity as a unit sign.

Air evacuation was on a small scale and for specialist cases only. In all, 838 cases were evacuated from Rimini airfield during the quarter.

3. Medical Units

For the greater part of the period it was possible to hold cases of up to 30 days' hospital expectancy in Eighth Army Medical Units. No. 66 Gen. Hosp. was opened at Riccione and housed the "Trinity", which again comprised No. 4 Mob. Neuro-Surgical Unit, a detachment of No. 1 Maxillo-Facial Surgical Unit and the Opthalmic Section of No. 83 Gen. Hosp.

This hospital opened in Cesena on an excellent site and provided good accommodation for officers and for infectious cases. In addition, on the advice of the Consulting Surgeon, 140 odd cases were selected for primary suture during the quiet period. Of these cases 70% were fit to return to duty within 17 days.

4. Regrouping of Formations

1 Canadian Corps left Eighth Army in the middle of February. As a result, 5 Corps took over the Adriatic sector, and 2 Polish Corps came up astride Route 9 in the former 5 Corps sector. The withdrawal of 1 Canadian Corps was by easy stages and, as their larger medical units (No. 5 Cdn. Gen. Hosp. and the C.C.S.s) were withdrawn, Canadian troops were treated and evacuated through British medical channels.

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5. Italian Combat Groups

The Cremona Combat Group came under command 1 Canadian Corps in early January and the Friuli Combat Group under command 5 Corps in February. These groups consisted of about 9,000 men each, and each was provided with two field hospitals of 50 beds apiece and a Medical Section which incorporated stretcher-bearer elements and the equivalent of a field hygiene section. The problem of bringing their sanitary discipline to a reasonable level is discussed elsewhere in this narrative. Their care and treatment of casualties was faulty at first owing to their lack of experience, and all the old mistakes - such as failure to indicate when a tourniquet had been applied or when morphia had been given - cropped up with regularity. The Consulting Surgeon prepared a "Vade mecum" for medical officers which was translated into Italian and given to Italian medical officers. By this means and by the efforts of the Staff Captains (Medical) and the British Liaison Units a great improvement soon took place.

6. Indian Casualties

There was no suitable staging unit for Indian casualties before No. 31 Comb. Gen. Hosp. at Numana. Therefore, No. 15 C.C.S. at Riccione and, on its departure, No. 18 C.C.S. at Cattolica were reserved exclusively for Indian cases. No. 39 Ind. Stag. Sec. was attached and provided interpreters and cooks. Both of these C.C.S.s adapted themselves remarkably well to a strange task and carried out most useful work.

7. Transfusion Fluids and Penicillin

Whole blood was obtained by bleeding local donors, and the supply of plasma and crystalloids never gave any anxiety.

Penicillin became really plentiful for the first time.

8. Summary

The quarter provided few acute medical administrative problems. There was no major outbreak of malaria, and battle casualties remained low.

Planning for the Spring Offensive was begun in this quarter.

A map showing the lay-out of Eighth Army Medical Units at 31.3.45 is attached. (SEE MAP 24)

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The Health of the Troops

I. Physical Geography

As no substantial advance was made during the quarter, the area of operations remained the same as previously described. In the coastal sector about 15,000 acres of flood water existed at the beginning of the period in three areas - on either side Route 67 to the north east of Ravenna; in the Pineta di Classe neighbourhood north of the lower reaches of the Savio, and to the west of Route 16 opposite Cervia and Cesenatico. These had been considerably reduced by the end of March as a result of pumping operations and natural drying.

A 10 Corps Ski-ing Rest Camp was established at Sarnano. Until the end of February suitable slopes were found at 1,500 - 2,000 feet, but by the middle of March the snow line had receded to 4,000 - 5,000 feet.

II. Climatic Conditions

The quarter opened with cold, dry weather and several heavy snowfalls, and throughout most of January the greater part of the Army area was covered with a thick layer of snow. Hard frosts occurred at night, but there were occasional mild spells which led to local floods, and in the Ravenna neighbourhood fogs were frequent. Towards the end of January, however, short periods of sunshine and thaw and blustery dry winds resulted in a gradual clearing of the snow without much flooding. Excellent weather followed, with sunshine and clear skies, very little rain and a gradually increasing temperature. By the end of March the countryside was full of fruit trees in blossom. Weather conditions did not at any time seriously interfere with transport. Route 67 from Forli to Florence, where difficulty had been expected during January, was kept open throughout. Icy surfaces produced a considerable number of accidents in the first half of the quarter.

III. Diseases prevalent among the civil population

Considering the severity of the devastation in this area, with the consequent overcrowding, exposure and shortage of all the ordinary necessities of life, the health of the civilian population remained surprisingly good. Up to the end of January there must have been much suffering as a result of the housing conditions and the shortage of food and fuel, but obvious signs of malnutrition were not nearly so frequent as they were farther south. Reliable data on the prevalence of disease were not obtainable. A.M.G. reported a steady improvement in returns, but it was obvious that most figures then available could not be regarded as either accurate

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or complete. There could be very little doubt, for example, that tuberculosis had increased very considerably and that the number of cases reported was only a small fraction of the whole.

Enteric Fever

The San Marino - Rimini epidemic had subsided before the close of the year and only sporadic cases continued. It is clear, however, that this was not an epidemic in the true sense, but was in the nature of an acute exacerbation of an endemic, which still smouldered and was likely to flare up again. O.C. No. 2 Mob. Bact. Lab., who undertook the greater part of the bacteriological investigations during and after the outbreak, insisted throughout that the "epidemic" was not checked as a result of the various measures which were taken but merely permitted to subside, and that unless a search for carriers was energetically pursued a serious flare-up in 1945 could be predicted with certainty. He reported that he could not rely on effective co-operation in this regard from the civilian authorities.

Towards the end of the quarter an increase in the number of cases of enteric fever was noted in Forli Commune.

A.M.G. began an immunization campaign which, however, met with considerable difficulty as a result of popular distrust of injected vaccine. Much opposition from civilian doctors, ostensibly based on fear of the "negative phase", was encountered whilst the outbreak was in progress in Rimini. The Italian medical profession has a curious preference for the completely useless oral vaccine, whilst their respect for the "negative phase" does not deter them from using vaccines in the treatment of enteric fever cases.

Diphtheria

Many scattered cases continued to occur until the middle of March when the incidence appeared to show signs of declining. Most cases were reported from Ravenna, Bagnacavallo and Faenza neighbourhoods, but no actual epidemic occurred.

Venereal Disease

About 45% of women submitted for examination were found to be infected. Gonorrhoea was detected about twice as frequently as syphilis. These figures from a selected class do not reflect the condition of the population as a whole in which venereal disease is probably not excessively common. Few military infections were traceable to local women.

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Malaria

Very few cases - none in February, only two in March - were brought to the notice of the A.M.G.

Typhus

No cases were reported. Lousiness was not a serious problem in this area.

Infective Hepatitis

Sporadic cases were now being recognised among civilians, and a total of eighteen were reported in February.

IV. Principal diseases affecting the Troops

On the average the daily sickness rate was lower than that for the corresponding quarter of the previous year - 1.46 per thousand as against 1.76 in 1944. Accidental injuries rose gradually from the fairly low figure of 0.88 per 1,000 per week ending 3rd February to 1.58 per 1,000 at the end of the quarter. This rise was probably associated with increased road traffic.

Respiratory diseases showed a reverse tendency, steadily declining from 1.18 per 1,000 in the 3rd week of February to 0.6 per 1,000 in the week ending 31st March.

Venereal Disease

This was the largest cause of sick wastage during the quarter. A comparison between the curves of incidence for this quarter and for the first quarter of 1944 is interesting; the incidence fluctuated between 0.06 per 1,000 per week and 0.65 for the former, whilst for the latter the lowest incidence was 0.8 and the highest 1.38. No quarter in 1944 showed so bad a record as this first quarter of 1945. In only 13 weeks in the whole of 1944, but in 11 out of the first 13 weeks of 1945, was the incidence higher than 1 per 1,000 per week.

Battle casualties in the first quarter of 1944 were low, so the difference cannot be attributed to greater activity at that time, and the opportunities for infection were certainly not less. The most significant difference is the fact that another year had been added to the length of time overseas.

From the beginning of the year a Comparative Weekly Health State of Formations was circulated, though it was recognised that the figures given were not strictly comparable. Figures for V.D. showed that Canadians and Poles had the highest incidence, but that among British Formations, whichever was out of line had the largest number of cases, as one would expect. Most infections were contracted whilst on leave; in this connection, D.D.M.S. 10 Corps may be quoted:-

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"The analysis of the sources of infection of all cases which pass through Corps Medical Units invariably tells the same tale. 80-95 per cent. of all cases were infected in Rome. A Corps Order was published enforcing the use of a P.A. Centre after each exposure to infection. A man who contracted V.D. subsequent to exposure in Rome and who failed to produce evidence that he had attended a P.A. Centre was punishable under the Army Act. While these and other methods - e.g. propaganda, films, lectures - may have produced some decrease, it was only when the Rest Centre, which was located in one of the main streets of Rome, closed that the number of cases started to decrease. Eighth Army Rest Centre, to which 10 Corps now send personnel for leave, is located very much further out of Rome and is not producing cases to the same degree. The cases contracted in the Corps Area are negligible, and the infecting women are invariably apprehended and submitted for treatment."

The propaganda campaign carried out by Canadian Corps was not followed by an improvement in their figures while they remained with Eighth Army.

Infective Hepatitis

A comparison between the two first quarters, 1944 and 1945, was as encouraging in relation to infective hepatitis as in relation to venereal disease it was depressing. 1944 opened with an incidence of 1.55 per 1,000 which fell gradually to 0.3 at the end of the first quarter. In 1945 the incidence began at 0.45 and fell to 0.19.

Malaria

The incidence of fresh cases fluctuated between 0.02 and 0.16 per 1,000 per week. All the Italian Gruppi under command were known to be fairly heavily infected, the Cremona Gruppo being the worst. Incidence of relapse was expected to be high in April and May.

Eighth Army was now situated in what is probably one of the most dangerous localities for malaria in Europe. The risk was greatest in the belt which includes Ravenna and stretches outwards from Lake Comacchio for a distance of about 15 miles, as it is here that A.sacharovi (elutus) breeds in the saline marshes; farther north this variety is probably to be found in large numbers at any place within 15 miles of the sea. The other vectors in the Po valley (the principal of which is A. maculipennis var atroparvus) are much less important. There was a possibility, however, that, should the enemy flood any considerable part of the lower Po Valley, in the subsequent drying out A. sacharovi might spread westwards with disastrous results.

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Planning for the coming season was based upon recognition of these facts.

The first meeting of the Malaria Committee was held on 20th February. Medical and "A" representatives from all Formations attended, and the Adviser in Malariology, A.F.H.W., was present. General lines of policy and action were decided.

No. 8 Mob. Mal. Lab. held training courses for medical officers, for officers and N.C.O.s of Malaria Control Units, for Polish A.M.C.U.s, for Italian medical officers and malaria officers, and for D.A.A.s G. (Malaria). Courses for malaria diagnosis assistants were held at Nos. 1 and 2 Mob. Bact. Labs. The Italian Malariologist attached to No. 8 Mob. Mal. Lab. visited all three of the Italian Gruppi and the 228th Div., lectured to hygiene personnel and regimental officers and arranged for lectures to be given to all officers by the Formation malaria officers who had received special training for this purpose at the Laboratory. Unit anti-mosquito squads and unit malaria officers were trained by field hygiene sections or, where this was not possible, by R.M.O.s. Nos. 11 and 19 Fd. Hyg. Secs. held special courses for Italian squads. So far as formal training was concerned, it was considered that by the end of April the position should be completely satisfactory.

Destruction of hibernating mosquitoes by D.D.T. spraying of buildings began shortly after the middle of March. All Malaria Control Units were placed under command Army for this purpose, and the scheme of operation which worked so successfully towards the end of the previous season was put into commission. The Army Malaria Control Company was now authorised, the effective date being 1st April, 1945. This would make little difference to the method of operation but would finally put Eighth Army scheme on a firm basis.

1% D.D.T. solution was applied by hand-sprayers, and preparations were well advanced for aircraft control of breeding. In January it was estimated that an area of about 12,000 acres might require treatment in the territory then occupied. This area had been considerably diminished by pumping and natural drainage, but the amount of shallow water and marshy land lying ahead was so enormous that planning was based on an empirical figure of 30,000 acres, of which half might be treated with D.D.T. and half with Paris Green. This would necessitate a supply of about 10,000 gallons of 5% D.D.T. in derv and 20 tons of 25% Paris Green weekly. The airfield at Rimini was selected as the most suitable place to use as a base, and a storage and loading depot was established. It was arranged that three large tanks with a total capacity of 8,000 gallons should be connected by means of a pipe line to a pump and feed pipe;

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two smaller tanks to be used for mixing purposes. A mixing plant for Paris Green and cement was established at a factory in Cesena.

Scabies

The rising incidence noted towards the end of 1944 continued to the end of January - 1.29 per 1,000 per week - when it dropped again, the quarter ending with a rate of 0.63 per thousand. This comparatively high incidence was not attributable to any particular Formation or nationality. Canadians, Italians, Polish and British troops all produced unusual numbers at some time during the quarter, and there appears to have been a general increase in this disease. It is possibile that there was an association between this increase and that noted for V.D.

Pediculosis

Routine impregnation of all shirts passing through mobile laundries began early in February. It is tempting to relate this factor to the fall in incidence of pediculosis which occurred about that time - from 0.56 in the last week in January to 0.08 in the last week in February, but the decline certainly commenced before impregnation was in general use.

Infective Parotitis

A total of 174 cases occurred among Indian troops. All were mild. Infection, as is normal among Indian troops at this time of the year, was widely scattered and it was not possible to impose a strict quarantine.

V. Battle Casualties

The total number of battle casualties for the quarter was 3,679, the highest weekly incidence being 0.4 per 1,000 for the week ending 6th January, and the lowest 0.06.

VI. Medical Stores

Advanced Depots of Medical Stores under command during the quarter were:-

No. 7 Adv. Dep. Med. Store

344 Polish Adv. Dep. Med. Stores

"S/ Italian Adv. Dep. Med. Stores

The position as regards supply and distribution of medical stores remained generally satisfactory throughout the period. At the beginning of February D.D.M.S. Polish Corps stated that considerable difficulty had been experienced in obtaining adequate supplies of anti-syphilitic drugs, especially Bismostab. This was brought to the notice of the Consulting Venereologist, and with improvement in the supply

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position stocks were made available to 2 Polish Corps through their own Advanced Depot of Medical Stores.

Several requests were received for a standardised transfusion stand for use in advanced surgical units.

The supply of blood and penicillin to forward units was from No. 2 Base Transfusion units at Ancona through No. 9 F.T.U.

Blood was not issued to units not capable of storing it and, in general, units forward of C.C.S.s and F.D.S.s were not supplied.

The supply of penicillin was fair and towards the end of the quarter good.

VII. Rations

The quality of the ration was excellent. Most meat and potatoes were fresh. Early in the quarter some difficulty was experienced in obtaining fresh vegetables from local sources, and priority was then given to operational troops, with a result that ascorbic acid issue was necessary in 10 Corps for a short period.

High altitude rations were issued to certain troops engaged in snow clearance on mountain roads.

VIII. Clothing and Equipment

Towards the end of 1944 10,000 sleeping bags were issued to Polish Corps and 5 Corps for distribution to troops in exposed positions for whom four blankets were not sufficient. One sleeping bag was found to be equivalent in warmth to at least two blankets, but experience showed them to be too bulky for general use by forward troops. Eventually the use of sleeping bags was restricted to Army troops and to semi-static Corps troops, and by corresponding withdrawal of blankets from those issued with sleeping bags an Army pool was established for issue as necessary to troops in specially exposed positions.

ATSO - I for anti-louse impregnation of shirts at mobile laundries became available towards the end of January, and from then onwards all shirts were impregnated as a routine. Treated shirts are undistinguishable on ordinary examination from untreated, and few troops realised that they were wearing impregnated shirts. Some trouble arose at the laundries from the fumes which are given off in the drying process. So long as ventilation around the dryer was free no inconvenience was caused, but at night the black-out restrictions caused fumes to accumulate, and some of the operators suffered from nausea and vomiting. To avoid this, all treatment of shirts was carried out in the hours of daylight.

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IX. Sanitary Conditions and Surroundings

As the Army remained static throughout the quarter it was possible to achieve a high standard of cleanliness in occupied towns and villages. This was facilitated by the fact that the inhabitants of this part of Italy are of a rather better type generally than the Italians of the south.

Two Italian Gruppi, the Cremenona and Friuli, were under command during the greater part of the quarter, and another (Folgure) for a shorter period. Sanitary conditions among these troops were positively shocking. When they first came under command no units used latrines, and billeting areas were indiscriminately fouled. R.E. structures when provided were misused and broken to pieces. The officers showed as little indication of any rudiments of sanitary conscience as the men. The medical section of each group included a "Disinfection and Anti-Malaria Platoon", some of whom had attended courses on hygiene, but as effective units they might as well not have existed. When they were employed at all it was on duties which had no relation to hygiene. Furthermore, in the Italian Army, rank counts for so much that it was difficult to see how an Italian hygiene officer, and much less a N.C.O., could function as a sanitary adviser, as it was not possible for him to advise a unit commander of higher rank than himself about difficulties in sanitation. The approach of the fly and mosquito season was, therefore, viewed with gloomy foreboding, especially as it was known that these Gruppi included a high proportion of gametocyte carriers as a legacy from Sardinia.

Intensive training and efforts at supervision provided some improvement. At the end of the quarter all hygiene personnel had received special courses of training, and courses had been held for unit sanitary personnel. Most units had latrines of a satisfactory pattern, but the popularity for use of these structures was not as great as their interest as a novelty, and indiscriminate fouling was still a problem which had not been solved.

X. Conservancy

Deep trench latrines were the rule, even in towns, wherever it was possible to employ them. Burn-out latrines and buckets with Otway Pit disposal were used in some units. Cesspits in towns produced the usual difficulties, and in Rimini area two improvised cesspit emptiers were put into use with great success.

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Some excellent controlled tips were set up by hygiene sections. This had been found the only satisfactory method in towns, as most units either could not or would not dispose of their refuse individually in a satisfactory manner.

XI. Water Supplies

Rapid progress was made during the quarter in the work of restoring municipal supplies. By the end of March all occupied towns had a satisfactory supply except Ravenna, where, however, work on the original supply from wells 26 miles south at Torre Pedrara had been practically completed by the end of the quarter. Wallace Tiernan Chlorinators were used in several towns. In others improvised chlorinators made by field hygiene sections were employed; these called for constant attention and checking.

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MEDICAL ASPECTS OF EIGHTH ARMY OPERATIONS (CONCLUDED)

1.4.54 - 30.6.45.

Operations Affecting the Medical Services

1. Operation "Buckland"

This was the code name for a series of operations whose purpose was to cross the River Senio in strength and destroy the enemy south of the River Po.

Operations began on 1st April when 2nd Commando Bde. attacked the Spit on the east of Lake Commachio and advanced up to Porto Garibaldi. From 1st - 9th April final regrouping was completed, and at 1920 hours on 9th April a full-scale attack on the River Senio was launched by 5 Corps and 2 Polish Corps. The attack was preceded by the heaviest-scale air operation of the war in this theatre, 800 heavy bombers and 1200 fighter-bombers and fighters taking part in the softening-up process. Flame throwers were used on a very large scale in the Senio crossing which went entirely according to plan.

56th Div. (5 Corps) carried out an amphibious operation on 10th - 11th April, landing on the west shore of Lake Commachio to outflank the vital Argenta gap. Between 9th and 14th April there were 2,600 wounded in Eighth Army.

By 15th April 5 Corps had broken into the Argenta gap, and both 5 Corps and 2 Polish Corps had crossed the rivers Santerno and Sillaro. At the same time 13 Corps, with 2nd N.Z. Div. and 10th Ind. Div. under command, moved from central Italy to take over the sector between 5 Corps and 2 Polish Corps. The next week's operations were a follow-up of a withdrawing enemy who none the less was fighting skilfully, as a toll of 2,400 wounded between 16th and 22nd April shows. This period took the Army into the Po plain and saw the capture of Bologna by the Poles.

By 25th April Eighth Army had joined with Fifth Army north of the river Reno, and on 26th April the New Zealanders crossed the Po, to be followed shortly after by the remainder of 13 Corps and 5 Corps.

13 Corps then become the pursuit Corps and advanced rapidly across the rivers Piave and Tagliamento to Monfalcone near Trieste.

The total of wounded in Eighth Army between 9th April and 2nd May, when the German Army Group in the south west finally capitulated, was 6,484.

2. Operations after 2nd May

Marshal Tito's Yugoslav army was in possession of the Port of Trieste, and his units and Formations were beginning an infiltration of the provinces of Carinthia in

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Austria, and Venezia Giulia in northern Itlay. This state of affairs was countered by moving ten Allied Divisions into Austria and north Itlay, comprising six British Divisions, one N.Z. Division, one Indian Division and two U.S. Divisions. This display of force brought negotiations to a successful conclusion, and in mid-June Marshal Tito agreed to withdraw his troops from Austria and relinquish control of the Istrian peninsula.

3. Medical Appreciation and Plan for Operation "Buckland" (See ~~App. I~~ MAP 25)

(a) Strength of Eighth Army

The total strength of Eighth Army at the start of the operation was approximately 290,000 and with the arrival of 13 Corps rose to 334,000 by 12th April.

(b) Corps and Army medical units available on 9th April:

	Brit.	N.Z.	Ind.	Pol.	Ital.	Total	Total Beds
FDS	8	-	-	-	-	8 (X 50) =	400
CCS	6	1	1	2	-	10 (X 120) =	1,200
FSU	13	-	1	4	2	20	-
FTU	7	1	-	2	-	10	-
Gen. Hospt. (200 beds)	3	-	-	1	-	4	800
Gen. Hosp. (600 beds)	2	-	-	-	-	2	1,200
Ital. Hosp.	-	-	-	-	-	6 (X 100) =	600
Total beds in Corps and Army areas							4,200

Note: The following additional medical units arrived with 13 Corps troops later: one Indian C.C.S., two F.D.Ss., three F.S.Us., two F.T.Us.

(c) Estimate of battle casualties and sick

This estimate was made for the first ten days of the battle only.

Battle Casualties

700 per day for the first three days	=	2,100
400 per day for the next seven days	=	2,800
Total D Day to D + 10		4,900

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Sick

Estimated at 2 per thousand per day on a strength of 290,000 for first three days and then on 334,000.

Therefore:

Daily Sick for first three days 580 X 3 = 1,740

Daily Sick for next seven days 668 X 7 = 4,676

Total Sick - D Day to D + 10 6,416

Total sick and battle casualties from D Day to D + 10 11,316

Note. The battle casualties (wounded) estimate was in this case produced by "Medical" Eighth Army from a study of the casualty figures for the Cassino and Gothic Line battles and differed markedly from the "G" figures. The actual figures were 902 on D Day, and the total for the first ten days was 4,809.

(d) Forward Surgical Teams

The following teams were available for the treatment of Priority I, II and III cases:

In FSUs	21
In CCSs	10
In 200 bed Gen. Hosp.	2
	33

These surgeons could average sixteen operations per day for a prolonged period on a mixed intake of Priorities. They could thus deal with 508 (say 500) wounded daily.

Therefore it seemed likely that surgical teams would have to average 20 wounded a day for the first three days and that minor wounds would be dealt with by surgeons in the Riccione and Ancona group of hospitals.

(e) Casualty evacuations

(i) Ambulance Cars

The following ambulance car units were available in Corps and Army areas:

Three British MACs	243	Ambulance cars	12 TCUs
One Polish MAC	75	" "	
One Platoon N.Z. MAC	25	" "	
One Indian MAS	25	" "	
One Sec. British MAC	25	" "	
	393		12

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These ambulance cars were responsible for evacuation from Divisional field ambulances as far back as No. 5 Gen. Hosp. at Pesaro. It was estimated that they were more than sufficient.

Rearward of Pesaro, responsibility for evacuation was with D.D.M.S. of No. 1 District.

(ii) Ambulance Trains

These were arranged to run six days weekly from Forli or Rimini to Ancona. Average load - 180 casualties.

(iii) Air Evacuation

It was arranged that only seriously wounded cases would be evacuated by air, and their number was estimated to be about 200 per day.

(f) Estimate of daily evacuation out of Eighth Army for first ten days

Total sick and wounded for first 10 days	11,316
Total beds	5,000

It was therefore anticipated that 6,316 cases would be evacuated out of Eighth Army area in the first ten days - an average of 632 per day.

Note: It was realised that these figures must be an over-estimate, as they do not take into account the slightly wounded or minor sick who would remain in Army area. As it turned out, the "wounded" estimate was correct, but the sick rate did not rise as was expected and averaged only 470 per day instead of 640 as estimated. Consequently, this evacuation estimate out of Army area averaged 350 per day for the fortnight 7th - 20th April.

4. Casualty evacuation and treatment during initial stages of operation

(a) 5 Corps

Advanced Surgical Centres were set up at Russi (by No. 57 F.D.S. with two F.S.Us. and one F.T.U.) and at Ravenna (by No. 59 F.D.S. with two F.S.Us. and one F.T.U.). These two units dealt with the bulk of Priority I and Priority II casualties. Priority III cases were sent to Forli where No. 59 Gen. Hosp. and No. 5 C.C.S., each with two F.S.Us. attached, admitted casualties alternately; or, for Indian and Italian casualties, to No. 9 Indian C.C.S. at Ravenna where two F.S.Us. were attached. N.Z. cases were evacuated to No. 1 N.Z. C.C.S. at Forli.

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On 12th April No. 59 F.D.S. closed at Ravenna, leaving behind some 50 severely wounded who were too ill to stand evacuation. This large number is an indication of the pressure of work at the Advanced Surgical Centre. They were taken over by No. 65 F.D.S., and No. 58 F.D.S. moved on to Lugo.

(b) 2 Polish Corps

For the start of the battle, Advanced Surgical Centres were formed at Barnaba (No. 3 Pol. Fd. Amb. with two F.S.Us.) and at Faenza (No. 4 Pol. Fd. Amb. and one F.S.U.). All British cases were evacuated to No. 3 or No. 5 Pol. C.C.S. at Forli. British and Gurkha cases from formations under command 2 Polish Corps were evacuated to the British units in Forli, and only Priority I and II cases were held in Polish units.

(c) 10 Corps

All battle casualties were evacuated to No. 59 Hosp. at Forli.

(d) Eighth Army

It will be seen from the above that Forli was the forward focus for casualty evacuation. Nos. 4 C.C.S., 5 C.C.S., 59 Gen. Hosp. 1 N.Z. C.C.S. and 3 and 5 Pol. C.C.Ss. were all in the town and there were fourteen Surgeons working here. It was also the most forward centre for rail and air evacuation. Ambulance trains were called forward three times a week and up to 200 cases a day were despatched to Bari by air each day.

Road evacuation was to No. 83 Gen. Hosp. at Cesena and thence to the general hospitals in the Rimini - Riccione - Pesaro area.

5. Casualty evacuation and treatment after the initial stage. (See ~~App. II~~ MAT 26)

5 Corps set up their main Advanced Surgical Centre at Alfonsine by 16th April. As well as No. 58 F.D.S., No. 1 C.C.S. opened in the town and this constituted a focal point for forward surgery until 18th April when No. 5 C.C.S. opened in Argenta. 13 Corps had now arrived and had opened No. 3 Ind. C.C.S. in the Lugo area. No. 56 F.D.S., with two F.S.Us. and a F.T.U., opened near S. Petrizio. As for 5 Corps, so for 13 Corps, rearward evacuation was to Forli.

For 2 Polish Corps, the move of No. 6 Polish Gen. Hosp. to Forli made their evacuation problem very much simpler and only long-term cases were evacuated further.

10 Corps took over command of Macforce, an independent force of six infantry battalions which had been containing the Monte Grande feature, and as the advance

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continued it became possible to evacuate their casualties along Route 9 to Forli instead of to Florence.

Casualty evacuation through the Army area continued as before, and a summary of sick, wounded, and evacuation figures for the period 9th - 18th April is given below.

Sick and wounded admitted to Eighth Army Medical Units

(9th April - 18th April)

Sick	4,239
Wounded	4,303
Total	8,596

Evacuated out of Eighth Army Area

(7th April - 20th April)

By ambulance car	1,928
By ambulance train	1,234
By air	1,687
Total	4,849

6. Crossing of the River Po: 18th April - 2nd May (See ~~App. III~~ MAP 27)

5 Corps had established an Advanced Surgical Centre at Argenta by 19th April, and No. 1 C.C.S. together with No. 57 F.D.S. moved to Copparo, west of Ferrara, by 24th April. This became the main surgical centre for the River Po crossing, cases being evacuated thence back through No. 5 C.C.S. at Argenta to the Forli area.

No. 9 Indian C.C.S. moved into Ferrara on 22nd April and dealt with all Indian battle casualties.

At the same time, 13 Corps were moving medical units up behind the fighting troops. 10 Corps and 2 Polish Corps had been withdrawn after the fall of Bologna on 22nd April.

The line of evacuation was lengthening very rapidly, and, to provide hospital beds well forward and also to establish a staging area, No. 54 Gen. Hosp. was opened at Ferrara on 29th April.

7. Advance through Venezia Giulia. (See ~~Apps. IV and V~~ MAPS 28 & 29)

5 Corps moved their Medical Centre up to Padua where No. 1 C.C.S. and Nos 57 and 58 F.D.Ss. were opened. No. 4 C.C.S. was passed to command 5 Corps and opened at Rovigo to stage casualties en route for Ferrara. Corps responsibility for evacuation ended at Ferrara where Army took over.

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13 Corps, who were the "pursuit" Corps during this stage, had medical units spread from south of the Po nearly to Trieste, and for most of the time the D.D.M.S. was out of communication with D.D.M.S. Army. As the situation stabilised, No. 19 C.C.S. moved to Padua and Nos. 52 and 55 F.D.Ss. to Porto Guardo and Cervignano respectively.

Battle casualties fell considerably after the Po crossings, as might be expected, and so the very long lines of casualty evacuation were not over-burdened.

Every effort was made to start air evacuation from Ferrara, but this proved impossible as the R.A.F. finally decided not to open up the airfields.

8. Wounded Ps.O.W.

At this time some 3,500 wounded Ps.O.W. fell into our hands in hospitals at Abano Terme, Conegliano and Pordenone.

An extract from the Consulting Surgeon's Report of the casualties in these hospitals is given below:-

"A visit to such a hospital is like stepping back into 1914-16, though we must not overlook the difficulties with which the Bosche had to contend. At Imola, formerly occupied by the Germans, civilians told us that the enemy was getting his wounded away in ox-drawn carts, travelling by night and hiding by day and harassed at any time by our bombing and shelling. This would lead to long delays before primary surgical treatment could be given. One surgeon declared that 'Wounds did not behave like this until they came to Italy', but as he had previously worked on the Russian front during winter months that is the probable reason. One would have thought that some progress might have been made by adopting a technique suitable to this highly cultivated terrain, but there is no evidence of it. Is this a reflection on German Medical Schools, stripped of their best brains and staffed by men so rigidly disciplined in politics that free thought and reasoning in medical science forms no part of the training?"

D.D.M.S. Eighth Army decided that, humanitarianism apart, it was very much in our own interests to attempt to clear these hospitals and return as many as possible of the patients to the P.O.W. camps.

At each group of hospitals a small British administrative cadre was formed and a F.S.U. was attached to advise the German surgeons and to instruct them in the nature of working of such equipment and drugs as were supplied from British sources.

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9. Clinical

The following extract from a report by the Consulting Surgeon on the final battle of Eighth Army is quoted:-

"If there is any progressive spirit at all, the surgery of each new offensive should be better than that of the one before, though factors other than mere surgical skill and experience play their parts in the final results. Thus, good stretcher-bearers, correct firstaid, accurate triage, well judged resuscitation, sound surgery, good lines of evacuation and well organised distribution of cases at the Base all contribute. In this last battle we were well served in all these things, and it has been gratifying to hear reports of unparalleled excellence.

"Thus, in the first 600 wounds arriving at No. 5 Gen. Hosp. At Pesaro 95% were fit for delayed suture 3 - 5 days after wounding, and of these over 90% healed to 100% perfection. During one visit I saw large numbers of these operations; the wounds might have been incisions of premeditated procedures, so clean and free from inflammatory reaction were they, only an occasional small slough being seen. A report from the Chest Centre at Bari said that in the first 60 cases arriving not a single instance of sepsis was encountered.

"This happy state of affairs results from the combination of all the factors above mentioned, and surgery can claim to have made considerable progress in the past five years - early evacuation to the surgeon, adequate surgery, good splinting, non-interference with dressings and an organisation by which cases reach hospitals for delayed suture within 3 - 5 days.

10. Position at the end of the quarter

(a) For location of medical units see ~~Appendix VI.~~ MAP 30

(b) 5 Corps

With 6th Armd. Div., 46th Div. and 78th Div., 5 Corps was now established in the Austrian provinces of Styria and Carinthia. It was planned that, when H.Q. Eighth Army should move into Venice, the building up of hospitals should begin and that area should become medically self-sufficient, the only cases for evacuation being those for invaliding to the U.K. Casualty evacuation was at this time via Udine to No. 22 Gen. Hosp. at Mestre.

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(13) 13 Corps

This Corps, with 56th Div., 1st N.Z. Div., and 10th Ind. Div. under command, had an internal security role in the Trieste area. No. 19 C.C.S. and No. 3 Ind. C.C.S. were at Palmanova, No. 66 F.D.S. at Trieste and No. 55 F.D.S. at Pola. Evacuation of casualties was through Udine to Mestre.

(d) Eighth Army

There were two Army Medical Areas. At Udine the main units were Nos. 70 and 83 Gen. Hosps. and No. 64 F.D.S. for minor sick. Evacuation was by road to Mestre or by air to Rome, for which one aircraft a day was employed.

At Mestre No. 22 Gen. Hosp. was open together with No. 12 C.C.S. Evacuation was by road into 1 District hospitals.

(e) Surrendered Personnel

There were remaining some 18,000 German wounded in the 5 Corps area in Austria. They were scattered in about 50 hospitals and were supervised by A.Ds. M.S. of the Divisions in whose area they fell.

(f) Displaced Persons

These presented a big problem in the initial stages. Some hundreds of thousands of civilains, and also Cossacks, Slovenes and Chetniks, who had been fighting for the Germans, were pushed on into Austria by the Russian and Yugoslav advances. They had no belongings and they were directed into groups according to their nationalities. Their camps were bare fields in which they made shelters for themselves of branches of trees or any other object to hand. It was thcught that about 150,000 displaced persons would remain an Eighth Army responsibility through the winter, and huts would be provided for them.

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The Health of the Troops

I. Physical Geography

The last battle of the Italian Campaign began on 9th April and ended with the total capitulation of the enemy forces on 2nd May. Eighth Army crossed the Po on 24th April, and when the end came 5 Corps was in Austria, and 13 Corps had swept right round the northern margin of the Adriatic as far as Monfalcone. In the period under review the Army passed from the foothills of the Apennines and the plains of Ravenna into the high Carinthian lakeland of Austria, and occupied Venezia Giulia, Trieste, and Pola.

The battle opened with the crossing of the Senio in the low-lying Ravenna plain, already described in detail. The struggle for the Argenta gap was fought between the reedy shallows of Lake Comacchio and the flooded country to the south and west, in a district already, even at that time, swarming with mosquitoes. The advance across the Po and the Adige carried our forces with increasing rapidity safely beyond the confines of this most dangerous region, where the larvae of A.saccharovi thrive in the saline marshes and lagoons near the river mouths.

Venezia Giulia is a fertile plain between the Alps, rising like a wall against the northern sky, and the waters of the Adriatic. Excellent roads link Padua at the western end with Udine and Trieste in the north and east. The plain is watered by numerous wide shallow streams, and the malaria risk is high at any point within ten miles of the coast and as far east as Monfalcone. The countryside is highly cultivated and well wooded and in parts is reminiscent of some of the agricultural counties of England. Apart from the destruction of bridges and villages at important road junctions and river crossings, the war had left but little mark.

Our troops entered Austria along two main highways - Route 13 which climbs gently along the valleys of the Tagliamento and the Fella, and Route 54 by Caporetto and the magnificent Pass of Predil. Both ascend through narrow defiles which would have been exceedingly difficult to force against determined opposition. Bridges and tunnels were destroyed and the restoration of the railway line presented a formidable problem. Carinthia is a beautiful country full of deep lakes and wide fertile valleys, fir-clothed hills and long grey limestone ridges. It suffered very little from the devastation of war. The roads are excellent, towns and villages are clean, well-built and modern, and there is an abundance of timber. The countryside is rich and highly cultivated.

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II. Climatic conditions

Except for a heavy fall of rain towards the end of April, which slightly hampered our crossing of the Po, the battle was fought in weather which could hardly have been more favourable. The nights were cool and the days were fine and sunny, with only occasional showers. From the middle of June onwards the day temperatures rapidly increased and by the end of the quarter the weather in Venezia Giulia was often excessively hot by day and close and oppressive by night. In Austria it was cooler and there were frequent thunderstorms accompanied by torrential rain. In the foothills on the Italian side of the Alps rainstorms were often sudden and surprisingly localised.

III. Diseases prevalent among the civil population

During the battle the worst destruction fell upon the villages in the Argenta gap and in the Lugo district, where the offensive opened. Many civilians were killed and wounded, and many more were rendered homeless. Several villages were completely destroyed by concentrated bombing and shelling.

North of the Po there was much less devastation and comparatively little damage was done to the majority of towns. Padua, Venice, Udine and Trieste suffered very little, and the Austrian towns and villages were affected hardly at all, although in some there had been a good deal of bomb damage earlier in the war.

The nutrition of the civil population in both Venezia Giulia and Carinthia was in general very good. Both are rich agriculturally and can have suffered little in the way of serious food shortage during the war.

Available information about the prevalence of disease is scanty and unreliable. Enteric fever is endemic in many towns (notably Venice, Trieste and Ferrara) and there were small civilian outbreaks after our occupation in Villach and elsewhere. Tuberculosis and increased year by year in Carinthia and was said to have reached a rate of 17.9 per 1,000 in 1945; the incidence was also high in Trieste. Venereal disease was rife in Trieste, as shown by the incidence amongst the New Zealanders from the first few weeks of their occupation of the city. Malaria is unknown in Austria, but in the coastal strip along the Adriatic the prevalence had been high during the war. Sandfly fever occurs at various places round the Adriatic but is of a mild type.

The refugee population in Austria furnished scattered cases of typhus and enteric fever. Some of these people were heavily infested with lice and scabies,

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and their V.D. rate was probably high. It was fortunate that the end of the war came in early summer and not in winter, otherwise infectious disease would have been a more disturbing factor than it was.

IV. Principal diseases affecting the troops

The average daily sickness rate fell week by week during the battle, reaching the record low figure of 1.09 per 1,000 in the week ending 5th May. By the end of the quarter it had returned to its usual level of just under 1.5 per 1,000.

With the end of the battle accidental injuries shot up from under 1.5 per 1,000 per week to over 2 per 1,000 in the second and third weeks of May, but tended to decrease towards the end of the quarter.

Respiratory diseases continued to decline steadily until the week ending 5th May (0.22 per 1,000), after which there was a slight increase to about 0.5 per 1,000 at the end of the quarter.

Venereal Disease

Venereal disease was the only infectious condition which gave rise to any serious concern during the quarter, and its depredations were largely confined to a single Formation.

The rate fell during the battle, as might have been expected, reaching the low figure of 0.47 per 1,000 in the first week of May. It very quickly swung back to about 1 per 1,000 where it continued to the end of the quarter.

The contribution of 2nd N.Z. Div. to this figure was out of all proportion to their numbers. The week ending 9th June shows this best. In that week 2nd N.Z. Div., representing about 6.5% of the whole of the total Army strength, produced no less than 48% out of a total of 215 cases. This represented a rate of 5.09 per 1,000 among the New Zealanders, the rate for the remainder of Eighth Army being 0.59 per 1,000.

A.D.H. Eighth Army makes the following comments:-

The causes of this abnormal incidence amongst New Zealanders are interesting. While the New Zealand figures were soaring up the incidence in U.K. Formations was tending to diminish, so the increase cannot be attributed solely to the end of hostilities. Practically all infections were acquired in Trieste, which was jointly occupied by Marshal Tito's troops and the New Zealanders. The women of Trieste are both attrective and amorous and their fear of the Yugoslavs may have prompted them to seek the company of the New Zealand troops for protection, if for

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no other reason; it was reported that families of all classes were prepared to offer every kind of inducement in order to get a British soldier to sleep in the house and protect them from looters. Moreover, the civil control of prostitutes had been disrupted and this may have been a minor factor in producing a high incidence. The chief cause, however, may be adduced from the fact that in practically every case V.D. patients amongst the New Zealanders admitted that they had taken no precautions of any kind. It is reasonable to infer from this attitude to prophylaxis that there was probably a general increase in promiscuity as well.

"A.D.M.S. 2nd N.Z. Div. was convinced that this disquieting state of affairs was due in large measure to ill-considered propaganda in the popular press about penicillin. He believed that many soldiers had concluded from reading articles in "Reader's Digest" and elsewhere that the cure for V.D. by means of penicillin was so simple that they need no longer have any fear of the consequences of promiscuity. It is interesting to speculate on the reasons why the same cause has not, apparently, led to a similar effect in the case of U.K. troops."

In general, of course, the U.K. troops in Austria and other parts of the Army area may be supposed to have had fewer opportunities and perhaps less temptation than the New Zealanders in Trieste. Although the attendances at P.A. Centres in Venice were relatively large, little V.D. appears to have been acquired there. Despite the ban on fraternisation in Austria, the V.D. rate during June was higher amongst British troops there than among British troops elsewhere: 0.57-0.79 per 1,000 per week, as compared with 0.41-0.55 per 1,000 outside Austria.

Malaria

From the medical point of view one of the most satisfactory results of the final battle was that it saved us from danger of an extensive outbreak of malaria in the coming season. On 24th May it was possible to publish an A.R.O. permitting all routine anti-malaria precautions to be discontinued to the north and east of the following boundary: north of Cordroipo, Route 13 to Udine - Route 56 to Gorizia; east of the river Taglismento. From the end of the battle onwards the only really dangerous areas occupied by Eighth Army troops were those around Monfalcone and Cervignano, and the belt between Route 14 and the sea, especially near the mouth of the river Isonzo. After the settlement of the Trieste problem it became possible to move nearly all troops out of the really dangerous areas and give thorough cover to those who remained.

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It is hardly surprising, therefore, that the malaria incidence was low. The highest weekly rate for primary cases was 0.36 per 1,000 in the week ending 9th June. In 13 Corps alone, which was the Formation most exposed to infection, the highest combined rate for fresh plus relapse cases in June was 0.66 per 1,000 per week; that was at the beginning of June, and the rate fell to only 0.13 per 1,000 in the last week of the month, a remarkable figure for a "highly malarious" zone at the end of June. For this there were three reasons; site selection, vigorous extra-regimental control, and a high standard of personal protection, of which three the first was probably the most important factor.

Although one result of the success of the final battle was that the elaborate organisation, previously described, for dealing with malaria was never put to a really severe test, it must be conceded that it worked most admirably. There was not a single serious hitch in the arrangements. Detachments of the Malaria Control Company, under the direction of two officers of the Malaria Field Laboratory, achieved very rapid cover of the worst areas by flysol-spraying with power plants mounted on Jeeps and 30-cwt. vehicles. This was followed by a systematic spraying of buildings with D.D.T. in kerosene, using hand-sprayers. At first 1% D.D.T. was used; later the strength was increased to 3%, observations having shown that 1% D.D.T. as then applied gave only about four weeks' protection. Every building treated was clearly marked with the letters "D.D.T.", the number of the detachment, and the date. With the end of the fighting it became possible to concentrate on the worst areas in which there were aggregations of troops, and about the end of May the programme was completed and all detachments were switched to larval control.

Aircraft spraying and dusting began in the middle of May. The Paris Green mixing plant at Cesena and the improvised D.D.T. mixing and loading arrangements at Rimini were an unqualified success. The American pilots were extremely keen and did excellent work. In the second half of the quarter a total of about 30 tons of Paris Green - cement mixture, and the equivalent in diluted concentrate of about 10 tons of crude D.D.T. (some 50,000 gallons) were distributed from the air. No. 8 Mob. Mal. Fd. Lab. carried out continuous surveys, including a check on the Klagenfurt area in Austria, and generally supervised all extra-regimental work in Eighth Army.

The pamphlet "Don't Get Malaria Now" was distributed to all ranks as a personal issue.

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Infective Hepatitis

The gradual decline in incidence which occurred in the first quarter continued until it reached the low level of 0.06 per 1,000 for the week ending 5th May. Thereafter it showed a tendency to rise, and the curve for the first six months of 1945, though much shallower, bears an interesting resemblance to the symmetry of the previous years' pendulum-like swing. It seemed as if under settled conditions infective hepatitis might have a definite seasonal incidence, with the peak in October or November and the trough in May or June.

Dysentery

Compared with that for 1944 or for any other year in the history of Eighth Army, the incidence was very satisfactory. There was an abrupt increase in the second week in May, but the rate then recorded (0.29 per 1,000) was the highest in the quarter and was largely due to 2 Pol. Corps (59 out of a total of 64 cases). The Poles left Eighth Army in May, and the incidence immediately fell to less than 0.1 per 1,000 per week and remained at a low level afterwards.

This satisfactory state of affairs was due to the remarkable paucity of flies, which in turn may be attributed to the nature of the area with its widely scattered prosperous farms, good general sanitation and clean-living people. Efficient unit sanitation and, to a minor degree, the use of D.D.T. must also have played a part.

Scabies and Pediculosis

Scabies, while fluctuating mildly, showed a declining tendency, while pediculosis took the opposite trend.

Sandfly Fever

There was a brisk outbreak in troops of 13 Corps after the occupation of Pola, due to extensive breeding in the rubble of bombed buildings which would have taken a long time to clear away. The rubble was sprayed with D.D.T. with good effect. The disease was mild and the incidence fell rapidly. During the week ending 23rd June, there were 7 cases among R.N. personnel. The following week 102 cases were reported, 44 of them among R.N. personnel, the remainder among British troops.

V. Battle Casualties

The total number of battle casualties during the quarter was 6,210, of which 4,982 occurred between 7th and 21st April. It is interesting to note that the casualties for this quarter, which included the final battle, were less than double

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the number sustained during the previous quarter (3,679) in which no major engagement took place.

VI. Medical Stores

The quality of stores was good, and the position as regards supply and distribution remained generally satisfactory throughout the quarter. In the middle of May, when the light section of No. 7 Adv. Dep. Med. Stores was in Klagenfurt and the heavy section at Padua, it appeared as if supply difficulties for units around Udine might occur, but No. 3 Adv. Dep. Med. Stores arrived at Udine from Florence and were open and functioning before any difficulties arose.

Both these depots obtained their stores by road from No. 2 Base Dep. Med. Stores at Ancona, and this method proved satisfactory. Units were supplied by road from advanced depots.

The Italian units were able to obtain almost all their requirements from their own stores, and only rarely did they draw on British units. This was a marked change from the previous quarter, when concern was caused by the quantity of medical stores the Italians were obtaining from British sources.

There was an increased demand for dental appliances and materials, and all dental units were working at high pressure throughout the quarter.

Supply of Oxygen

Until Padua was opened as a medical centre all the oxygen in use in the Army came from Florence via No. 3 Adv. Dep. Med. Stores, who were at that time established there.

For a short time No. 7 Adv. Dep. Med. Stores obtained oxygen locally from a producing plant in Padua.

In early June arrangements were made for No. 3 Adv. Dep. Med. Stores to obtain oxygen from a producing plant in Udine, which was also supplying oxygen to the R.A.F. The output was amply sufficient to meet demands from both 5 and 13 Corps.

Supply of Blood, Plasma and Penicillin

During the quarter all these items were in good supply and were distributed direct to units by the "Blood Bank", No. 9 F.T.U. This unit was located at at the beginning of the quarter and remained there until Ferrara was opened as a British Medical Centre on 27th April. Communications proved to be rather long during the forcing of the Argenta gap, but the battle was moving so rapidly that it was considered inadvisable to move the "Blood Bank" until the position should have

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become fairly static. The "Blood Bank" remained at Ferrara for the crossing of the rivers Po and Adige and on 4th May moved to Padua. Towards the end of May it moved again to Udine, where it was attached to No. 83 Gen. Hosp. and remained there for the rest of the quarter. Units were very well supplied with blood, plasma and penicillin, and no cases of inadequacy or failure to receive supplies were reported.

After the battle the supply of blood from Base virtually ceased and hospitals and C.C.S.s obtained such supplies as were required by local bleeding.

VII. Rations

The battle was a triumph for the supply services. Every Formation under command reported that the rations issued even to the most rapidly moving troops were excellent in every way. At the height of the conflict the fighting troops received at least one hot meal daily and fresh meat and vegetables reached them regularly. Only rarely was it necessary to issue M & V and biscuits.

From the beginning of May onwards the supply services had to tackle some new and formidable problems. Eighty thousand troops in Austria and to be supplied with rations, and there was no possibility of establishing through rail communications for several months at least. In the initial stages enormous numbers of refugees had to be fed from Army sources and, with the exhaustion of enemy stocks, the feeding of the surrendered enemy forces had to be undertaken as well. The result was that while the ration for our troops in Austria was adequate throughout in quantity, it was deficient in fresh vegetables and fruits after the middle of May. Plenty of perishable fruit and vegetables could be found around Forli and Ancona but transport difficulties would not admit of the delivery of more than a small proportion by road, and most of it was unsuitable for the unavoidably slow and interrupted journey by rail. Some oranges, however, were received from Base towards the end of the quarter. The vitamin 'C' content of the ration was low enough to produce complaints from certain Formations in Austria but not sufficiently low to justify the issue of supplements. It never fell below about 15 mgm ascorbic acid net per man daily.

At the beginning of May there were estimated to be in the British zone in Austria about 350,000 individuals of all nationalities - surrendered forces, prisoners of war, refugees and displaced persons - who had to be sorted out and fed. Those who came in the category of Displaced Persons were supposed to be rationed by

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the Austrian Government, but in the early stages most issues of food came from Army sources.

Enemy stocks of food were soon exhausted, and surrendered personnel were fed according to scales based on available supplies, drawn up by agreement between S.T. and Medical branches at Army H.Q. These scales furnished about 2,000 calories per diem for non workers and up to about 2,900 for manual workers. This ration was very much better than the scales to which the enemy had been reduced in the last stages of the struggle, but it was badly balanced and notably deficient in first-class protein and vitamins - particularly vitamin 'C'. Its defects were, of course, recognised from the beginning, but the situation was such that they had to be accepted. On 28th May, as a result of a detailed analysis, D.D.M.S. Eighth Army addressed a memorandum to D.T.S.T. which included the following:-

"The most serious deficiencies are in vitamin 'C' and animal protein; the latter is most likely to cause trouble in connection with heavy work. The low vitamin 'A' content is also a dangerous element in view of its influence on the resistance to infections. When dehydrated potato is included in the ration the vitamin 'C' level becomes just sufficient to prevent deficiency, but this, presumably, could not be guaranteed.

"It is recommended, therefore, that compound vitamin tablets should be issued so far as supplies will permit; if possible, one tablet daily or, failing that, on alternate days.

"In view of the fact that scattered cases of typhus have already occurred, it is essential that so far as possible the nutritional level should be maintained. For this reason it is recommended that issues of vitamin supplements should be commenced without delay."

It proved, however, that compound vitamin tablets could not in any circumstances be provided. Ascorbic acid tablets were asked for in their place, but by the end of the quarter efforts to improve the ration had met with little success.

It may be noted that the state of nutrition of both enemy forces and displaced persons showed a remarkable lack of obvious signs of deficiency disease. Not a single authentic instance of any of the well-known nutritional disorders came to notice; no doubt some minor cases would have been found had they been carefully sought, but in general the impression given was of lean, hard, tired and demoralised men who looked remarkably healthy despite their hardships. It seems unlikely that

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there was not, amongst all these defeated thousands, a substantial population who had failed over a long period to obtain a sufficiency of one or other of the essential dietary factors, according to accepted standards. It is possible that a very gradual deterioration in diet, such as must have happened in the German Army, may enable the body to adjust itself to deficiency to a greater extent than has been realised before, and that the danger level may be lower in such circumstances than in the case of sudden deprivation.

VIII. Clothing and equipment

Khaki drill was taken into use early in May. The change-over was well timed, the end of April having been rather cooler than was expected, and the temperature rapidly mounting from the middle of May onwards.

In Eighth Army the use of shorts was prohibited throughout the Army Area "at any time except for organised recreation". This somewhat revolutionary measure had been given a trial at the end of the previous malaria season, more as a means of testing the general reaction than in the hope of reaping any immediate benefit. It was accepted with very little criticism from any quarter at the opening of this season and served a useful secondary purpose in helping to impress upon everybody the dangerous nature of the country in which the Army was then operating.

The advance, however, rapidly carried 5 Corps into Austria, which is non-malarious. The ban on shorts was therefore partially lifted on 24th May, when all routine anti-malarial precautions were discontinued north of the line Codroipo, Route No. 13 to Udine - Route No. 56 to Gorizia, and soon afterwards was lifted throughout Army area.

D.D.M.S. Eighth Army writes: "Thus passed one of the very few instances in which this particular measure, advocated by "Medical" with monotonous regularity every malaria season since the beginning of the war, has been put into practice. Had the battle gone otherwise, and had we been held up in the Po Valley throughout the season, there can be little doubt that our malaria casualties would have been materially reduced by the prohibition of shorts."

The nights in Austria were relatively cool, and all troops there retained three blankets, 46th Div. in the Wolfsberg areas having four.

IX. Sanitary conditions and surroundings

In Austria both the people and their dwellings look much cleaner than they do in Italy. The public services of all towns and villages in Carinthia are excellent.

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The countryside is fairly thinly populated and villas and farms are soundly built and usually have modern plumbing and sanitation. The discharge of sewage into the lakes is prohibited, and most lakeside dwellings have cesspits which are cleared at regular intervals, the contents being disposed of on the land. Despite the enormous number of homeless people wandering in droves over the countryside in May, there was little obvious fouling, and fly breeding was conspicuous by its absence; but the prevalence of bug infestation in camps and buildings in Austria was remarkable.

Venice with its extensive waterways was full of unusual sanitary problems. On the whole, the canals are surprisingly clean, there being more tidal current than would have been expected in the Adriatic, which helps to clear them. Refuse is collected by barge and dumped at sea. Towards the end of June refuse in the numerous side alleys was beginning to produce flies, and the smaller canals were becoming odoriferous in the summer heat. The presence of enormous numbers of rats offered a very difficult problem, especially on the Lido; before the war there were very large numbers of cats in Venice, as individual owners had been made responsible for keeping their property free of rats after a plague scare some years before, but during the war the cats were slaughtered for food, and the rat population increased enormously. Typhoid fever was endemic, about twenty cases occurring weekly all the year through.

Venezia Giulia is prosperous, not very thickly populated and fairly clean and the towns have good public services. In Trieste, the sewers and water mains were severely damaged, and repairs were delayed during the Yuguslav occupation. Typhoid fever is endemic in the city. In Pola the worst problem was how to deal with extensive sandfly breeding in the rubble of bombed buildings.

The sanitation of British troops improved after the end of the battle, and few instances of fouling of the countryside by indiscriminate tips, etc. came to notice. During the advance hygiene sections supervising controlled tips generally managed to hand over to the incoming hygiene or sanitary sections or to A.M.G. The absence of any serious fly infestation, and the low record of dysentery during June, bore witness to the generally satisfactory state of affairs.

The worst problem in sanitation during this period concerned refugees and displaced persons. The conditions amongst some of the early conglomerations of people - one could not call them camps - where men, women and children of all ages

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and nationalities were grouped in the lowest stages of wretchedness and want were indescribable. Conditions were bad enough in the field, but in buildings they became infinitely worse. Nearly all these people were lousy, starving, hopeless and exhausted and too ignorant and apathetic to use latrines properly in the few instances where they could be provided. Scattered cases of typhus, fortunately only a few, were found here and there, and the first thought of everybody concerned was to carry out disinfestation; but in actual fact the greatest menace of this period was of dysentery or enteric fever. By great good fortune no large epidemic occurred. Up to the end of June there had been only one small outbreak of enteric fever which affected two camps.

X. Conservancy

The problems of conservancy, and the methods adopted to meet them remained substantially the same as before.

XI. Water Supplies

No special difficulties were encountered. All the large towns occupied during the advance had had excellent supplies of dependable purity, and most of these were either in working order or were quickly restored. In Trieste there were complications due to the occupation of the city and the waterworks by the Yugoslavs, and to bomb damage to mains and sewers in one district, but this problem did not last long. In general, the policy was to restore the purification plant when stocks of chlorine gas, etc., were available from civilian sources (e.g. at Trieste, Grado, Udine), and where this was not possible to instruct units in the town to carry out hand chlorination.

Few problems arose even during the rapid advance. Water points were established without difficulty on the numerous streams flowing through Venezia Giulia, and Carinthia abounds in excellent supplies. Most of the large camps constructed for the Todt organisation in Austria had good piped supplies which required no purification.

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MALARIA CONTROL IN MOBILE WARFARE
ITALIAN CAMPAIGN 1943-1945

by

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Fourteen hundred years ago Justinian's general, "the genial Belisarius," undertook a war in Italy which foreshadowed in astonishing detail the campaign of 1943-1945. From Sicily by Reggio and Salerno to Naples, from Naples to Rome, from Rome by the "the rock of the Apennine" to Ancona and Rimini; step by step he forced the Germans (Goths) to their last shelter at Ravenna, and brought a four-year struggle to a triumphant conclusion in the same malaria-ridden plains which saw the final destruction of Kesselring's Army.

Had this miniature edition of the recent campaign taken place in modern times its medical history might have afforded some interesting parallels. Unfortunately no such basis for comparison exists. The Italian campaign in the last war (1914-1918), for example, was fought under conditions so different that it would be idle to compare them. In any case, even if such comparisons were valid they would obscure the most interesting point about the battle against malaria in Italy, which is the fact that this campaign witnessed, not so much an improvement, as a revolution in the methods of combating malaria in war.

When the Eighth Army landed in Sicily its conception of malaria prophylaxis was not two steps ahead of the previous war. By the close of the campaign the control of malaria in mobile warfare had emerged as a practical proposition for the first time in military history. Given the necessary discipline and training, there is no reason why mobile operations in Europe should ever again be attended by heavy casualties from malaria.

Power sprayers; D.D.T.; aerosol bombs; an effective repellant - these, and the Jeep, have made it possible for an army to protect itself from malaria under the most difficult conditions. In studying the Italian campaign we can watch the effect of their introduction, first on the theory of malaria prevention, and later more tardily their results in the field. The evolution was never completed and malaria claimed its victims to the end, but they fell by tens where formerly they would have tumbled down in hundreds.

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Sicily witnessed a medical disaster which repeated on a small scale many much-quoted episodes of previous wars, but which did not, fortunately, affect the outcome. The battle of the Lombardy Plain saw a new organization based on the new theory in full operation for the first time. The chief object of this paper is to trace the administrative steps which led from one to the other. To assess what was actually achieved is difficult, but it is significant that after the initial setback in Sicily - an experience which those who were present never forgot - control measures were so effective that many medical officers are now unwilling to believe that any other region in Italy is really highly malarious.

MALARIA IN ITALY

In 1740, Horace Walpole mentioned "a horrid thing called mal'aria, that comes to Rome every summer and kills one." It first "came to Rome" about 200 B.C. after the second Punic War, and throughout the ages a high prevalence in Italy has frequently been associated with the devastation of war. The sacking of Rome early in the fifth century A.D. and again in the sixteenth century were followed, for example, by severe exacerbations of malaria. Some evidence however, has been adduced (Celli) to show that apart from the influence of war on the one hand, and man's efforts at control on the other, waves of increase and decline extending over centuries at a time have occurred in Italy, the last of which began its "natural" decline about fifty years ago. It is not easy, therefore, to predict with confidence what the malarial condition of any part of Italy will be in a particular set of circumstances.

Hackett, in his celebrated work "Malaria in Europe," used two interesting maps to demonstrate the manner in which the mortality from malaria in Italy declined in the forty-year period up to 1930. These show clearly that while the decline has been enormous, the distribution of the worst areas remains the same - namely (excluding Sardinia), the Foggia and Taranto plains and the southern half of Sicily. In other words, a glance at the malaria map must have suggested when the Italian campaign was planned that the invaders were about to be thrown into contact with the worst of whatever malaria risks the country might be able to offer.

How bad it was likely to be nobody could have predicted with certainty. In 1887 the malaria mortality in Italy was 710 per million; by 1914 it had fallen to 57. During the last war it rose year by year to a peak of 324 in 1918, but by 1939 it had been reduced to the low level of 14 per million. From 1924 onwards

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the reduction had been partially, and perhaps largely, due to land reclamation schemes carried out under the direction of the Rockfeller Experimental Station in Rome. It soon became clear that the systematic destruction of these bonification schemes was part of the policy of the German Army in retreat, but to what extent this would result in an increase in malaria was a problem to which there could be no definite answer.

Long after the Allies had established themselves in Italy, and access had been gained to the best Italian sources of information, the same uncertainty existed regarding the parts of Italy as yet unoccupied. At the end of June, 1944, one malariologist was rash enough to circulate a "Review of the Malaria Situation in Italy", based upon data obtained from certain reputable authorities. This had no sooner appeared than it was fallen upon by the malariologists of another unit, who declared themselves, at considerable length and not without heat, to be "at variance with most of his points." They insisted that neither the past history of malaria in Italy, nor malaria morbidity figures, nor spleen nor parasite rate, could be accepted as indices of the state of any district in Italy under the peculiar conditions of warfare; the habits of the vector were liable to change, intensive medication of the population in malarious areas made spleen and parasite surveys unreliable and a fluid refugee population reduced prediction based on pre-existing conditions to absurdity.

PLANNING FOR SICILY

At the close of the Sicilian campaign the lessons of the operation were reviewed. The reports make interesting reading. It was easy then and it is easier now, to discover faults, when the critic is unhampered by the practical administrative difficulties of a large combined operation, the forces and staffs of which were dispersed over three widely separated Commands.

The original instructions were excellent; reliance was to be placed in the initial stages on mepacrine, protective cream (Mark II), clothing precautions, and head-nets for assault troops. Later, "as soon as possible after landing," nets or sandfly-proof bivouacs were to be provided and flysol spraying was to be carried out. It is only when one studies the results that the loopholes in the original plan become obvious; which is not the same thing as saying that they could have been avoided. For example, it was soon evident that most troops who went into action

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wearing shorts would not, and often could not, change into slacks after sundown, and it was realised that it would have been better not to have issued shorts at all. Yet it was eighteen months, and the third season in Italy, before repeated representations resulted in a temporary and grudging withdrawal of shorts from troops in a highly malarious zone of operations.

Sicily was the Eighth Army's first contact with malaria and, even if the training and equipment had been beyond criticism, casualties would certainly have been suffered through inexperience. As it was, later investigations showed that too much of the training had been theoretical. The D.D.H., Middle East (Colonel A. E. Richmond, C.B.E.) after a visit to Sicily when the epidemic was at its height, commented that "practical training (in the use of individual protective measures) had not been adequate - this as distinct from theoretical instruction, of which much had been given. It is felt that one and a half hours at least per week should be included in the training programme of all units likely to proceed to malarious areas. This instruction should include the actual putting up of bush-nets and bivouacs, the application of cream, important points in the selection of camp sites, etc."

The 1st Canadian Division prepared for the operation in England and Scotland. They were particularly unfortunate in regard to malaria training. Certain vital instructions about precautions and planning were either lost in transit from Cairo or very much delayed, and no clear directions was received until the D.D.M.S. 30 Corps, visited the division in the U.K. only five weeks before the date of the actual landing in Sicily. A specially trained malaria officer, who was provided by Middle East and flown home, was so much delayed en route that he only joined the division three days before embarkation. It is hardly surprising that the A.D.M.S., 1st Cdn. Div., commented rather bitterly: "Planning for protection against malaria offered many problems mostly caused by lack of clear information of the conditions to be met and inexperience with the disease in general. In this one thing alone, one feels that concise, comprehensive instructions should be made available to English planning staffs at once. Information trickled in slowly and seemed incomplete. Time for planning was brief and there was no time for extensive training of special personnel. Equipment was provided so late that no one had time to see it, let alone become familiar with it. "He mentions, also, that "for reasons of security medical officers were not allowed to commence the study and

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discussion of malaria and other tropical diseases until too late on in the planning".

The inadequacies of training showed themselves in many ways, all of which contributed to the casualty figures. The irregular taking of mepacrine and lack of supervision in regard to it, carelessness over clothing (individuals in shorts, or even without shirts after sundown, and officers wearing cut sleeves, were common sights in the early stages), failure to use protective cream, lack of understanding of the purpose of head-nets, bad camp site selection - all are mentioned again and again in the reports.

As so much reliance had been placed on mepacrine it was unfortunate that the administrative arrangements should not have been perfect. Formations complained with some justification, of a lack of uniformity in regard to the prescribed regime, and a verbal loophole in an Army Instruction appears to have led to a widespread impression that mepacrine was only to be taken for a period of five weeks.

The most obvious error in regard to equipment was the fact that mosquito nets were not a personal issue. Several different types were provided (bush-nets, sandfly curtains, bivouacs for two men) and they were held on charge by units and were supposed to arrive with the units transport. In many instances they were very much delayed - one unit had arranged for the nets to arrive on "D plus 20" transport, and one brigade was still without nets a month after landing. It is hardly surprising to find that these particular units had very heavy casualties.

Another mistake which probably had an unfortunate indirect influence on the whole of the subsequent campaign was that the old Mark I cream was issued to 13 Corps instead of the much more acceptable and more efficient Mark II cream which had been authorised. This was the origin of a prejudice against repellents of any and every kind, which lingered until the end of the war. Men who had been in Sicily swore that "anti-mosquito cream" actually attracted mosquitoes.

Failure to ensure that malaria control units and the malaria field laboratory got their transport across at an early stage greatly restricted their usefulness. A month after the landing the O.C. Malaria Field Laboratory, who was also Adviser in Malaria to Headquarters, Eighth Army, was still without a car for his personal use. The effect on the efficiency of the laboratory was reflected in some acid criticisms by one A.D.M.S. who complained that malaria survey reports were received so late that they had only a "nuisance value." If there was any justification in

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this criticism at the time, there was certainly none thereafter. Once the field laboratories were provided with the independence and mobility they asked for they constantly operated so far forward that accurate reports were often available within twenty-four hours of the capture of a new area, and on many occasions they carried out their surveys under fire.

The Anti-Malaria Control Units for the Sicily operation were thrown together in haphazard fashion; being "A" units with a medical role they were nobody's baby, and nothing about them was satisfactory. They were formed too late or not formed at all; the personnel were unsatisfactory; they were untrained or wrongly trained; one A.M.C.U. lost itself in Tunisia, and never reached Sicily; others arrived without officers, without transport, without equipment. When they did at last get to work their operations were unco-ordinated because the parent formations were constantly on the move and had no clear idea how to employ them. It was soon realized that the only way to use them effectively was to place them under central control at Army, a solution which raised what someone described as "screams of parochial dismay," and a compromise had to be accepted; one of the two Units with each division came under Army control, the other remained with its formation.

The second season in Italy was far advanced before an effective system for employing A.M.C.U's under mobile conditions had been worked out, and - a much more difficult proposition - put into operation despite the parochial feelings of the diehards. Many difficulties would have been avoided if malaria control units had been mobilized in the first instance as medical units on an Army and District basis.

SICILY AND AFTER, 1943

What happened in Sicily may be briefly described.

D-Day was July 10. During the first fortnight there were about 200 cases of malaria due to infection elsewhere. About July 23, the Sicilian mosquitoes began to take their toll and cases poured into the medical units in alarming and increasing numbers. In the first week in August there were 1,302 malaria admissions, in the second there were 1,819, this latter was the peak. By September 3, when the invasion of the Italian mainland began, the Sicilian campaign had produced 7,138 cases of malaria and 3,257 "N.Y.D. Fevers" - a possible total of 10,395 casualties due to malaria. From August 1 to September 3 the malaria wastage was 0.88 per 1,000 per diem; if "N.Y.D. Fever" is included the daily wastage becomes 1.24 per 1,000.

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The heaviest toll was from 5 Div. and 50 (Northumberland) Div., who were infected in the highly malarious Lentini-Catania Plains. To quote the A.D.M.S., 50 (Northumberland) Div.:-

"For three and a half weeks, during the battle of Primosole Bridge and in the plain south of Catania, the Division was deployed on a two Brigade front, with the third Brigade close up in reserve. These Brigades and supporting arms were in the centre of a "red" (highly malarious) area on the malaria map. They were overlooked by the enemy and movement had to be mainly confined to the hours of darkness. The fighting conditions were hard, the ground littered with dead bodies and enemy refuse, the troops were widely scattered and before the final withdrawal of the enemy ..... the troops engaged in these battles began to show definite signs of fatigue." This Division had 1,217 cases of malaria; five of its Infantry battalions sustained 433 casualties from malaria between them.

The severity of the outbreak caused surprise and anxiety amongst the staffs at all levels, and unit commanders admitted freely that they had never fully realized the danger, despite the instructions and warnings which had been given. The D.D.H., Middle East, recorded that he had been told that "junior officers and senior N.C.Os. set a particularly bad example as regards individual measures of protection. It was also very clear that formation staffs were not blameless.... It was credibly reported that one area commander was notorious for his disregard of personal anti-malaria precautions."

It unnecessary to describe the measures which were taken once the danger was realized, as these have been sufficiently indicated in the criticisms mentioned above.

Sicily left a legacy which contributed very largely to the malaria incidence during the first three weeks on the Italian mainland. Between September 4 and November 27 a total of 15,547 cases of malaria and fevers N.Y.D. was admitted to medical units in the Eighth Army, and of these at least 8,000 were due to infection in Sicily. Four weeks after the landing at Reggio there was a dramatic fall in the number of malaria admission from 1,477 in one week to 523 in the next (week ending October 2) and thereafter the incidence gradually declined. On the whole the danger was less acute than in Sicily, the season was farther advanced, and the malaria discipline was rapidly improving.

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To preserve a just perspective, it should be realized that the malaria casualties in the Sicilian campaign were small compared with those suffered by British forces on many occasions in the last war. The average incidence in Sicily during the worst six weeks of active operations (July 23 to September 3) was equivalent to 275 per 1,000 per annum. This seems high; but in Macedonia in 1918 the incidence for the whole year was almost 460 per 1,000 (59,087 cases) for the entire force.

Sicily was the Jutland Battle of the struggle against malaria in the Italian campaign. Our casualties were severe, amounting almost to a defeat in themselves, but they did not affect the outcome; and thenceforward there was never a time when malaria caused any serious operational embarrassment.

NEW WEAPONS AND A FRESH ORIENTATION

At the close of his account of malaria in Macedonia in the Official Medical History of the last war, Colonel C. M. Wenyon made the following observation:-

"It would seem that a properly carried out compaign of protection against the mosquito would have reduced the incidence of malaria more than the unavoidably imperfect and partial anti-larval work carried cut in Macedonia."

The fact that in mobile warfare, in particular, adult mosquito destruction is the best method of supplementing personal protective measures was realized long before any practical means existed for putting the idea into effect. The 13 Corps medical plan for assault on the Italian mainland laid special emphasis on the importance of spraying out "all tents and all rooms of all buildings within 3 kilometres" of each unit, using flysol and flit guns. The idea was good but difficult to put into practice, one reason being that at that time - and indeed for long afterwards - too much emphasis was always placed during training upon anti-larval measures.

At the end of March, 1944, details of a number of developments which appeared to make possible destruction of adult mosquitos on a large scale were first received in Italy:-

(a) Power sprayers.

(b) "D.D.T." - Dichlor-diphenyl-trichlorethane.

(c) Insecticidal "sparklets," each weighing about an ounce, intended as an individual issue to forward troops.

Small quantities of D.D.T. arrived in April and, in the same month, the first consignment of power sprayers was issued to the Eighth Army. The sparklets failed

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to materialize and a supply of Westinghouse Aerosol Bombs was asked for instead; but it was over a year before either of these items became available in any quantity, and they were never employed by British troops during active operations in Italy.

Experiments with D.D.T. as a residual spray in buildings confirmed the claims which had been made for it, and it was quickly realized that a new phase had opened in the battle against malaria in the field. It was estimated that rooms treated in the prescribed manner, using 5 per cent D.D.T. in kerosene, would remain lethal for about two months to mosquitoes which rested in them. It should be possible, therefore, to achieve a high degree of control over newly occupied areas in the minimum of time and, in combination with the usual personal protective measures, this method offered, for the first time in military history, the possibility of really effective malaria control in forward areas.

Solutions of D.D.T. are dangerous if carelessly handled, and personnel who mixed and applied them had to be specially trained; the obvious answer was to confine the use of D.D.T. to A.M.C.U's and to co-ordinate their activities so that all areas were treated systematically, with due regard to the distribution of troops and the results of surveys by the malariologists.

The credits for working out an effective organization on these lines in the Eighth Army is due to Lieut.-Colonel J. Morgan, O.B.E., I.M.S., who was A.D.H., Eighth Army, until his death in August, 1944. The recommendation that all Malaria Control Units should be put under the command of Army H.Q. was made in the early days in Sicily, but the welding into an effective weapon of this conglomeration of ill-found, badly trained and often recalitrant units was a formidable task. Amongst them were many individuals who were keen and reliable, but on the whole the conditions under which these units had been formed had made them the repository of the misfits and throw-outs of every arm of the Service. As late as July, 1944, we find the following remarks in a letter by Lieut.-Colonel Morgan about the D.D.T. spraying scheme, in which the A.M.C.U's used Italian Labour who could not be closely supervised to spray out farms:-

"The officers and men are so poor in type that we have to keep ringing the changes constantly. They must be better personnel than we get as they have to work independently. They have gifts and vino thrust upon them on all sides and their round frequently degenerates into a bibulous, hiccoughing procession in which the B.O.R. is carried along by the Italian labour."

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Eventually, however, every difficulty was overcome, and it was found that when properly supervised these units did excellent work and showed an unexpected keeness. The power sprayers initially supplied proved to be unsuitable for D.D.T. sparying as they could not be adjusted to give a satisfactory wetting spray and tended to overheat with prolonged running. They were therefore switched over to flysol spraying and knapsack sprayers were used instead for the application of D.D.T. The method of operation under active conditions was briefly as follows:-

(a) One A.M.C.U. formed a Malaria Control Depot, located near Army H.Q. This depot prepared and issued the D.D.T. solution and supplied labour and materials of every description, rations, mail, pay, orders, survey reports, etc., to all A.M.C.U's by means of a despatch service which visited each A.M.C.U. every second day. This made the A.M.C.U's independent of the moves of local formations.

(c) One A.M.C.U. was organised as a Forward Spraying Unit. Flysol power-spraying teams, each consisting of a driver and two operators equipped with a power sprayer mounted on a vehicle (a Jeep for preference), were allocated on a divisional basis and covered the entire front. They operated from Field Hygiene Sections and sprayed all habitations on the axis of advance. In 1944 there were 14 teams under Army control; in 1945 there were 24. A sanitary assistant of the Field Hygiene Section supervised their work locally, but the A.M.C.U. officer was charged with the duty of co-ordinating their activities and maintaining close liaison with divisional staffs.

(c) D.D.T.-spraying A.M.C.Us were distributed across the front on a basis of two per division. They followed up the work of the flysol-spraying teams, covering an area extending to 3 kilometres on either side of the axis. They were placed under the immediate supervision of two officers from the malaria field laboratories who visited them frequently, checked the results of their work and (to ensure flexibility under rapidly changing conditions) moved them as necessary without prior reference to Army H.Q. Each house as it was completed was marked with the letters "D.D.T.", the number of the A.M.C.U. and the date.

This scheme worked admirably. In April, 1945, the A.M.G.U. system was replaced by a Malaria Control Company on a new establishment, but the method of operation remained essentially the same. It had the enormous advantage over the original system of divisional A.M.C.Us. (in which each Unit could be employed only in the area of its parent formation) that it was an easy matter to concentrate the total

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potential on the parts of the Army area which most required control. Polish and New Zealand A.M.C.Us. were not included in the scheme, with the result that they frequently expended energy and materials in non-malarious areas.

It was a pity that the Westinghouse Aerosol Bomb and the Insecticidal Sparklet did not become available until the greatest need for them was past. Unit mosquito squads were supposed to carry out twice-daily spraying within unit lines, using hand guns and anti-mosquito spray, but it is doubtful if this was ever done in an effective manner. The Aerosol Bomb is so simple to operate, and so much more likely to be used, that it seems the complete answer to the problem of inducing unit squads in forward areas to concentrate on adult destruction.

Air larviciding was first employed in Sicily in the Lentini area; later it was used in many parts of Italy, including the Pontine Marshes, Cassino, Lake Trasimene, and the canal systems near Perugia and Arezzo; but these operations were insignificant compared with the programme for the Lombardy Plain offensive in 1945. This included the use of both paris green and D.D.T. Planning was based on an ampirical figure of 30,000 acres which might require treatment, half with paris green and half with D.D.T. A storage and loading depot was established on Rimini airfield, which included three large tanks with a total capacity of 9,000 gallons connected by a pipeline to a feed pipe near the runway. The D.D.T. solution was mixed by hand in 44-gallon drums, pumped into two small (300-gallon) tanks where solution was completed, and run by gravity into the storage tanks. Paris green and diluent (powdered cement) were mixed in a machine constructed for the purpose by a technician in a soup-powder factory at Cesena, put up in stout half-hundred weight paper bags and loaded into the aircraft by hand. This depot was capable of dealing with 10,000 gallons of 5 per cent D.D.T. solution and 20 tons of 25 per cent paris green weekly. (The strength of the paris green mixture was later reduced to 15 per cent as a result of ground checks.) The aircraft were Bostons and Stearmans, flown by American pilots under the direction of a malariologist (Major H. G. Aitken, U.S. Sanitary Corps) in collaboration with the O.C., 8 Malaria Field Laboratory (Lieut-Colonel D. N. Keys). The pilots were extremely keen and the organization worked without a hitch. In the first five weeks of the season they laid down about 30 tons of paris green mixture and 50,000 gallons of D.D.T. solution.

The keenness and ability of the pilots were so great that one hesitates to make any comment on air larviciding which might be construed as a criticism of their skill. Treatment by means of aircraft is so spectacular, however, and so simple

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to lay on, that as a weapon against malaria it is liable to be misapplied. The number of areas really suitable for air treatment is limited, and great care in selecting sites and frequent ground checks are necessary if it is to be employed to full advantage. The following is quoted from a report by the present writer:-

"The distance from Rimini airfield to Nonfalcone or Palmanova is about 130 miles as the Boston flies, and the weather conditions on the area to be treated may be quite different from those on the airfield when the pilot takes off, particularly in this part of Italy which is notable for its localized rainstorms. On the morning of June 18, the A.D.H., Eighth Army, happened to be at Palmanova when a Boston came over and attempted to treat the moat with D.D.T. in oil. There was a strong east wind, the moat twists between high steep ramparts, and on the side of the town which the pilot was attacking there are many wires which make low flying dangerous. The plane roared low down over the ramparts at about two hundred miles an hour spewing a yellow cloud of oil on the wind, wheeled away, circled, roared down again, and so on a series of spectacular dashes which must have thrilled the onlookers; but to one of them it was a most depressing sight. On this occasion at least the pilot risked his life in a gallant but almost completely unsuccessful attempt to do what might have been done with perfect ease and accuracy from the ground. Enquiry elicited that the O.C., Mal. Fd. Lab., did not consider the moat at Palmanova suitable for air treatment, but had been assured that the pilot was satisfied he could do it".

Before leaving the subject of aircraft, the importance to the malariologist of reconnaissance from the air should be mentioned. A light aircraft (the Fairchild is very suitable) should always be available in malarious country, and would be particularly valuable if fitted for the paris green dustings of small inaccessible areas.

TRAINING AND PROPAGANDA

A vast amount of training was carried out during the campaign at the C.M.F. School of Hygiene Sections and Malaria Field Laboratories, by pathologists in mobile bacteriological laboratories and hospitals, and by regimental medical officers.

In the early days formal training showed the usual tendency to lag behind development in the field. This was particularly noticeable in the case of A.M.C.U. personel. To quote Lieut-Colonel J. Morgan, O.B.E., I.M.S. (May, 1944):-

"In training A.M.C.U. personnel less stress must be laid on physical measures of control. To be stressed should be the urgency of establishing initial control by

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adult destruction and chemical larvicide application. These things must be carried out with all speed on entering a zone. And the first of these is always adult destruction. A typical programme of an A.M.C.U. as at present trained is - 1st day; choosing a site and getting another unit to which it can attach itself; 2nd day; dipping for larvae and looking for adults; 3rd day; establishing liaison with formation and surrounding A.M.C.Us. etc. They must be taught that their job is immediate control. With only one or two exceptions the A.M.C.U.s might to all intents and purposes be a collection of quite untrained personnel. In fact, it might have been better had they been so."

Individual training was on the whole very successful. The standard of personal prophylaxis bore testimony to this. The one measure which teaching universally and completely failed to put over was the use of repellent. To the end of the campaign the prejudice against repellents remained unshaken; it amounted, indeed, to more than mere prejudice; it was a complete lack of appreciation, a rooted and scornful distrust. The average soldier simply did not believe in the necessity for a repellent or that the stuff he was given was of any value, and the majority of officers might have been unaware of its existence. There was something wanting, some fundamental error, in the whole of our teaching about this particular precaution; but one cannot help feeling that there may have been factors involved to which the psychiatrist might have been able to supply the clue.

A great deal of propaganda was devoted to mepacrine, and in the second and third seasons it was obvious that the vast majority of troops were mepacrine-minded and took their daily tablet regularly. In some respects propaganda showed too strong a bias towards suppressive treatment, producing an impression that this was the most important aspect of malaria prophylaxis. By the third season mepacrine was so firmly established in popular favour that not only formation staffs, but a proportion of the rank and file, wanted to commence it sooner and continue it longer than the dates given by higher authority.

Pure propaganda about malaria, as distinct from teaching, may be directed towards one or both of two objects:-

(a) Generally impressing on the soldier the necessity for taking precautions.

(b) Commending to his favour particular devices or courses of action, e.g. the Flit gun, care of the mosquito-net, the wearing of slacks in the evening.

The first is infinitely easier than the second, and the sign "This is a Malarious Area" was probably as effective in this regard as the most elaborate poster.

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In general, it may be said that propaganda of the first type was well done and generally effective; of the second it was poor. Many of the official posters were ugly and undistinguished, comparing very badly with, say, beer propaganda in civil life, and most of those produced by field hygiene sections showed more enthusiasm than inspiration or artistic ability. There were notable exceptions: the excellent official productions by Hopper, for example, and the wall paintings, well placed and brilliantly executed, carried out in the forward areas by a certain Pte. Goodale of 2nd Cdn. Fd. Hyg. Sec. in 1944. Honourable mention is also due, perhaps, to the famous life-sized poster at Anzio of "Jane" (surely the least malaria-minded of wartime personalities!) which had to be removed because it stopped the traffic.

Health weeks were organized by A.F.H.Q. in the second and third seasons, in which education officers of all formations collaborated with the Medical Services and malaria was given special attention. The first, in 1944, was extremely successful. The second came just after the close of hostilities and was handicapped by the prevailing feelings of reaction. In the Eighth Army two Hygiene Exhibitions were held which evoked an astonishing amount of interest from the troops. The 1945 exhibition was open for six days and was seen by about five or six thousand every day, many of whom waited cheerfully in queues for nearly an hour to get into the model tents. The malaria exhibits attracted a degree of interest which caused surprise, as there had been a feeling that the troops were "getting browned off" with incessant malaria propaganda. This was patently not the case. To the end of the campaign it was constantly found that teaching about malaria, if properly presented, was well received.

EPISODE AT MONTE SAN BAIGIO

At the end of July, 1944, an incident occurred which demonstrated in startling fashion the danger of relaxing malaria vigilance in Italy. It was an object lesson so striking that it produced a salutary effect on anti-malaria discipline generally, and may possibly have conferred more benefits in the long run than the injuries it inflicted at the time.

The 56 (London) Division disembarked at Taranto on July 17 after a short spell in Middle East. Between July 21 and July 28 they moved to Tivoli.

At the end of the first week in August their malaria figures rocketed; from a level of 30 to 40 cases per week they shot up to 344 cases in the second week in August, followed by 119 the next week and dropping back to 44 cases the week after. The peak was on August 9, when 64 cases were admitted, and the incidence for that week was equivalent to 984 per 1,000 per annum.

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The source of the outbreak was not difficult to trace. An advance party of 1,000 which detrained at Itri produced no cases of malaria. The remainder of the division were to have gone by train as far as Palestrina, north of Rome, but, at the last moment, the insecurity of a tunnel caused Movement Control to alter this, and the division left the train at Monte S. Baigio in the marshy district north-east of Tarracina, in one of the most celebrated haunts of malaria in Europe. They remained at the station for upwards of three hours before leaving in M.T. for Tivoli.

The journey from Taranto took about forty hours. The trains were very crowded, with up to 40 men and their personal kit in box trucks. It was impossible to use mosquito-nets. The journey was very slow, with many halts, and in the final portion, through the marshes, swarms of mosquitoes invaded the train and men were bitten both by day and by night. At the station itself there was an obvious mosquito nuisance.

About half of the division detrained at night. As each train arrived "Medical instructions emphasizing the highly malarious nature of the area and detailing full malaria precautions were handed to the O.C. and M.O." Their grateful comments are not recorded.

After full investigation the Consulting Malariologist (Brigadier G. Macdonald) was satisfied that the outbreak could not be attributed to a medical breakdown. Mepacrine was commenced on June 21, and "full precautions" were ordered for the journey from Taranto; these comprised daily mepacrine, clothing precautions, and the use of repellent. Mark II cream (pyrethrum type) had been issued in Middle East. Failure could be traced, as usual, not to any fault in the arrangements, but to the manner in which they were carried out.

With two exceptions units which arrived at Monte S. Baigio by night had more cases than those which arrived by day. These exception are interesting:-

167 Field Ambulance. - This unit had only one case in the second week in August. "Mepacrine and repellent supervision were of the highest order. At each stop during the night officers and N.C.O.s carried out an inspection of clothing and satisfied themselves that repellent was being used."

100 Lt. A.A. Regt. - This unit (strength 1,100) had only 9 cases in the week in question - i.e. about half the incidence in that week for the whole division. "At Taranto all three batteries were given a talk on malaria precautions by the M.O. To ensure that all men attended the lecture other duties were held up by the O.C. The O.C. also held a conference of all battery and troop commanders in which the importance

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of anti-malaria precautions was emphasized ..... Nevertheless, though clothing was supervised on the journey, mepacrine and repellent were not."

Throughout the division generally, however, investigation showed that precautions had been lax. Mepacrine had not been properly supervised, and with the single exception mentioned above the use of repellent had not been enforced; indeed, in some units it was not even issued to the men until they arrived at Tivoli. The Consulting Malariologist made the following comments:-

"Under intense anophelism such as was encountered it (i.e. Mark II cream) might be 100 per cent effective for a short period only, one to two hours. There may have been difficulties in application under the very crowded conditions, and great heat may have caused sweating that tended to wash it off. Despite these drawbacks, which might have limited its value, I consider that regular use by all ranks throughout the journey would have prevented an outbreak of this size."

The crux of the matter was, of course, that Movement Control had taken it upon themselves to alter the detraining station to a place which would not have been selected by anyone who understood the realities of the malaria situation. Nevertheless, even without this alteration cases would still have been caused by mosquitoes entering the train as it pulled slowly through the marshes, especially at dusk or at dawn. The same conviction arose in the minds of everyone who read the story of the outbreak: any division in Italy at that time might have fared as badly, and the standard of prophylaxis generally must be tightened up.

THE PLAINS OF LOMBARDY, 1945

When the Anzio beach-head at last burst open at the end of May, 1944, the malariologists sighed with relief, and switched their attention to that north-eastern corner of Italy where malaria has been rife since time immemorial.

In July a letter was circulated to all medical officers in the Eighth Army, informing them that "Professor Missiroli, the eminent Italian malariologist, had expressed the opinion that the Ravenna plain was now probably more malarious than the Pontine Marshes." A second letter issued to all formations two days before the assault on the Gothic Line (August 25) contained the following warning:-

"Almost the entire valley of the River Po is malarious ..... Under war conditions the risk will undoubtedly be greatly augmented by several factors, amongst them deliberate flooding. It is probable that this will be carried out by the enemy with the advice of competent malariologists with the intention of increasing malaria as well as mechanically obstructing troops, as has already occurred elsewhere in Italy.

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Until precise information is gained by survey after occupation it should be assumed that the whole valley north of the Rimini-Bologna road is extremely malarious, with a risk equal to or greater than that encountered in Sicily, in the Lentini plain, in 1943".

The advance was less rapid than was expected. Ravenna was not captured until the beginning of December, and the season was over before any considerable number of troops had entered the danger zone. The malaria organization had been granted a breathing space.

The interval was not wasted. General propaganda and training were purposely withheld until the spring, in order to get the maximum response from an intensive drive at a time when the danger was less remote, but courses for junior medical officers and malaria staff officers were held during the winter, the training of unit squads commenced in February, and malaria control personnel were given a refresher course lasting for two weeks in March, The Italian combat groups which came under command received special attention, as they presented both an immediate problem in sanitation and a threat for the future, on account of the enormous number of gametocyte carriers amongst them.

Nearer acquaintance with the Lombardy Plain did nothing to allay the anxiety of the malariologists. In the area already occupied there was a considerable amount of flooding, and air photographs showed a great deal more ahead; and it would be an easy matter for the enemy to put vast areas under water by blowing the dykes farther up the Po Valley. The experts made gloomy prognostications about the possibility, if this happened, of the rapid spreading westwards of A. sacharovi (elutus) from the saline marshes near the sea.

The propensity of elutus to bite by day was used as a weapon of medical diplomacy to such effect that when the 1945 season opened the Army Commander ruled that shorts would not be worn in the Eighth Army except for organized recreation. Quite apart from the improvement in individual protection which this order conferred, it had the advantage of impressing on the minds of all ranks the fact that there was an unusual malaria risk that season. It was gratifying to overhear references in the Mess to the ferocious mosquito of the Po valley.

Transmission was not expected to commence until early in May and active breeding was unlikely before the middle of the month. The arrangements for spraying and aircraft control have already been described. D.D.T. spraying was started on

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March 18, working first along the main routes in the worst areas, with the object of destroying as many hibernators as possible. Flysol spraying was to commence on May 1, with a total of 24 teams, the personnel of which were used prior to that date to augment the D.D.T. programme. This, as it turned out, was a mistake; it would have been better to employ both methods from the beginning, when the greater rapidity of flysol spraying would have achieved a wider slaughter of hibernating mosquitoes. When the big offensive began the flysol teams were got on the road as quickly as possible and all were functioning before the end of April. Aircraft larviciding commenced on May 15, although little evidence of breeding was found before the end of the month.

The Eighth Army flung itself into its last battle on April 9, and in twenty-three days the campaign in Italy was over. The speed of the advance made it utterly impossible for the spraying teams to keep pace with the forward troops, but they did their best, and the main routes were covered long before large-scale transmission could have commenced. Four British detachments, each equivalent to two Malaria Control Units, were employed on D.D.T. spraying, in addition to the Polish and New Zealand units which worked independently. It was found that one detachment using Knapsack and Pressure (Four Oaks Kent type) sprayers and employing about 100 labourers could spray about sixty farms daily. Over a thousand gallons of D.D.T. solution were used in the Army area every day.

Immediately hostilities ceased it became possible to arrange for most units to be sited outside the more dangerous regions and concentrate the spraying organization on the parts of the "red" area which were still occupied. When, towards the end of May, the D.D.T. programme was completed, all detachments were switched to larval control. The combined attack on these danger spots by D.D.T. spraying and larval control from the air and on the ground was so successful that in the extremely dangerous coastal sector near the mouth of the Isonzo, for example, where for political reasons certain elements of 13 Corps had to remain, the mosquito population virtually disappeared and the malaria rate remained consistently low.

The final battle of the campaign was over before the malaria season was properly started, although elutus in its uneasy hibernation in farms and out-houses claimed some victims. The extra-regimental spraying organization was put to the test of a mobile battle, the ability of the soldier to protect himself was not. When full precautions were instituted it was found that the standard was generally very high,

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but it must be acknowledged that in the third season in Italy no troops were ever exposed to anything comparable to Sicily in 1943. The malaria risks were probably not as great; the difficulties certainly bore no comparison.

SUMMING UP

The tragedy of preventive medicine is that its failures are obvious; success can never be proved. Failure has been given prominence in this account, because by such acknowledgments we learn; but those who took part in the campaign and were competent to judge must have realized how much was achieved. To demonstrate it mathematically is another matter. We know what the casualties were; we do not know what they might have been.

Let us glance at the figures.

If we consider the whole Force, we recall that at the outset of the campaign the incidence in one particular week rose to about 410 per 1,000 per annum. In 1944 there were two weekly peaks in Italy, one in May, 150.62 (w.e. May 6) and one in August, 146.21 (w.e. August 12). In 1945, up to the end of June, the highest rate in any week was equivalent to 38.85 per 1,000 per annum.

In 1944 the incidence was over 100 per 1,000 per annum in eight weeks during the first half of the year, and four weeks in the second. In only four weeks during the first half of 1945 did the incidence rise to more than one-third of this figure.

Secondly, if we compare the incidence of fresh cases of malaria in the Eighth Army with battle casualties, we find that the ratio falls progressively from two to one at the beginning of the campaign to less than one in ten at the end:-

		Malaria (Primary)	Battle Casualties (Wounded)	Ratio
1943	3rd Quarter	12,532	6,415	2 : 1
	4th Quarter	4,178	8,637	1 : 2.1
1944	1st Quarter	901	3,500	1 : 3.9
	2nd Quarter	3,037	15,516	1 : 5.1
	3rd Quarter	3,288	19,975	1 : 6.1
	4th Quarter	927	10,995	1 : 11.9
1945	1st Quarter	365	3,679	1 : 10.1
	2nd Quarter	600	6,210	1 : 10.4

Finally, as a rough test of the efficiency of protective measures under field conditions at the end of the campaign, we may compare two similar formations of equal size, one in a non-malarious country (Austria) and one in an area which is in

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part very highly malarious (Venezia Giulia). From May 5 to June 23 the 5 Corps were in Austria and 13 Corps were exposed to malaria in Venezia Giulia; yet their malaria figures were practically identical:-

	5 Corps Austria	13 Corps Venezia Giulia
Malaria "Fresh"	111	121
Malaria Relapse	122	113
Total	233	234

In the middle of the period in question 5 Corps had discontinued mepacrine and the majority of their "fresh" cases were due to a break-through of previous infection. This comparison indicates that a formation can be kept in a malarious zone in June without any increase in its malaria incidence over what it would have shown in a non-malarious country. (The average weekly rate in this case was 0.44 per 1,000 per week.)

It has not been possible in this brief sketch to pay tribute to the many hundreds of workers throughout Italy whose efforts contributed so largely to the wellbeing of their comrades, and only passing mention has been made of the most important factor of all.

The control of malaria in war can never be perfect without the informed and intelligent co-operation of the individual soldier. The most elaborate schemes cannot protect him if he will not protect himself. Discipline alone is not enough. What matters is his response when he is not under supervision, not the disciplined observance of rules, but action based on knowledge and understanding and a sense of personal responsibility.

What we are trying to protect, and the most important material we have to work with, are the same; not a force, or an Army; or "The Troops" - but MEN and it is only by considering them as men that we can hope to conquer malaria in the field.

For the foe is not just an organism or an insect. It is wily Nature herself, in all her complexity.

> "If you would see all of Nature gathered up at one point, in her loveliness, and her skill, and her deadliness, and her sex, where could you find a more exquisite symbol than the mosquito?".

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M A P S

MAPS appropriate to each phase of the Campaign will be found, with numbers in red to indicate references, at the end of the Narrative.

No appendices are missing, but some maps were originally numbered as appendices, thus accounting for the fact that certain appendices appear to be numbered out of their correct order.

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				Reference Nos
THE ROAD TO ROME - I	Phase I.	Period	3.9.43 - 30.11.43	1 & 2
" "	" II.	"	1.12.43- 31.3.44	3 - 5
ANZIO			January - June 1944	6 - 8
THE ROAD TO ROME II	Phase I	Period	9.9.43 - 1.10.43	9 & 10
	" II	"	1.10.43- 20.11.43	11 & 12
	" III	"	1.12.43- 31.3.44	
THE ATTACK ON GUSTAV AND HITLER LINES		Period	1.4.44 - 30.6.44	13 - 17
MEDICAL ASPECTS of EIGHTH ARMY OPERATIONS				
	"CP" 'OLIVE'	Period	1,7,44- 30.9.44	18 to 21
" "		"	1.10.44- 31.12.44	22 & 23
" "		"	1. 1.45- 31.3.45	24
" "		"	1. 4.45- 30.6.45	25 - 30.

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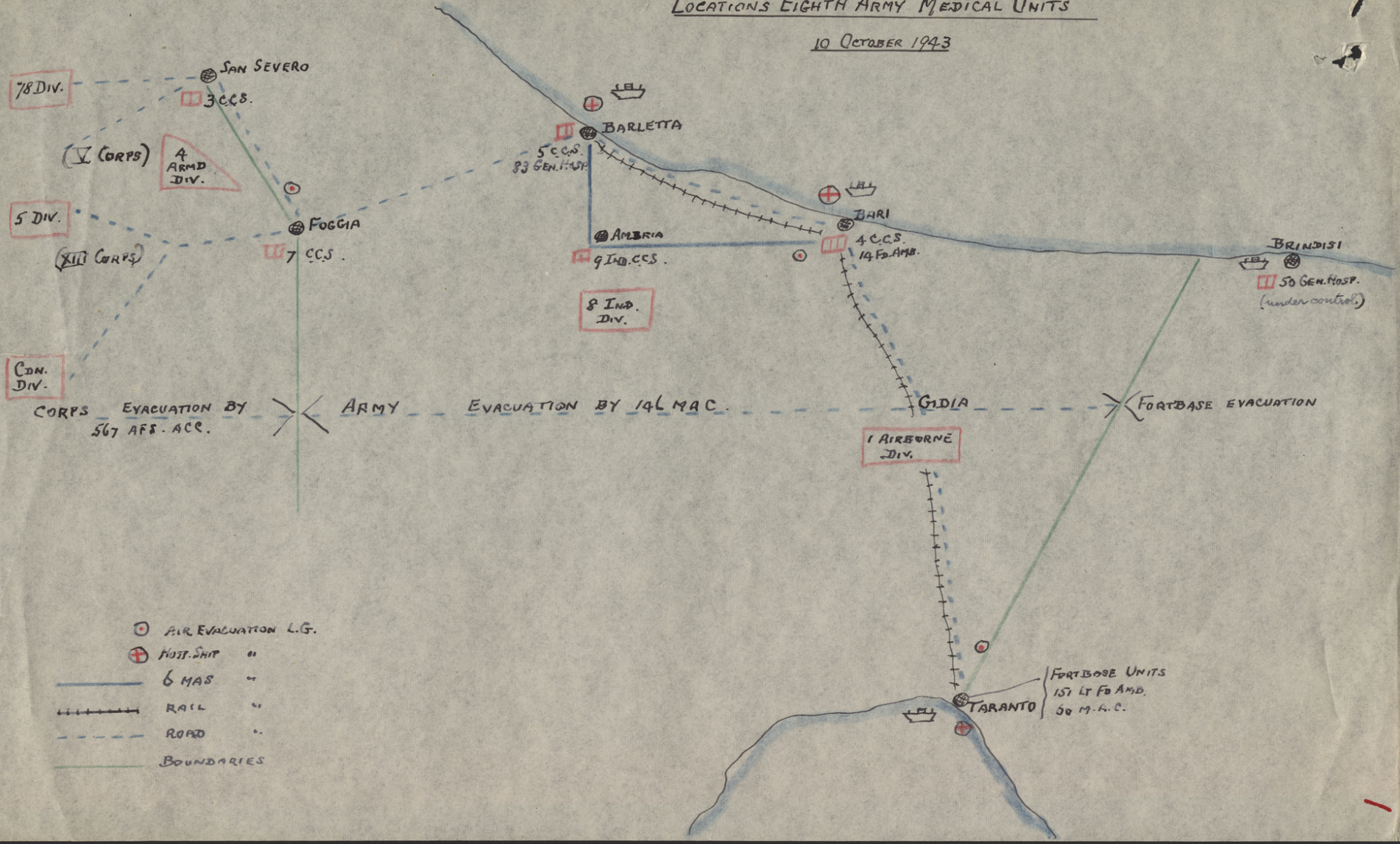
App: II

Locations Eighth Army Medical Units

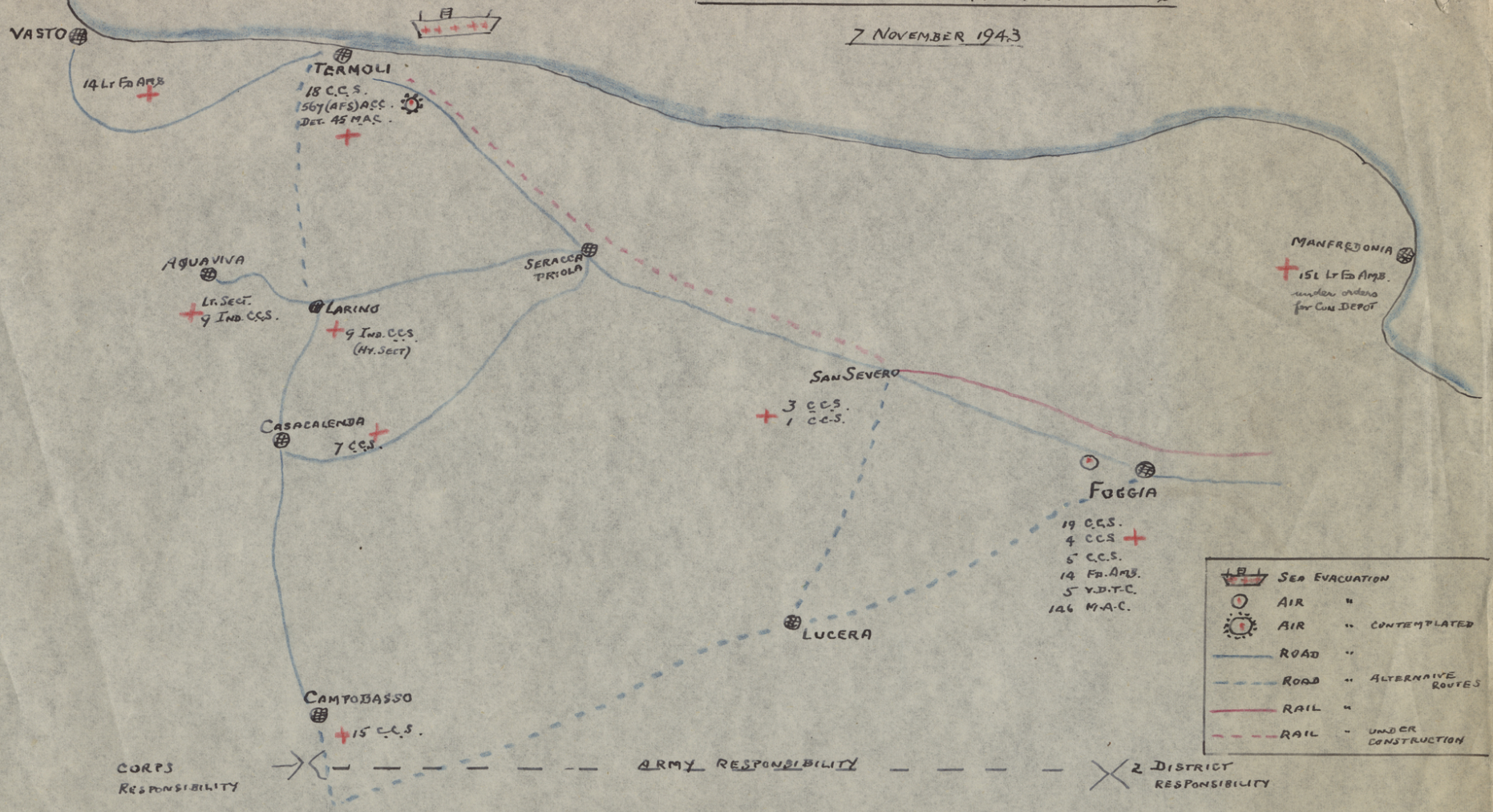
10 October 1943



APP: III

LOCATIONS EIGHTH ARMY MEDICAL UNITS

7 NOVEMBER 1943



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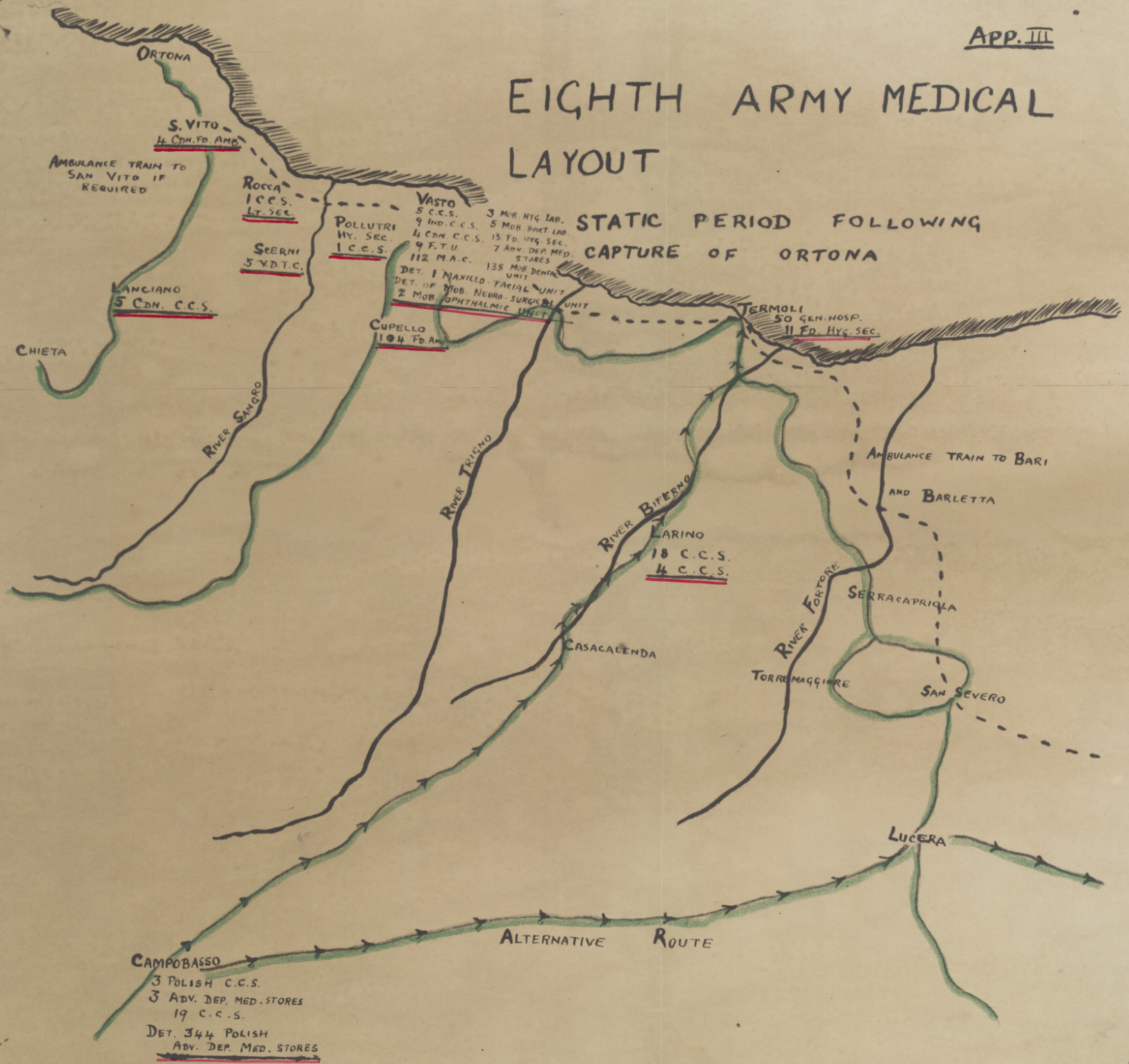
APP. III

EIGHTH ARMY MEDICAL LAYOUT

STATIC PERIOD FOLLOWING CAPTURE OF ORTONA



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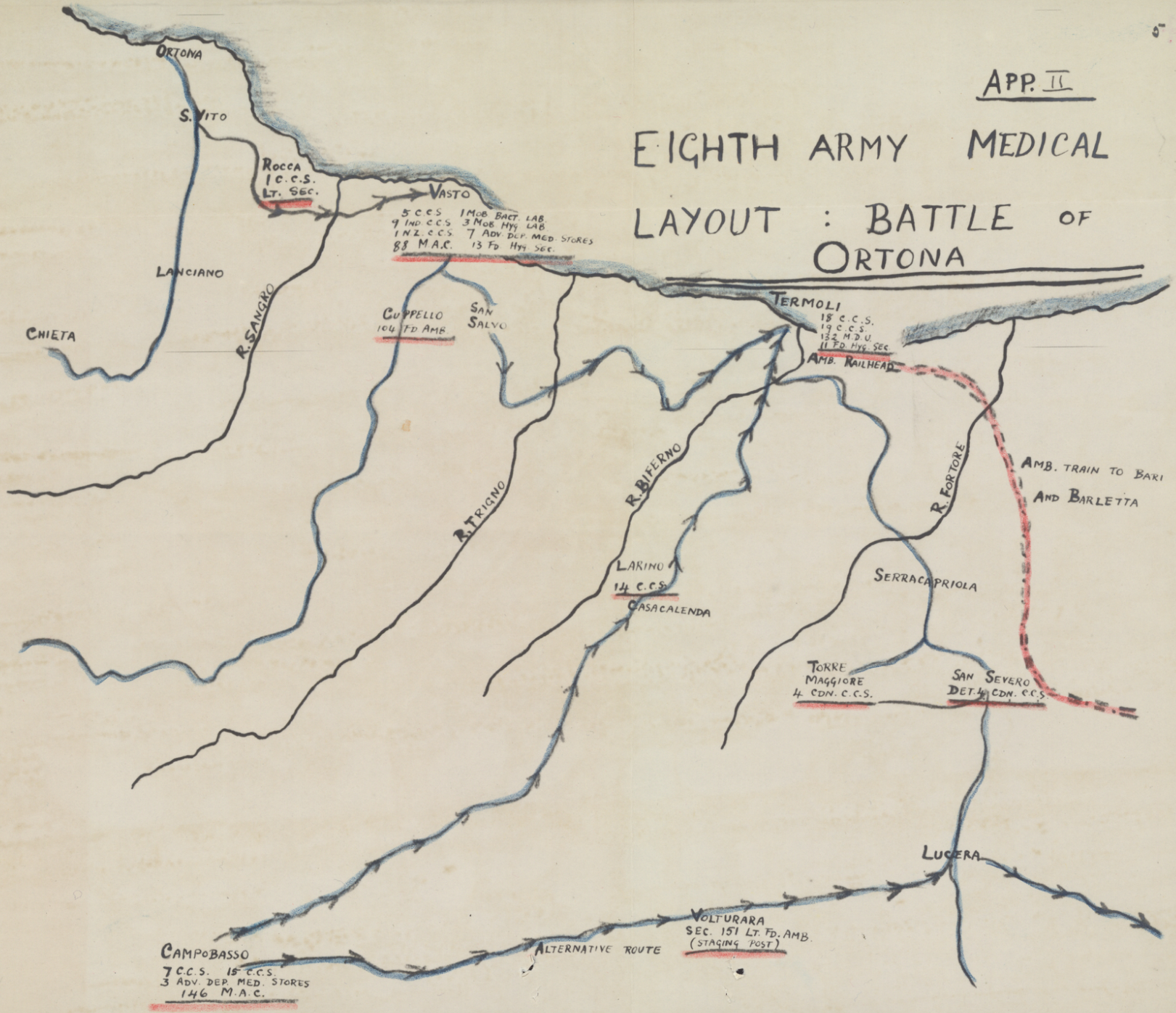
APP. II

EIGHTH ARMY MEDICAL LAYOUT : BATTLE OF ORTONA



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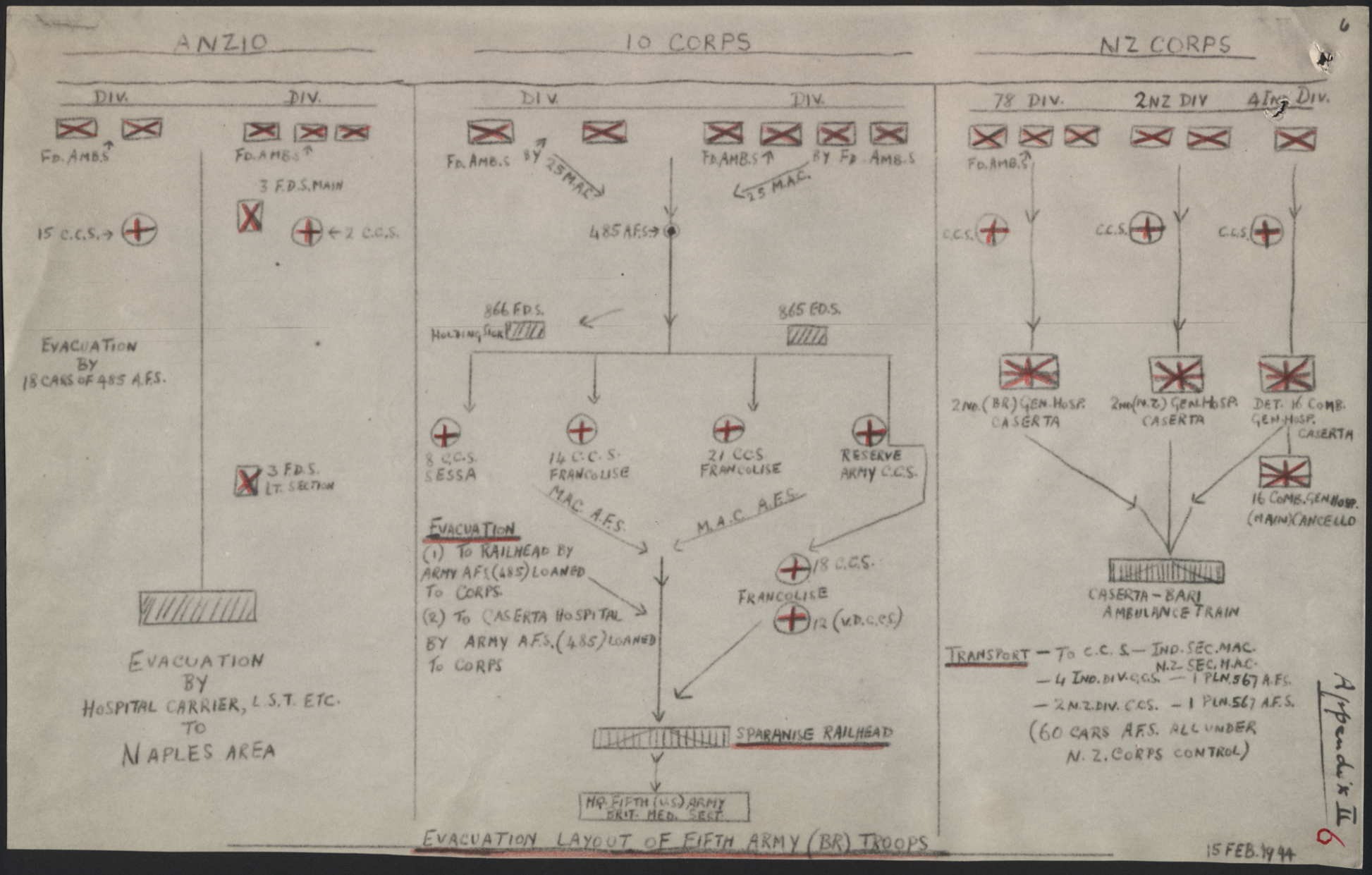

EVACUATION LAYOUT OF FIFTH ARMY (BR) TROOPS

15 FEB. 1944

Appendix II 9

ANZIO – BEACH-HEAD

APPENDIX III

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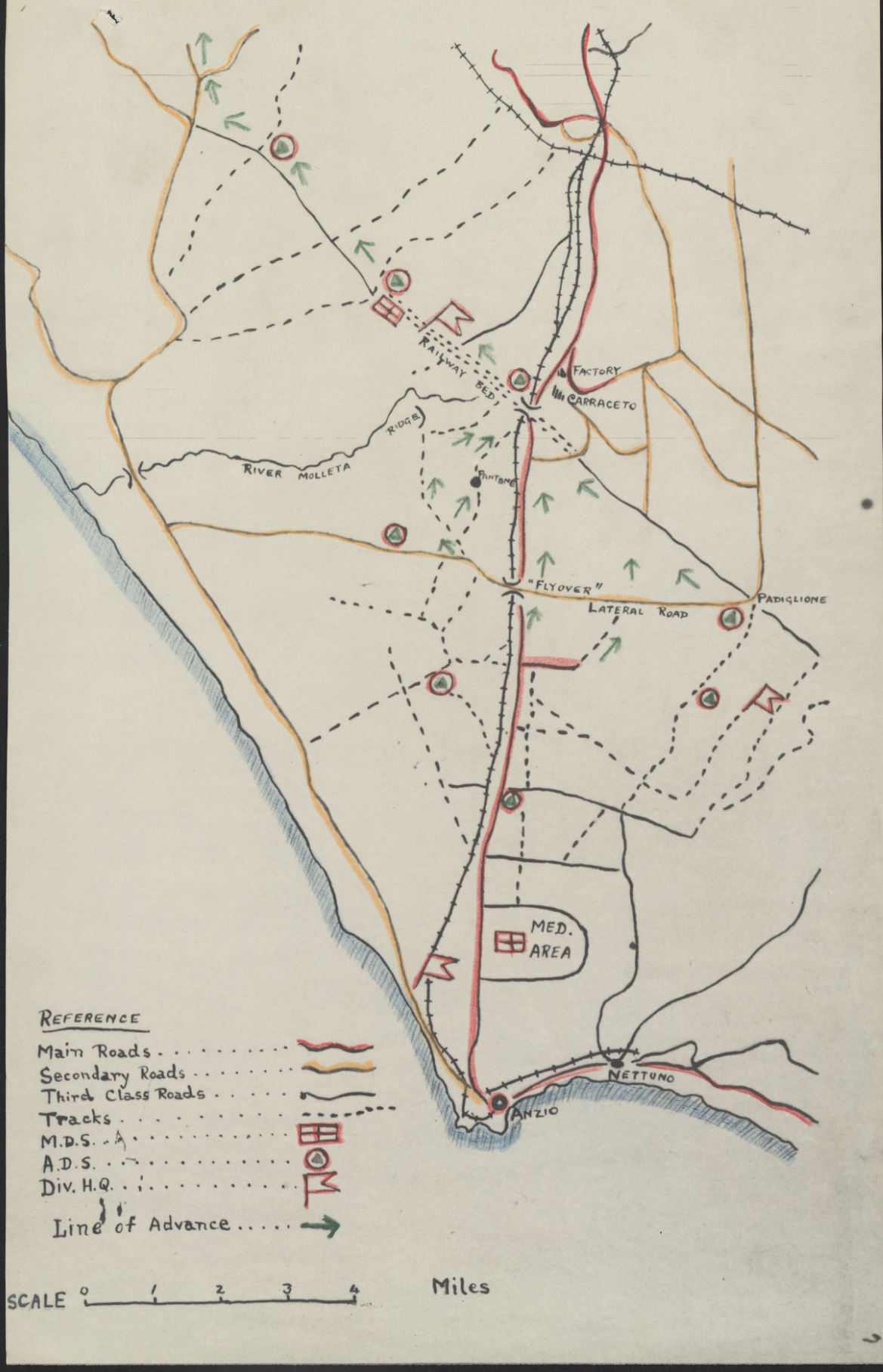

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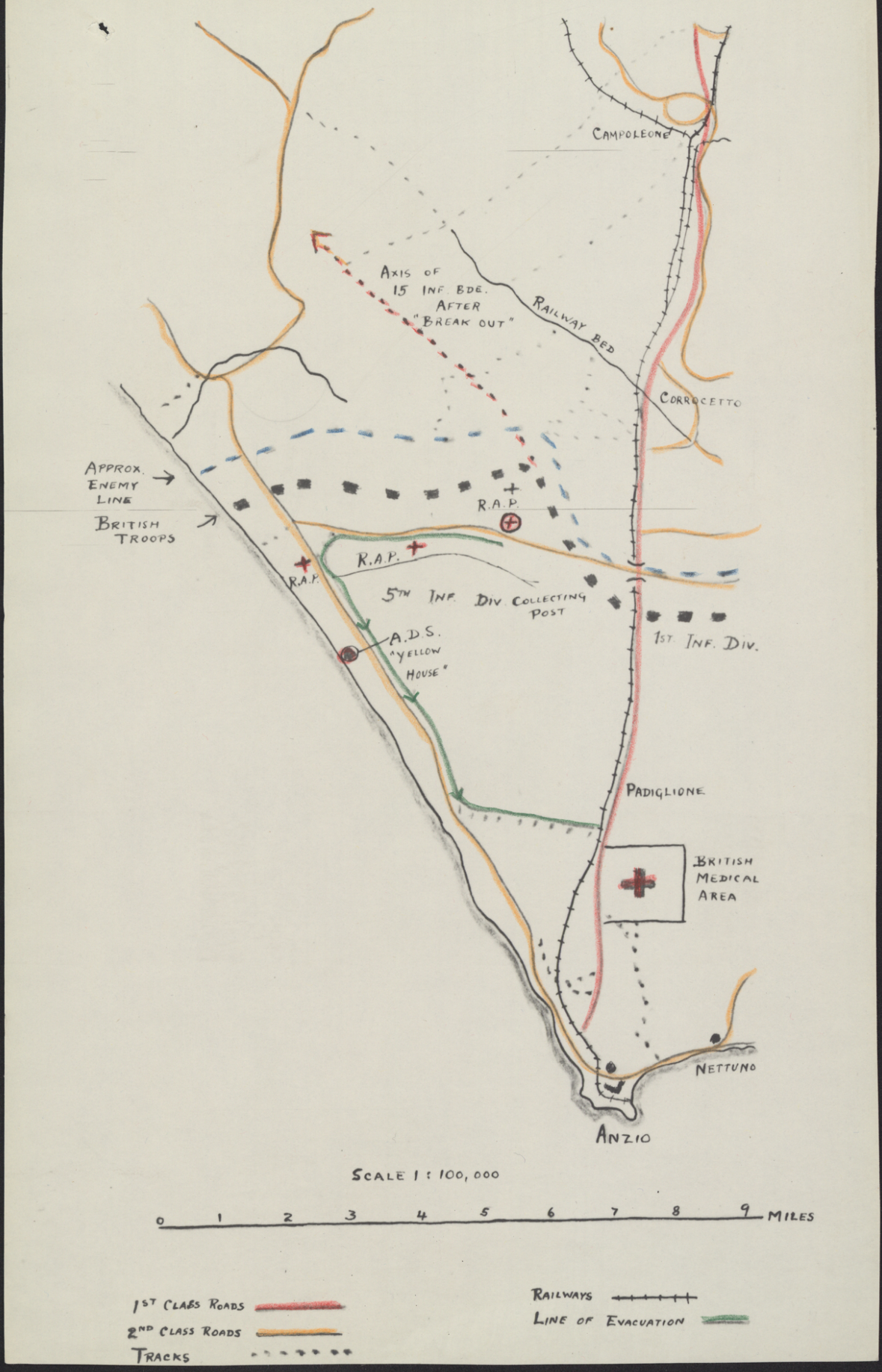

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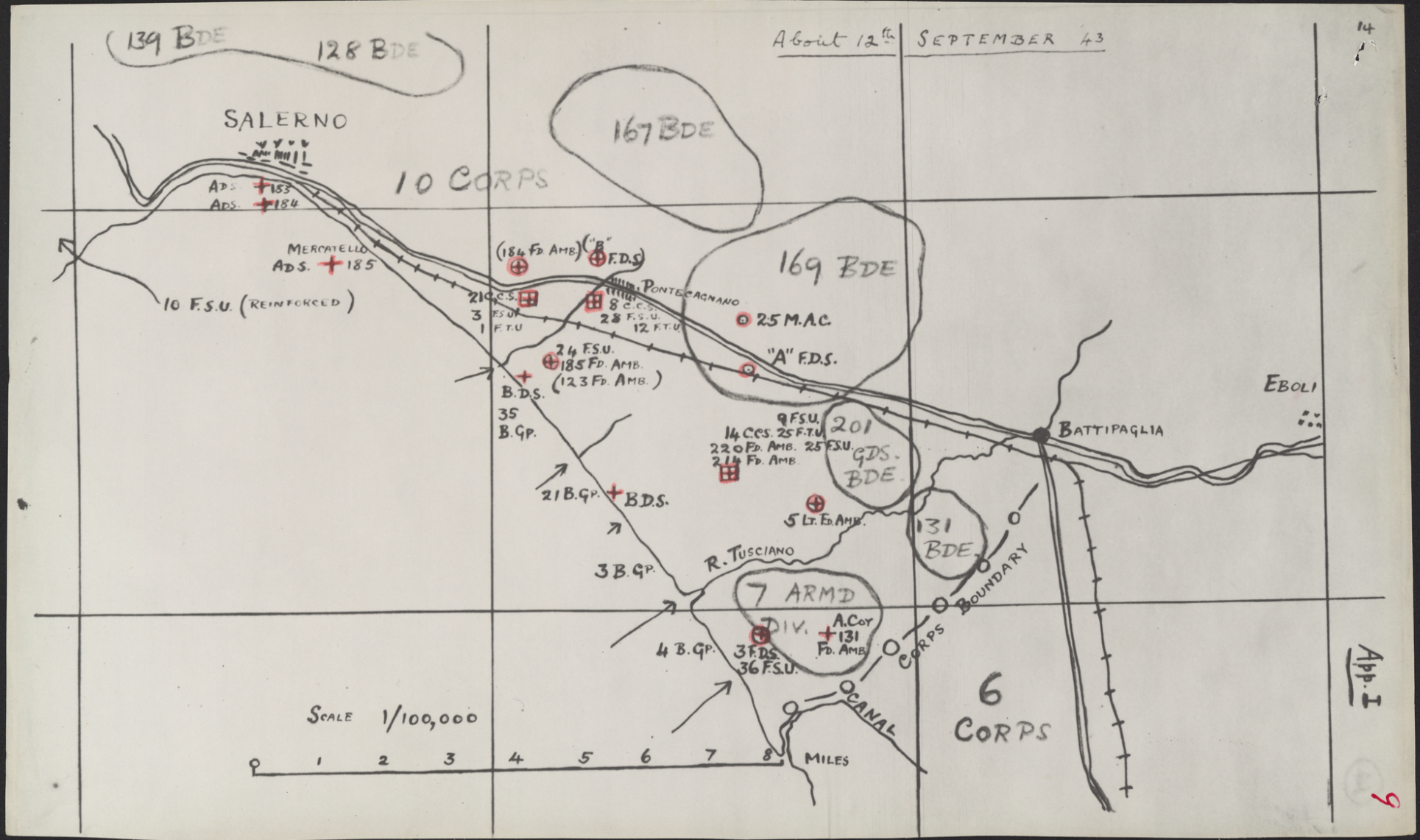

About 12th SEPTEMBER 43
14
139 BDE
128 BDE
167 BDE
169 BDE
201 GDS. BDE
131 BDE
7 ARMD DIV.
SALERNO
10 CORPS
6 CORPS
ADS 183
ADS 184
MERCATELLO ADS. 185
10 F.S.U. (REINFORCED)
(184 FD AMB) ("B" F.D.S)
PONTECAGNANO
21 C.C.S. 3 F.S.U. 1 F.T.U
8 C.C.S. 28 F.S.U. 12 F.T.U
25 M.A.C.
"A" F.D.S.
24 F.S.U. 185 FD. AMB. (123 FD. AMB.)
B.D.S. 35 B.GP.
9 F.S.U. 14 C.C.S. 25 F.T.U. 220 FD. AMB. 25 F.S.U. 214 FD. AMB
21 B.GP. BDS.
5 LT. FD. AMB.
3 B.GP.
R. TUSCIANO
4 B.GP.
3 F.D.S. 36 F.S.U.
A. COY 131 FD. AMB.
CORPS BOUNDARY
CANAL
BATTIPAGLIA
EBOLI
SCALE 1/100,000
0 1 2 3 4 5 6 7 8 MILES
App. I
9

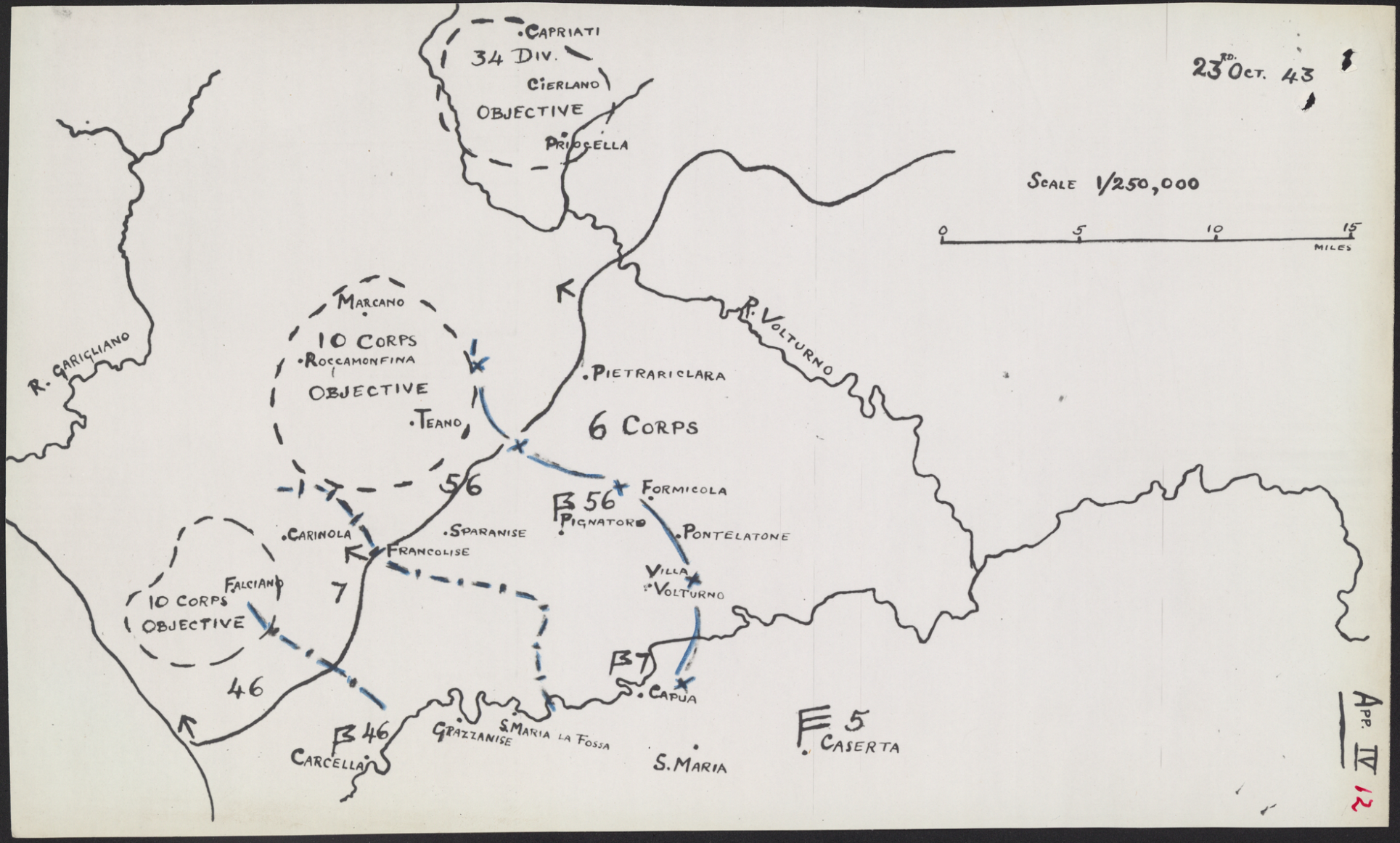

About 25th September '43
1
NAPLES
Mt. Vesuvius
Sarno
To Avellino
S. Lucia
45 U.S. Div.
Piozza
Acerno
45 U.S. Div.
Montecorvino
S. Cipriano
Cologna
Nocera
Regiato
Capezzano
5 Lt. Fd. Amb.
56 Div.
Salerno
Passano
46 Div.
Castellamare
Rangers
23 Armd. Bde.
Maiore
Amalfi
10 F.S.U.
U.S. Med. Det.
Collecting Co.
Clearing Plat.
Mercatello
5 Lt. Fd. Amb.
"B" F.D.S.
Pontecagnano
81
3 F.S.U.
1 F.T.U.
23 F.S.U.
18 F.T.U.
Olevaro
Lt. Sec. "B" F.D.S.
Battipaglia
Eboli
14
25 F.T.U.
220 Fd. Amb.
25 F.S.U.
Montecorvino Airfields
3 F.D.S.
36 F.S.U.
R. Sele
Persano
Altavilla
Albanella
Scale: 1/250,000
0
5
10
15
Miles
Gen. Hosp.
C.C.S.
M.D.S. or F.D.S.
A.D.S.
App. II
10

About 9th OCTOBER '43

App. III



AUSTRALIAN WAR MEMORIAL AWM2022.7.120


23RD. OCT. 43
SCALE 1/250,000
0 5 10 15
MILES
CAPRIATI
34 DIV.
CIERLANO
OBJECTIVE
PRIOCELLA
R. VOLTURNO
R. GARIGLIANO
MARCANO
10 CORPS
ROCCAMONFINA
OBJECTIVE
TEANO
PIETRARICLARA
6 CORPS
56
B 56
FORMICOLA
PIGNATORO
PONTELATONE
CARINOLA
SPARANISE
FRANCOLISE
VILLA VOLTURNO
FALCIANO
10 CORPS
OBJECTIVE
7
B7
CAPUA
46
B 46
CARCELLA
GRAZZANISE
S. MARIA LA FOSSA
S. MARIA
F 5
CASERTA
APP. IV
12

App. I 9

EIGHTH ARMY MEDICAL LAYOUT

10 MAY 1944

10 CORPS

13 CORPS

POLISH CORPS

FIFTH ARMY

CASSINO

ISERNIA
866 FDS

MACCHIA
15 C.C.S. 10 F.T.U.
9 F.S.U. 30 F.S.U.
3 A.D. MED. STORES

PIZZILI
5 POL. C.C.S.

VENAFRO
6 POL. GEN. HOSP.
3 POL. C.C.S.
DET. 344 POL. A.D.
MED. STORES

MACCHIAGODENA
865 F.D.S.

CAMPOBASSO
2 POL. GEN. HOSP.
ONE COY. 14 FD. AMB.
344 POL. A.D.
MED. STORES

PRESENZANO
14 C.C.S. 3 N.Z. C.C.S.
22 F.S.U. 8 F.S.U.
35 F.S.U. 1 NZ F.T.U.
12 F.T.U. 9 F.T.U. (BLOOD BANK)
85 M.A.C. 19 FD HYG SEC.
2 MOB. OPHTHALMIC UNIT (PENICILLIN TEAM ATTD)
5 MOB. BACT. LAB.
ADV. SEC. 10 A.D. MED. STORES

TORA
AMB. RAILHEAD

VAIRANO
4 C.C.S. 7 C.C.S. 2 IND. C.C.S.
13 FD. HYG. SEC. 28 F.S.U. 29 F.S.U.
36 F.T.U. 23 F.T.U. 15 F.T.U.
2 MOB. BACT. LAB. (SHOCK TEAM ATT)

PIEDIMONTE D'ALIFE

ALIFE
8 MAL. FD. LAB.
146 M.A.C.

4 CDN. C.C.S.
5 CDN. C.C.S.
8 CDN. F.D.S.
16 CDN. F.D.S.
3 CDN. GEN. HOSP.

ONE DIV. OF
9 CON. DEPOT
12 C.C.S. (V.D.T.C.)
14 FD. AMB.
3 MOB. HYG. LAB
30 L.S.
25 FD. HYG. SEC.

PIETRAMELARA
58 GEN. HOSP.
18 C.C.S. 2 C.C.S.
25 F.S.U. 4 F.S.U.
24 F.S.U.

RUARO

CAPUA
3 DISTRICT CONTROL POST

S. MARIA
10 ADV. DEPOT
MED. STORES

SCALE
1: 200,000

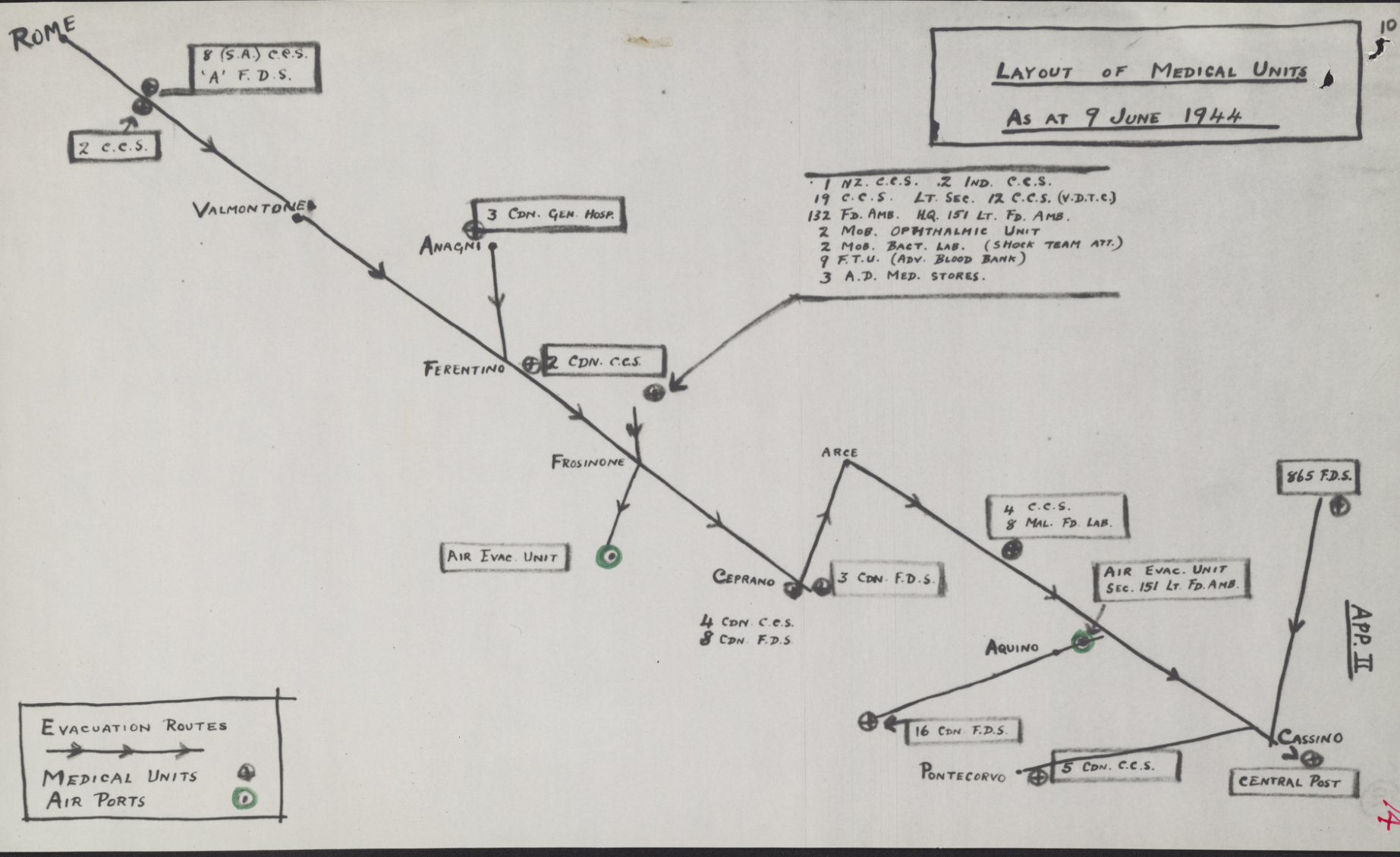
EVACUATION:
10 CORPS TO 15 C.C.S.
N.Z. CASES TO N.Z. C.C.S.
13 CORPS (BR.) TO 7 AND 19 C.C.S.S
" (IND.) TO 2 IND. C.C.S.
POLES TO 3 AND 5 POL. C.C.S.S AND 6 POL. GEN. HOSP.
FROM 15 C.C.S. TO CONTROL POST CAPUA BY 25 M.A.C.
PRESENZANO TO CAPUA BY 85 AND 146 M.A.C.

ROADS
RIVER
RAILWAY
CORPS BOUNDS

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

13

AUSTRALIAN WAR MEMORIAL
AWM2022.7.120



LAYOUT OF MEDICAL UNITS

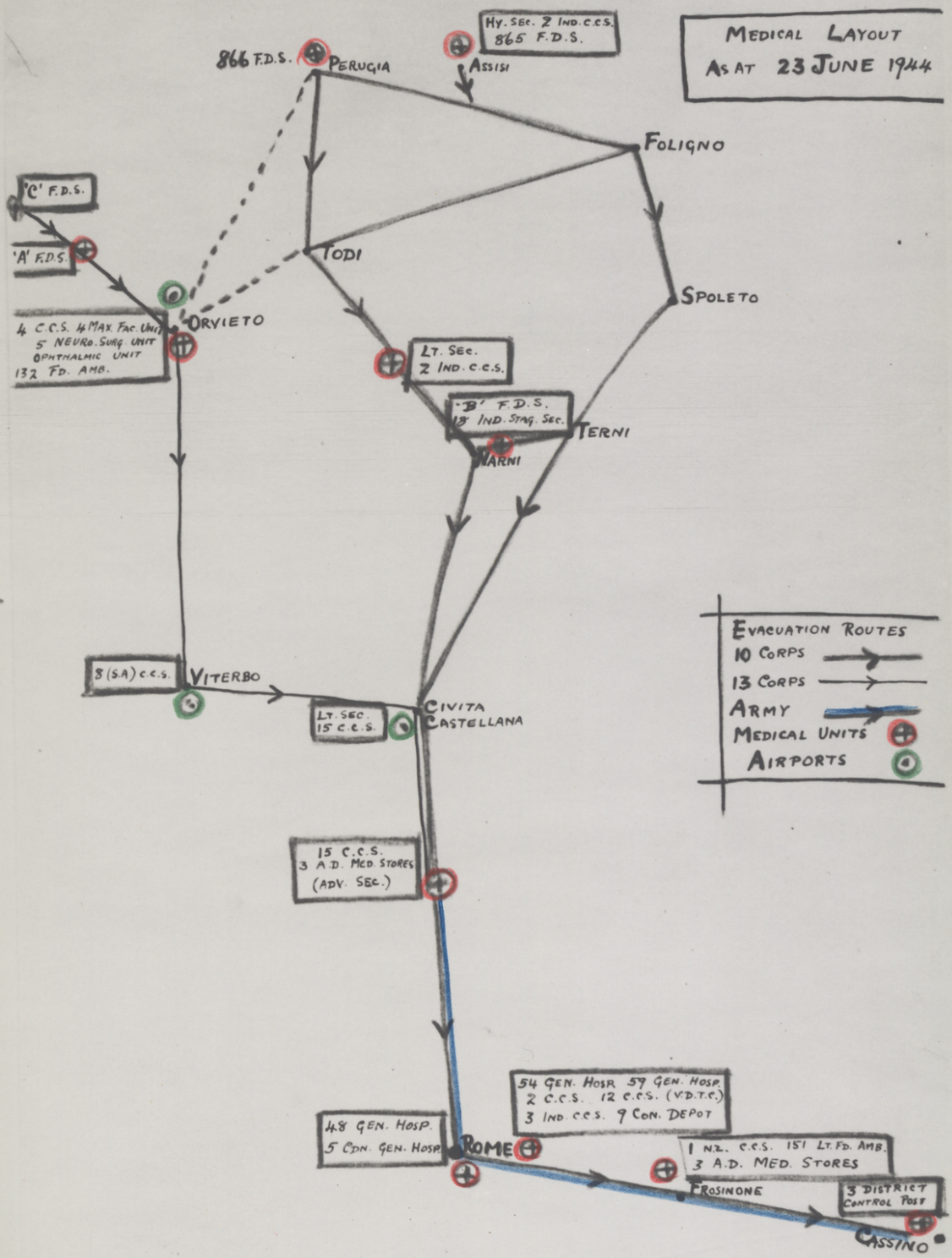
AS AT 9 JUNE 1944

10

APP. II

14

APP. III



AUSTRALIAN WAR MEMORIAL AWM2022.7.120

LAYOUT OF MEDICAL UNITS — 30 JUNE '44 — APP. IV

16

19 C.C.S.
866 F.D.S.
39 IND. STAGING SECT.
1 MOB. OPHTH. UNIT

ASSISI
2 IND. C.C.S.
865 F.D.S.

CITTA D. PIEVE
54 F.D.S.

PIEGARO
52 F.D.S.

132 FD. AMB.

MONTELEONE

HVY. SECT.
3 IND. C.C.S.

AIR EVAC.
SEC. 151 LT. FD. AMB.

(Casualties for Air Evac. only — Br. C.C.S.)

BRIT. TO TODI

IND. TO NARNI

TODI
14 C.C.S.

(SHORT TERM SICK

ORVIETO

59 GEN. HOSP.
4 C.C.S. 4 MAX. FAC. SURG. UNIT
5 MOB. NEURO. SURG. UNIT
OPHTHALMIC UNIT
LT. SEC. 12 C.C.S. - (V.D.T.C.)
3 A.D. MED. STORES

NARNI
53 F.D.S.
18 IND. STNG. SEC.

HVY. SEC. 15 C.C.S.

54 GEN. HOSP.
2 C.C.S. HVY. SEC 12 C.C.S. (V.D.T.C.)
18 C.C.S. 9 CONV. DEPOT
LT. SEC. 3 IND. C.C.S.
4 BRIT. STNG. SEC.
7 IND. DEPOT MED. STORES

48 GEN. HOSP.
5 CDN. GEN. HOSP.

ROME

TO CASSINO

EVACUATION
- 10 CORPS
- 13 CORPS
- ARMY

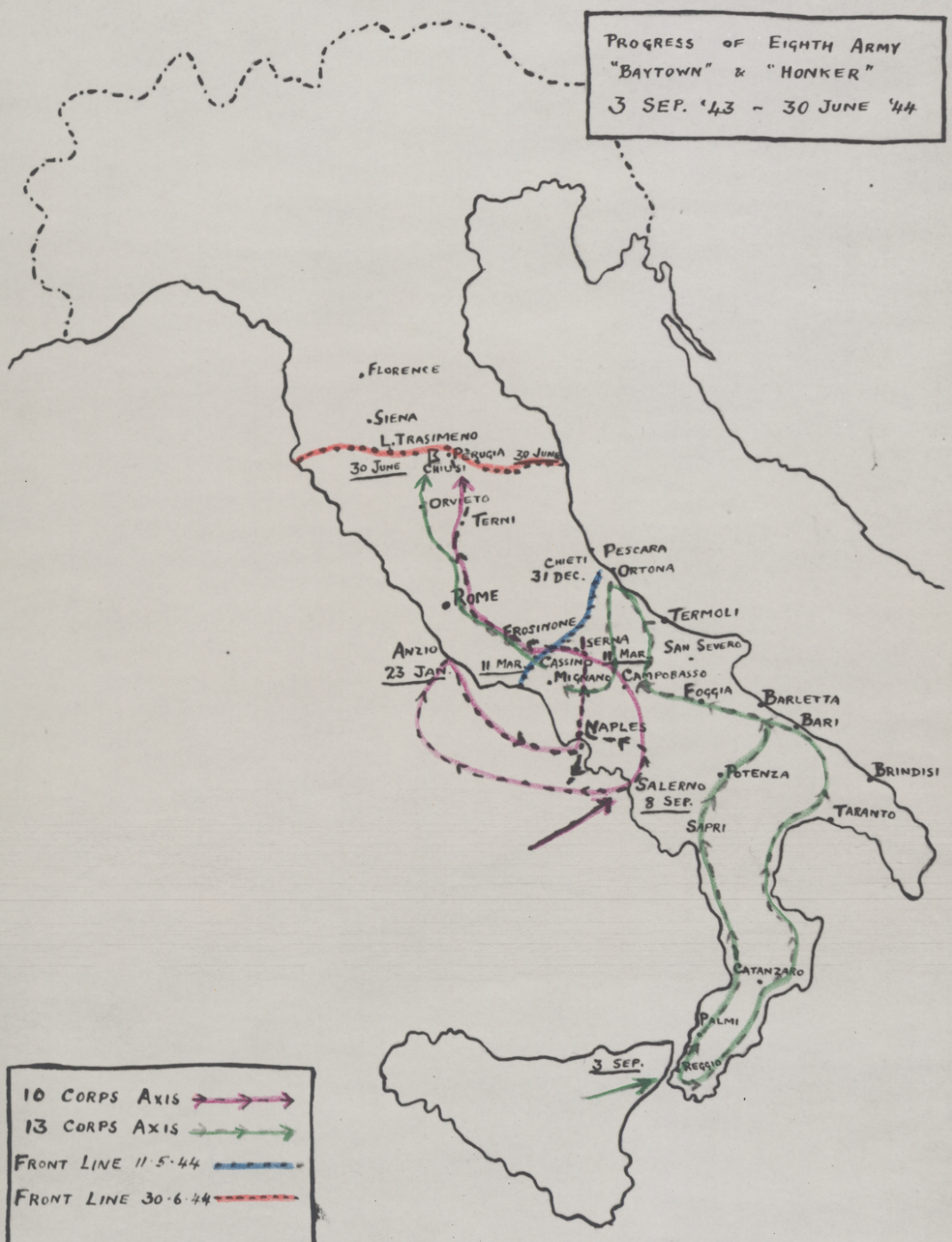
MEDICAL UNITS

AIR PORTS

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

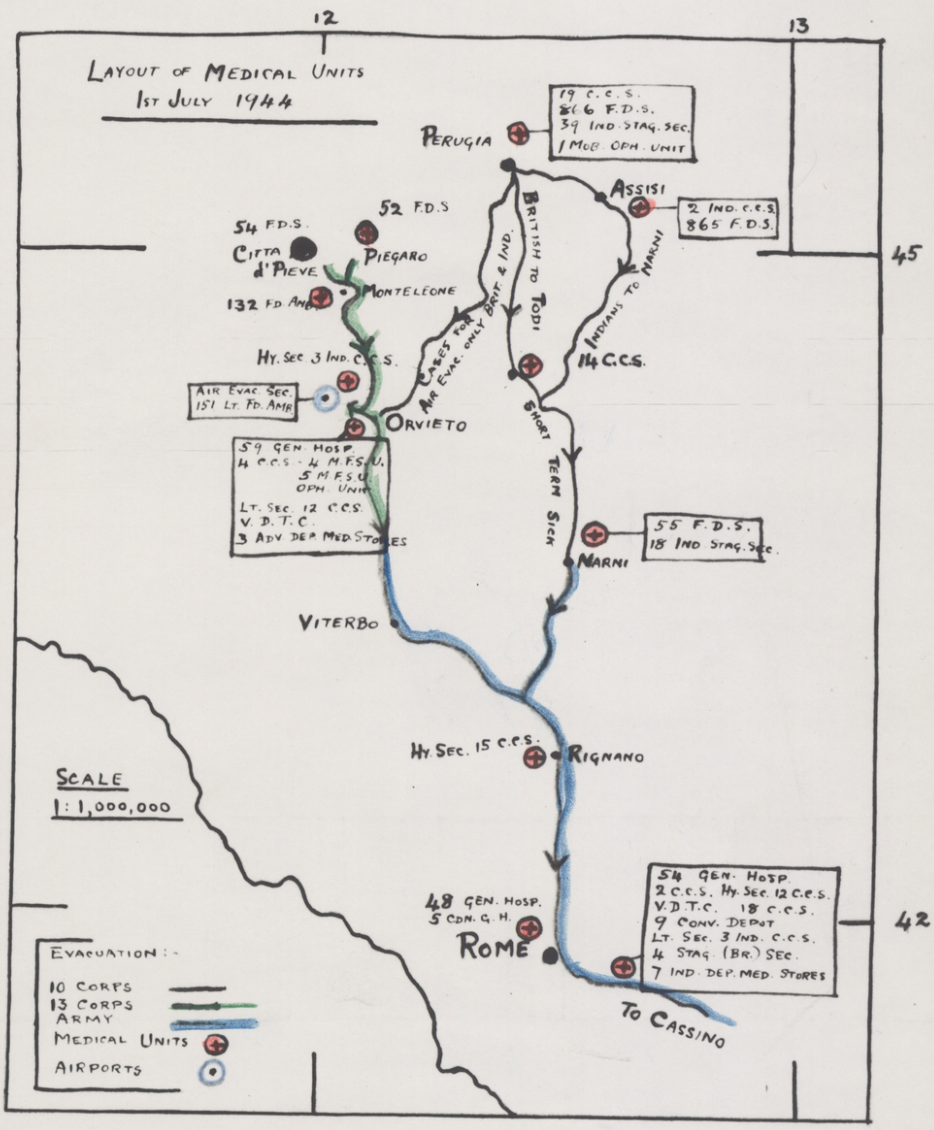
App. V

17

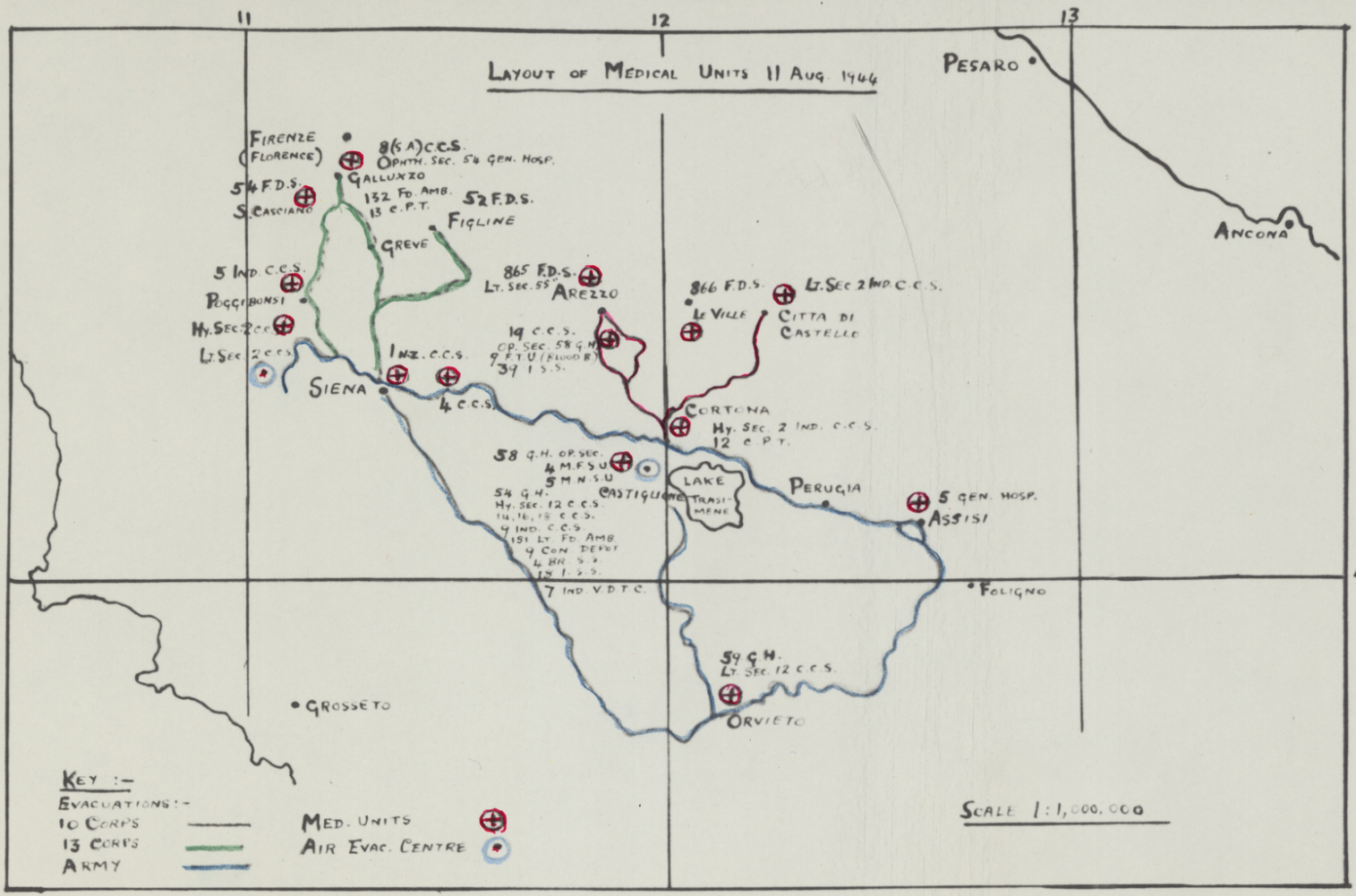


AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP. I



AUSTRALIAN WAR MEMORIAL
AWM2022.7.120



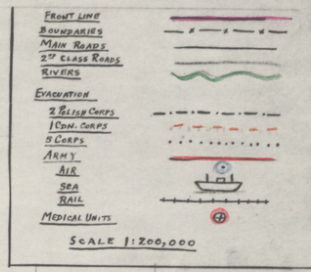
App. II

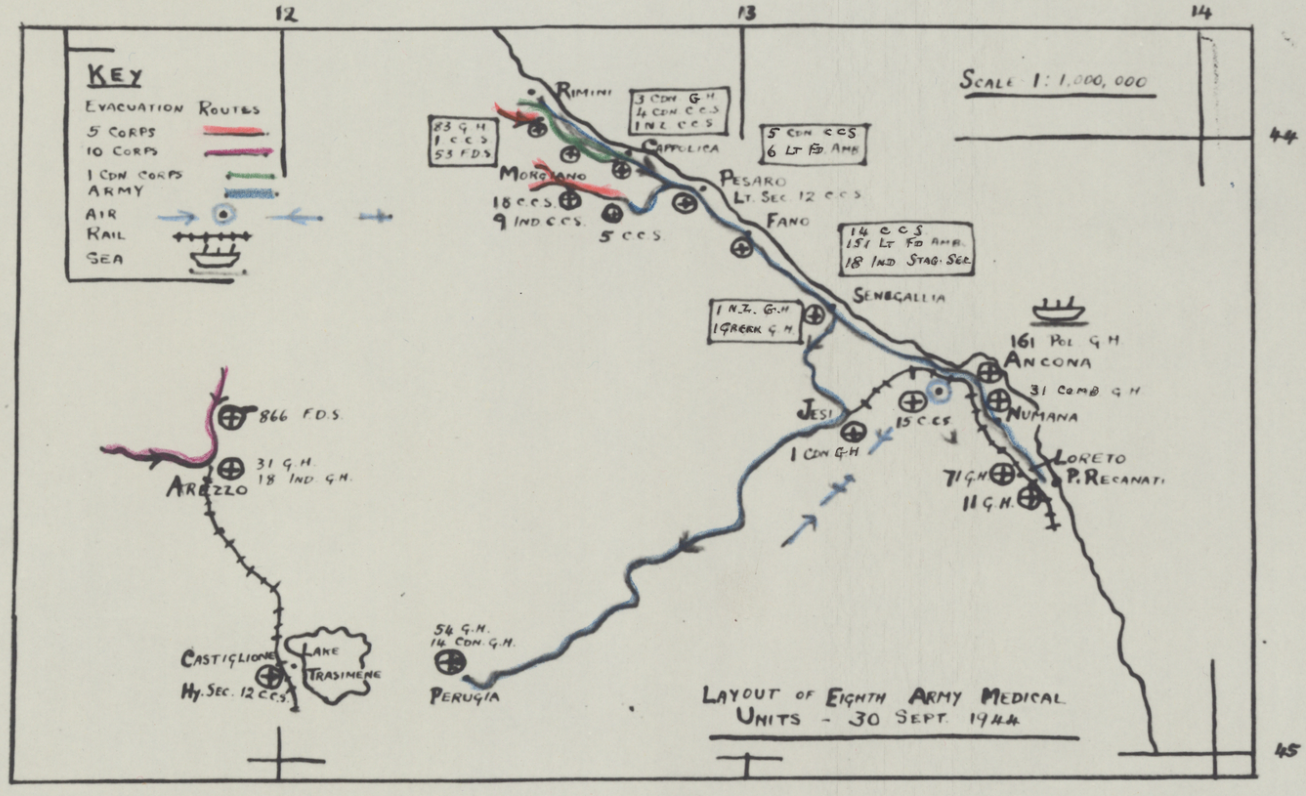
AUSTRALIAN WAR MEMORIAL
AWM2022.7.120

LAYOUT OF EIGHTH ARMY MEDICAL UNITS

25 AUG. 1944

APP. 3



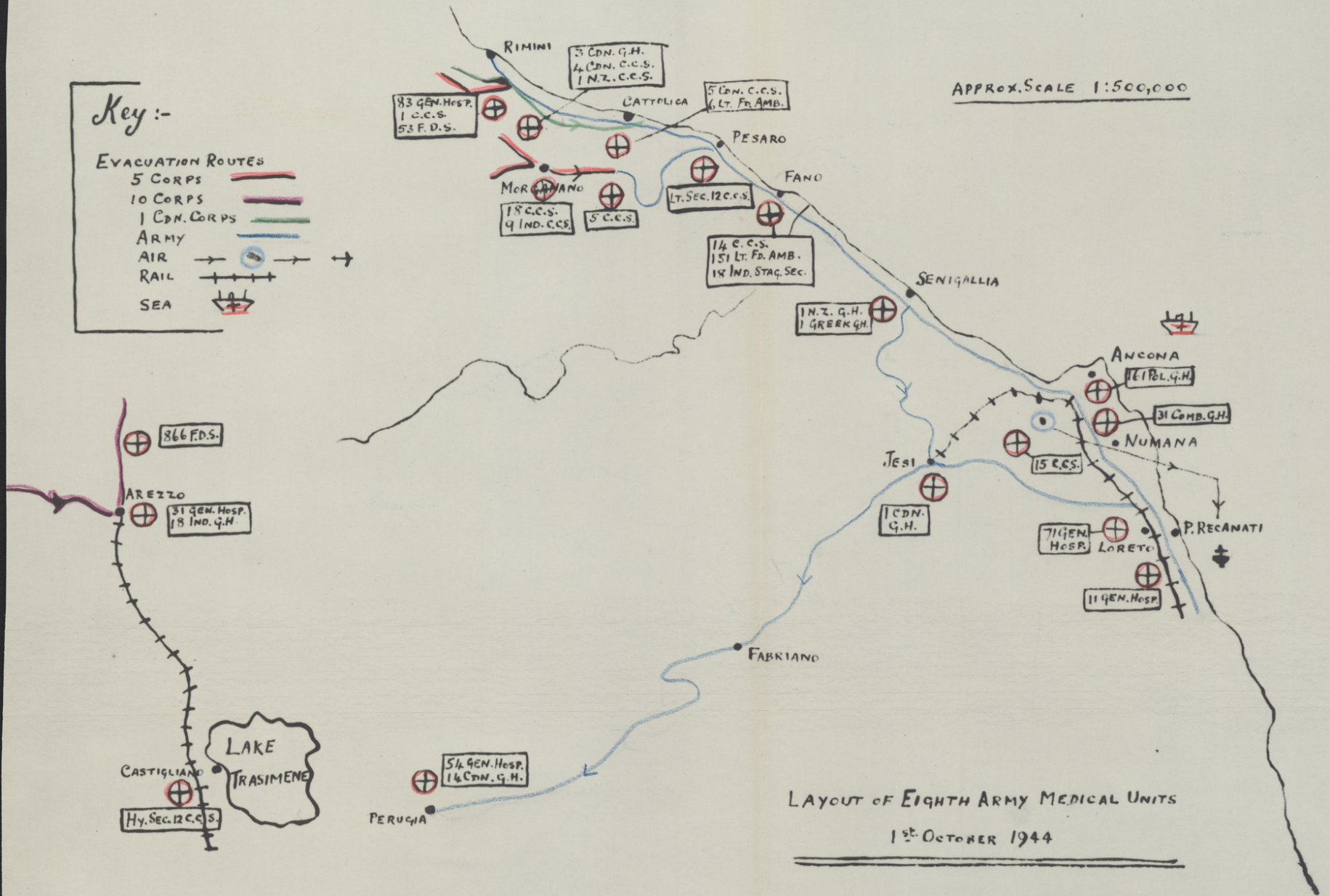

12
13
14
44
45
KEY
EVACUATION ROUTES
5 CORPS
10 CORPS
1 CDN CORPS
ARMY
AIR
RAIL
SEA
SCALE 1: 1,000,000
RIMINI
3 CDN G H
4 CDN C C S
INL C C S
83 G H
1 C C S
53 F D S
CATTOLICA
5 CDN C C S
6 LT FD AMB
MORCIANO
18 C C S
9 IND C C S.
5 C C S
PESARO
LT. SEC 12 C C S
FANO
14 C C S
151 LT FD AMB.
18 IND STAG: SEC.
SENIGALLIA
1 N.Z. G.H
1 GREEK G H
161 POL G H
ANCONA
31 COMB G H
NUMANA
JESI
15 C C S
1 CDN G.H
LORETO
P. RECANATI
7 I G H
11 G.H.
866 F.D.S
31 G.H.
18 IND G.H.
AREZZO
CASTIGLIONE
Hy. SEC. 12 C.C.S.
LAKE
TRASIMENE
54 G.H.
14 CDN. G.H.
PERUGIA
LAYOUT OF EIGHTH ARMY MEDICAL UNITS - 30 SEPT. 1944

App. IV

21

17

APP. I.



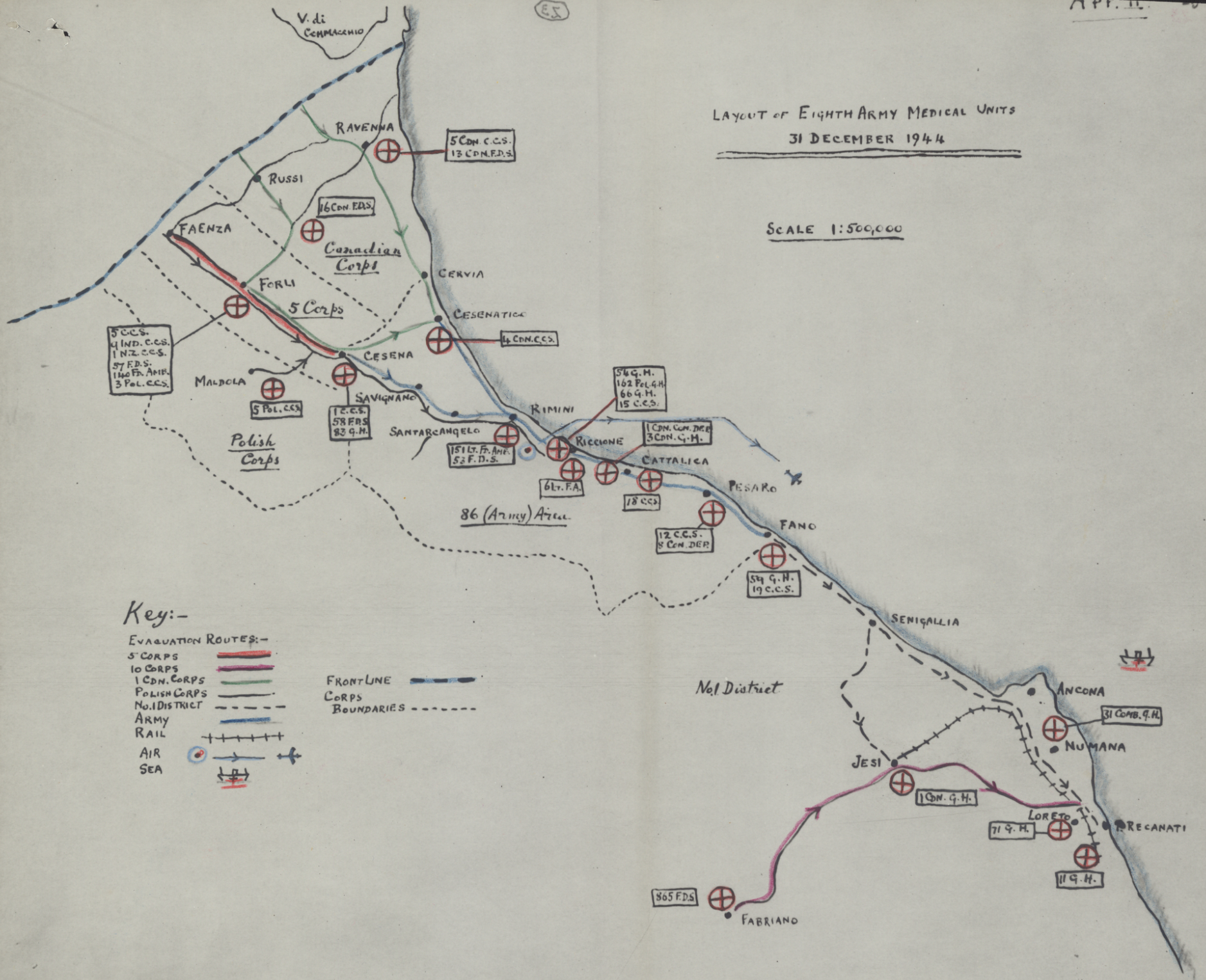
LAYOUT OF EIGHTH ARMY MEDICAL UNITS

1st OCTOBER 1944

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

AUSTRALIAN WAR MEMORIAL

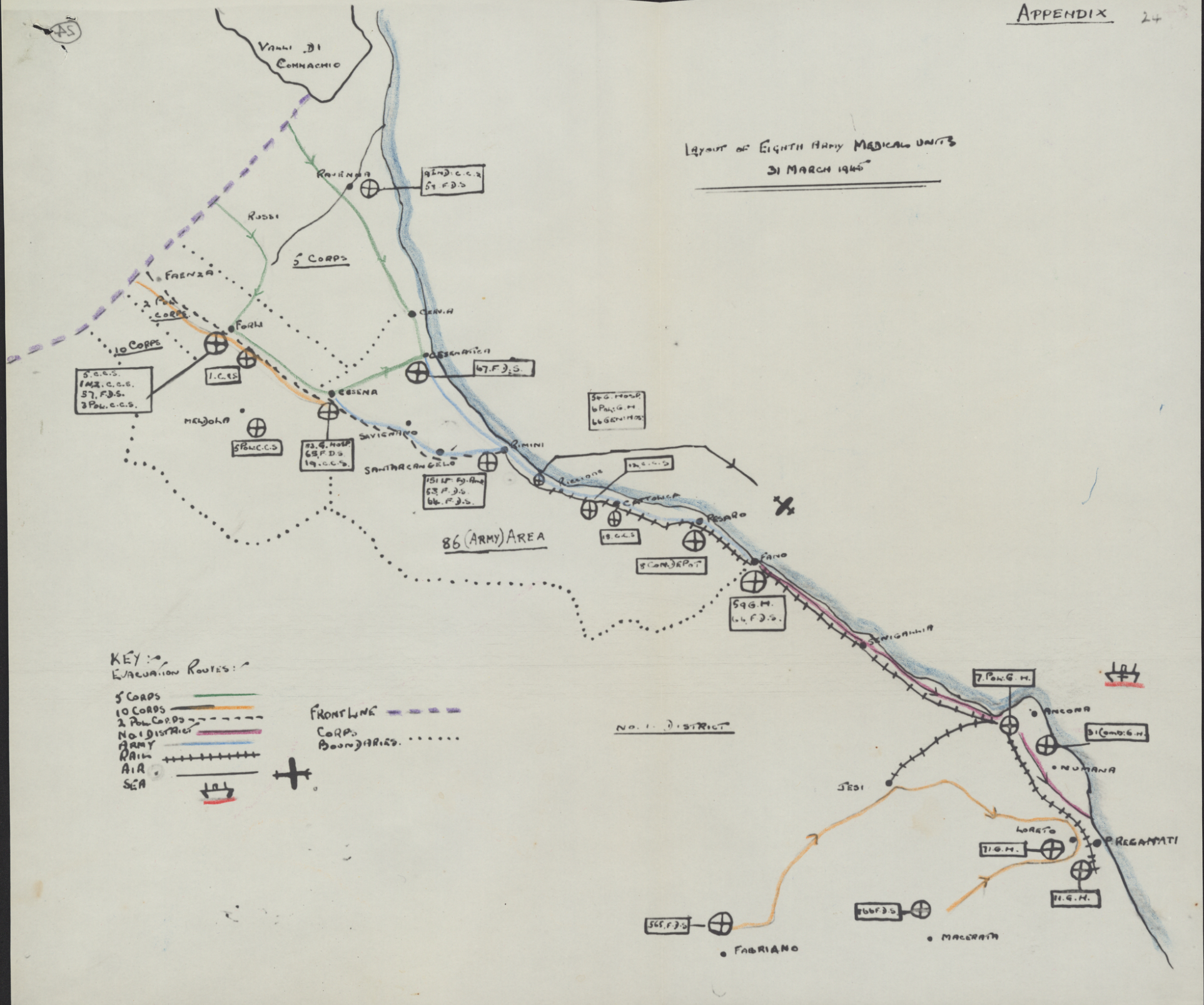
AWM2022.7.120



AUSTRALIAN WAR MEMORIAL
AWM2022.7.120

23

AUSTRALIAN WAR MEMORIAL AWM2022.7.120



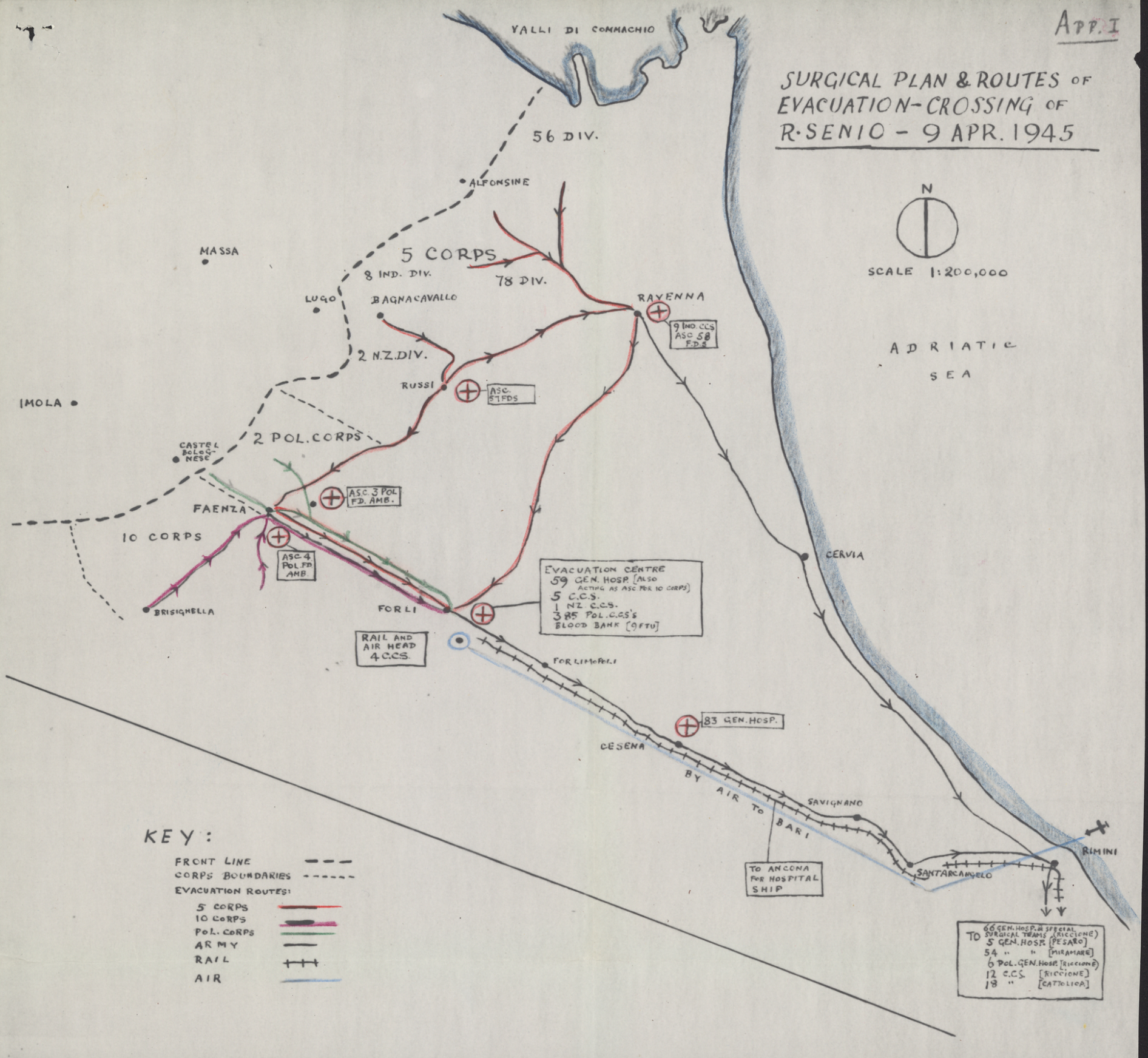
LAYOUT OF EIGHTH ARMY MEDICAL UNITS
31 MARCH 1945

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP. I

SURGICAL PLAN & ROUTES OF EVACUATION - CROSSING OF R. SENIO - 9 APR. 1945



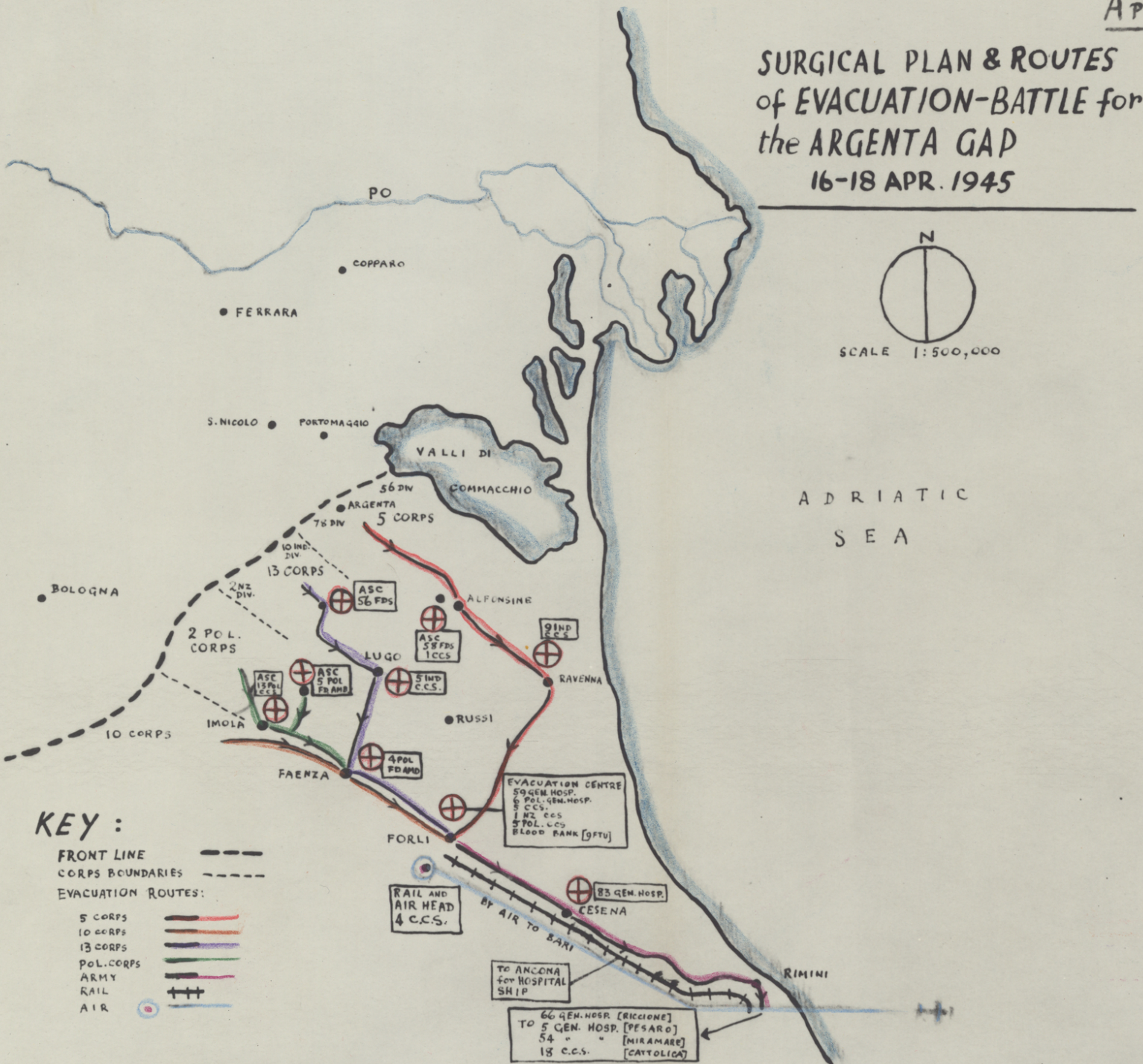
AUSTRALIAN WAR MEMORIAL AWM2022.7.120

25

APP. II

26 ds

SURGICAL PLAN & ROUTES of EVACUATION-BATTLE for the ARGENTA GAP 16-18 APR. 1945

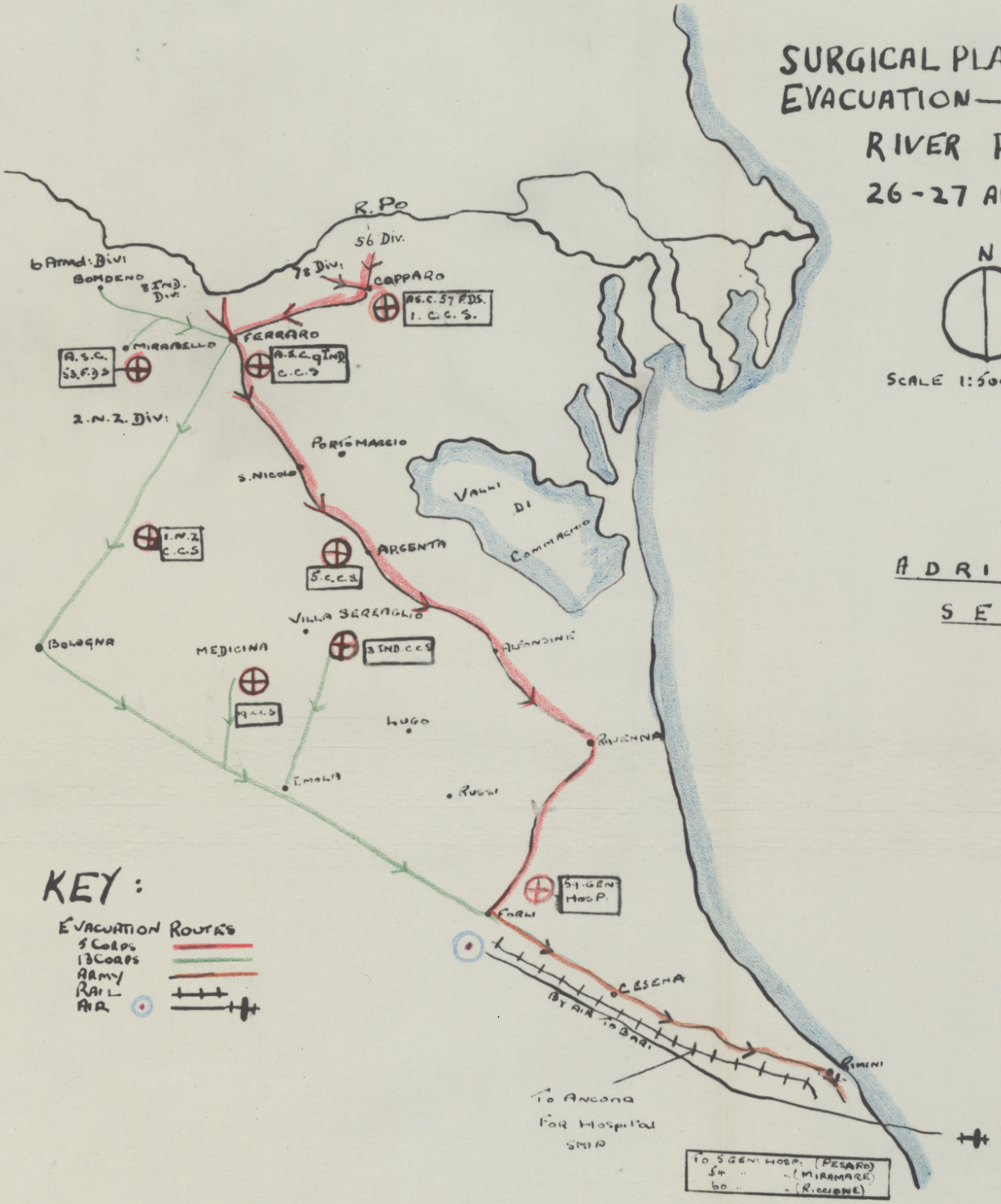


AUSTRALIAN WAR MEMORIAL AWM2022.7.120

AUSTRALIAN WAR MEMORIAL
AWM2022.7.120

APP. III

SURGICAL PLAN & ROUTES OF EVACUATION — CROSSING OF RIVER PO — 26-27 APRIL 1945

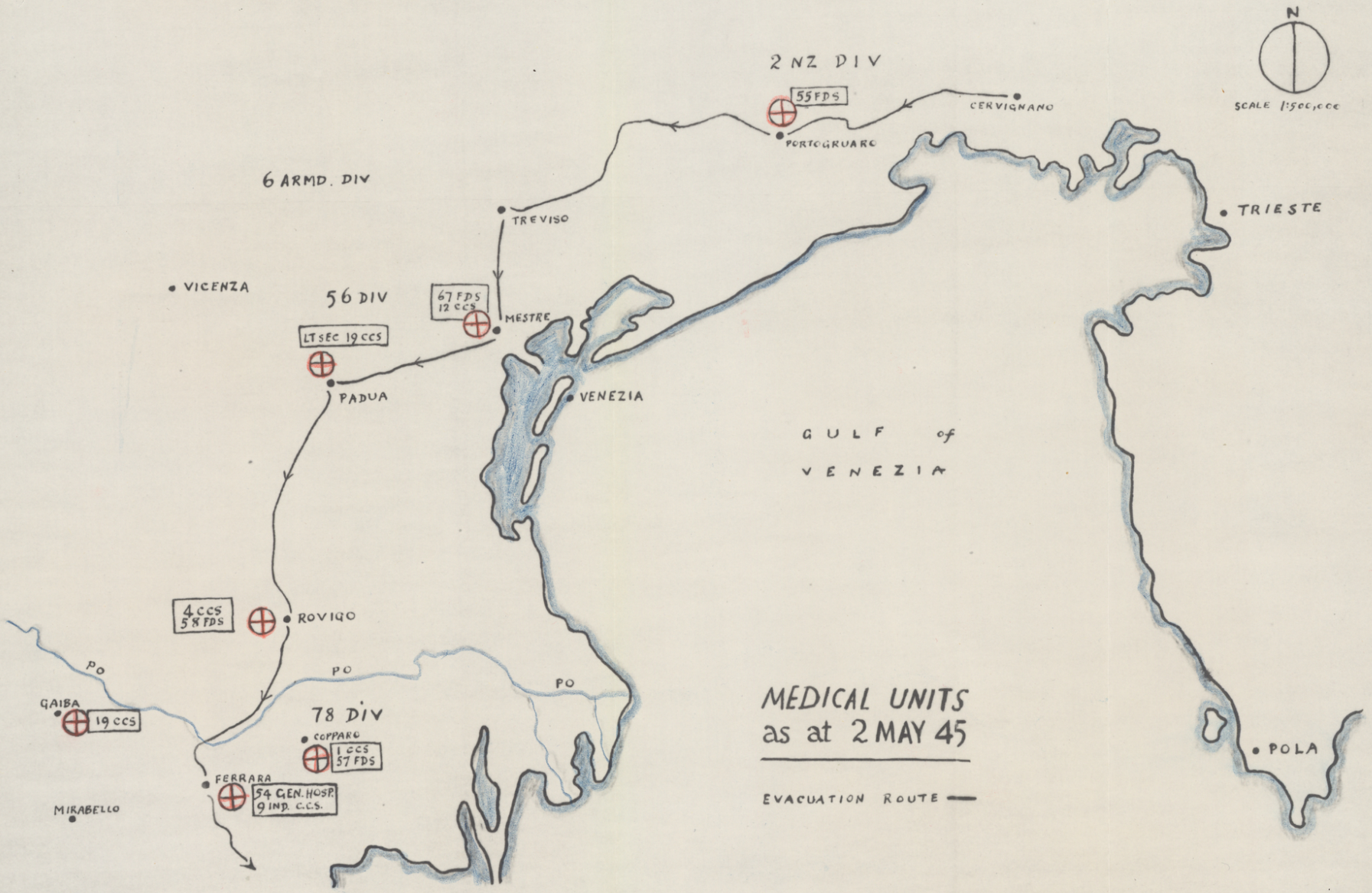


AUSTRALIAN WAR MEMORIAL AWM2022.7.120

AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP. IV

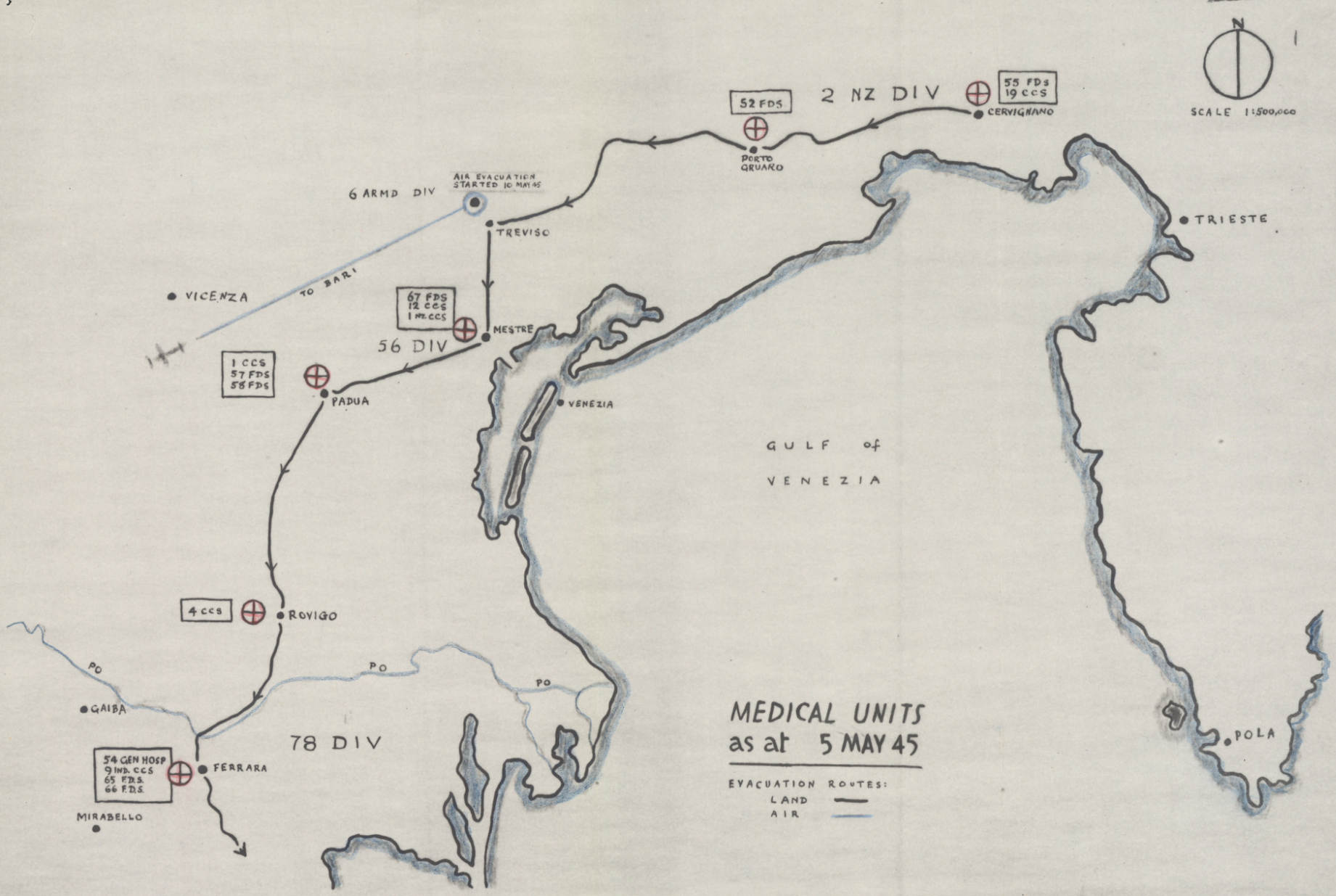
28



AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP. V

29

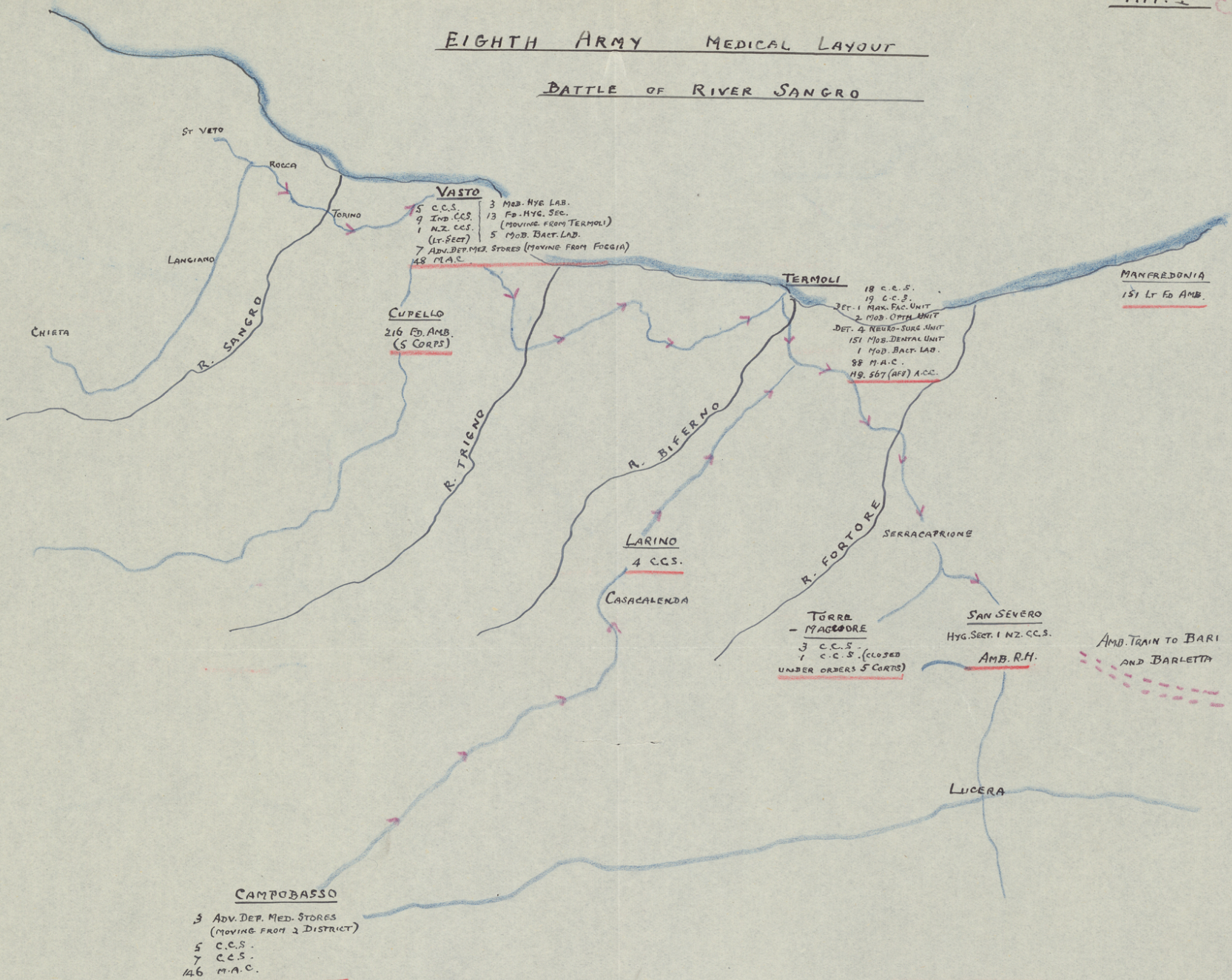


AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP: I

EIGHTH ARMY MEDICAL LAYOUT

BATTLE OF RIVER SANGRO



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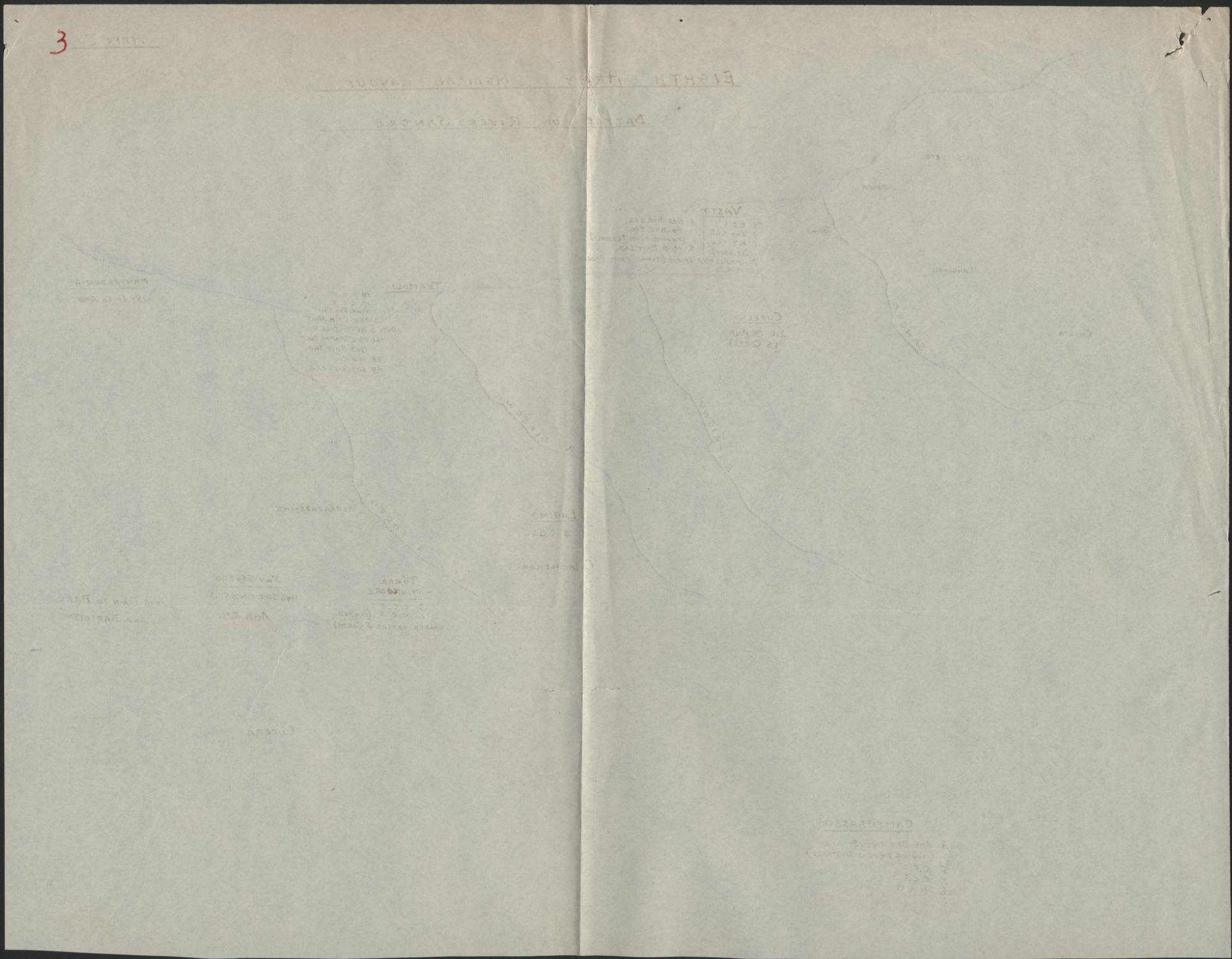
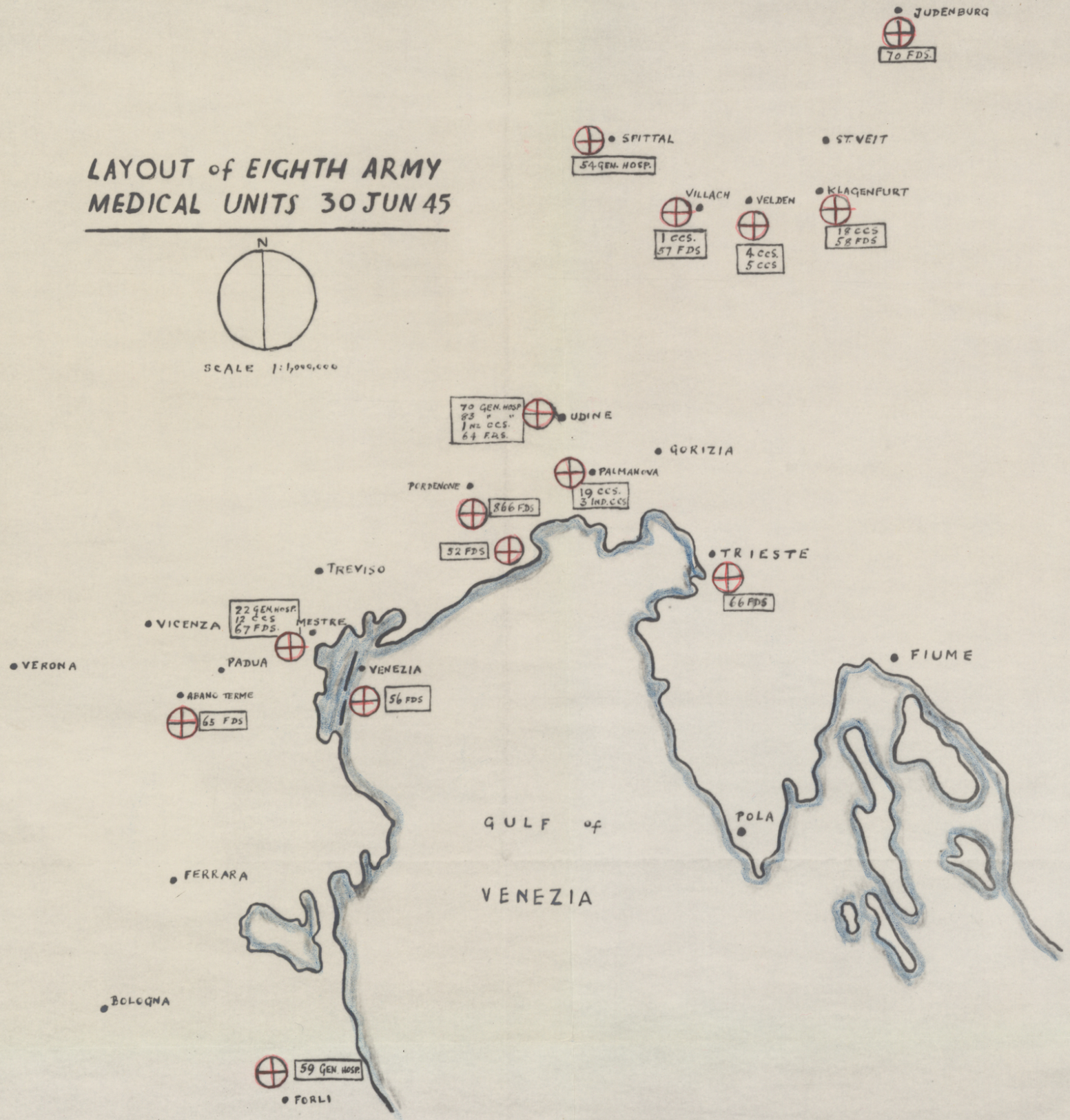


AUSTRALIAN WAR MEMORIAL AWM2022.7.120

APP. VI

LAYOUT of EIGHTH ARMY MEDICAL UNITS 30 JUN 45



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AUSTRALIAN WAR MEMORIAL
AWM2022.7.120

WAR OF 1939-45
Received from:
Medical Historian
Class. No. 624/5/6
Index
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AWM2022.7.120